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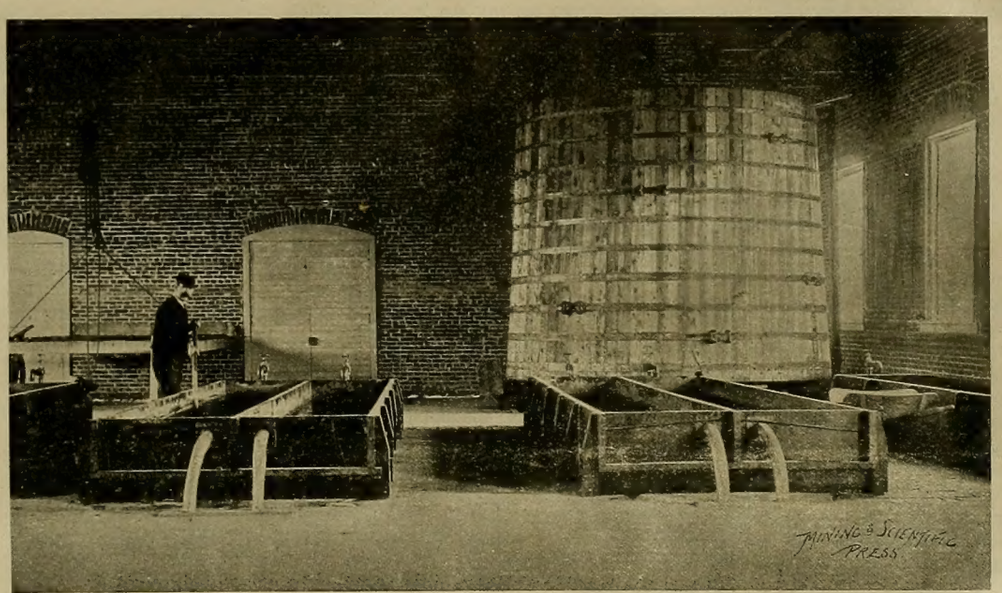
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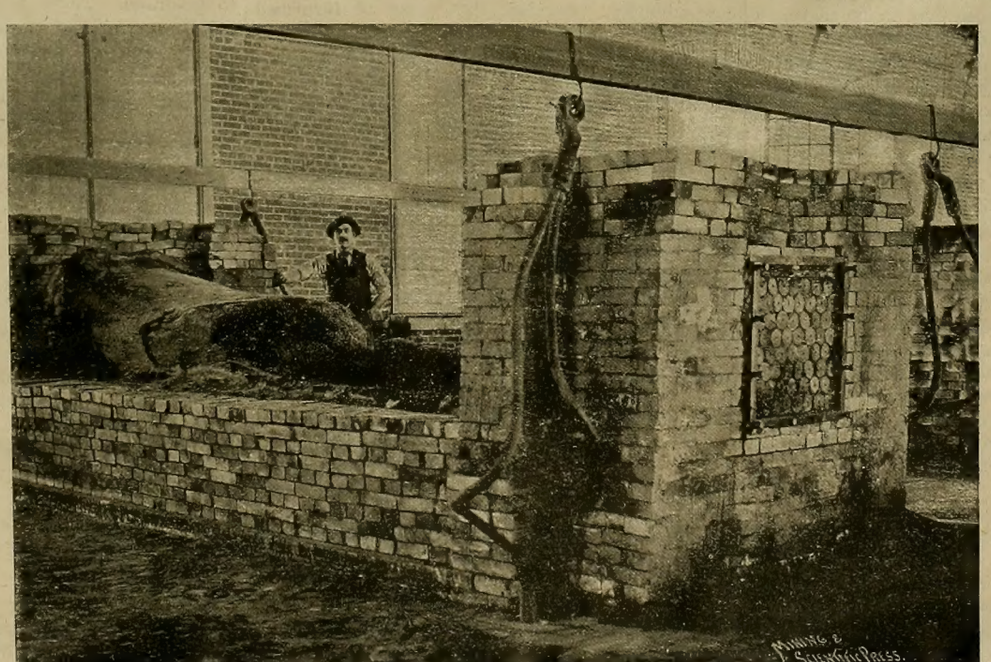
VOLUME LXXII. Number 1. SAN FRANCISCO, SATURDAY, JANUARY 4, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

## Manufacture of Carborundum.

Carborundum, the new abrasive, is now being turned out in greater quantities than ever before, at a factory at Niagara Falls. Carborundum was discovered in 1891 by E. G. Acheson, who for several years had been on the lookout for some method of crystallizing carbon, as he recognized that such a material would prove of great value as an abrasive. In 1890, when he became associated with an electric lighting company in Monongahela City, Pa., he had opportunity of carrying out experiments. In his first experiment he used an iron bowl lined with carbon and filled with a mixture of carbon and clay, in which a carbon rod was introduced. The bowl and carbon rod served as electrodes, by means of which a current sufficient to fuse the mixture was supplied, the object being to cause the carbon to be dissolved in the melted silicate of alumina, and by cooling the same to the point of solidification, cause the contained carbon to crystallize. When the current rent was applied and the mixture heated up, a violent chemical reaction appeared to take place. When cooled down the mass was carefully examined, with the result that a few bright-blue crystals were found. These crystals were carbide of silicon, or, as they are called commercially, carborundum. The latter name is made up from carbon and corundum, as it was supposed before a chemical analysis was made that carborundum was a compound of carbon and alumina.



TANKS USED IN THE MANUFACTURE OF CARBORUNDUM.



FURNACE AT THE CARBORUNDUM FACTORY AT NIAGARA FALLS.

The manufacture of carborundum, as now carried out at Niagara Falls, is as follows: The materials used are coke, sand (which is very rich in silicon), salt and sawdust, the two latter being used to facilitate the operation of the furnace. These are mixed in proper proportions and introduced into the furnaces, which are of brick built up into four walls so as to form a kind of rough brick box, no mortar or cement of any kind being employed. In the center of each end wall of the furnace is a large bronze plate, to which are connected the cables carrying the current. When complete the internal dimensions of a furnace are about 15 feet long, 6 feet wide and 5 feet high. Connecting with the inner surface of each plate are sixty carbon rods, each of which is about 30 inches long and 3 inches in diameter. The rods project through the walls of the furnace and form the terminals. When the furnace has been built up in this way mixture is introduced, about ten tons making the charge. Through the center of the mixture a core formed of small grains of coke is built, and this serves to form a continuous electrical connection between the terminals. When the current is turned on, the core is soon raised to a high temperature. About an hour after the application of the current, carbon monoxide gas is given off freely and when a lighted match is applied, this burns with the well-known lambent, blue flame and envelops the whole furnace. The current is kept on for about twenty-four hours and then the furnace is allowed to cool down, after which it is opened. When this is done it presents an appearance beautiful in the extreme, the core being surrounded by a cylinder of beautiful carborundum crystals varying in color from yellow to violet. The crystals in immediate contact with the core are in one solid mass; as the distance from the core is increased, the size of the crystals rapidly diminishes, until at about fifteen inches all crystallization ceases and an amorphous material is encountered, of a whitish gray color, for a distance of two inches, when suddenly a black mass, composed of the original mixture, now held together in a cemented state by the fusion of the salt, is met with. The crystalline and amorphous material, lying between the core and the outer black mass, is carbide of silicon. About two tons of carborundum are produced in one run. It is at once noticed that the core is changed in appearance; it now has a somewhat metallic luster, all impurities have been driven off and a very pure form of graphite remains. This may be an important by-product of these furnaces. The presence of graphite denotes that the temperature, when the current was on, must have been nearly 7000 degrees, which is the point of graphite formation. The makers of carborundum, however, take pains to keep the temperature of their furnaces under 7000 degrees, care being taken that it does not run too high, as carborundum is at its best when the furnace work is done between 6000 and 7000 degrees.

The product of the carborundum furnaces at Niagara Falls has been a thorough surprise to the

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J. F. HALLORAN.....General Manager

San Francisco, January 4, 1896.


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discoverer and all others interested in the plant. The yield of the furnaces has been most pleasing, and in some of them truly magnificent crystals, three-quarters of an inch across, have been found; the largest ever produced in the furnaces at Monongahela City never exceed one-quarter of an inch.

To prepare the carborundum crystals for commercial use they are ground down in a mill, treated with sulphuric acid to remove impurities, washed, sifted, and stored away to be sold in the form of powder for diamond polishing, lens grinding, etc., or made up into various forms, such as wheels, hones, slips, files, rub stones, knife sharpeners, scythe stones, and other articles.

The current for furnaces at Niagara Falls is supplied from the Niagara Falls Power Company's dynamos, and comes to the factory by an underground cable at a potential of 2200 volts. In the transfer room at the carborundum factory, the potential is reduced to 185 volts. When the current is first turned on, it is regulated to the full voltage. After about two hours the resistance of the furnace has become reduced sufficiently low to take a current of about 3000 amperes at this voltage. When this point is reached the regulation is carried on carefully, so that as the resistance of the furnace decreases, the potential of the current is reduced sufficiently to keep the supply of energy to the furnace at about 746 kilowatts. The dimensions of the core of the furnace are so adjusted that when the current reaches about 7000 amperes, and the regulation can be carried no further, the resistance of the furnace has become constant. This constant state is reached about four hours after starting, and for the remaining twenty hours the furnace is supplied with a current of about 7000 amperes at a potential of 105 volts.

Not long ago an interesting experiment of the grinding qualities of carborundum was made by a large iron firm in this country. A large roll of iron was nearly half an inch out of the true, and under ordinary circumstances it would have been recast, as the labor of grinding it down by means of emery would have been too great. It was thought that it offered an excellent opportunity to put carborundum to a really severe test, so the mineral was used to turn up the roll. The result was satisfactory, for it was found that the work was done in just one-twelfth of the time that would have been ordinarily required.

It is interesting in this connection to note that while the primary value of carborundum is found in its industrial uses, it is none the less worthy to be placed among our jewels, for this beautiful application of electricity has resulted in developing a gem possessing the colors of all gems and the hardness and refractive powers of the diamond.

The carborundum furnaces as they stand at Niagara to-day are the greatest power consumers in the world. At a given signal 1,000-horse power of electrical energy is turned into the granular core already referred to, and there within a space of 9 feet long and 21 inches in diameter, which is the size of the core, it is converted or transformed from electrical to heat energy—a remarkable amount of work to be performed in so limited a space.

Our engravings on the preceding page give a good idea of the tanks and furnace used in the manufacture.

## Some Recent Rulings.

Secretary of the Interior Hoke Smith has issued a circular which, among other things, says:

"Paragraphs 32, 50 and 51 of the United States Mining Laws and Regulations Thereunder," approved December 10th, 1891, are amended to read as follows, viz:

32—This affidavit should be supported by appropriate evidence from the mining recorder's office as to his possessory rights, as follows, viz:

Where he claims to be the locator, or a locator in company with others who have since conveyed their interest in the location to him, a full, true and correct copy of such location notice should be furnished, as the same appears upon the mining records; such copy to be attested by the seal of the recorder, or if he has no seal, then he should make oath to the same being correct as shown by his records. Where the applicant claims as purchaser, a copy of the location record must be filed under seal or upon oath as aforesaid, with an abstract of title, under seal or oath as aforesaid, brought down to date of filing the application, tracing the right of possession by a continuous chain of conveyances from the original locator to the applicant, also certifying that no conveyances affecting the title to the claim in question appear of record other than those set forth in the accompanying abstract. The abstract therein required may be certified to by the proper recorder or by any abstractor or abstract company duly authorized by State or Territorial statute, if abstracts so certified by abstractors or abstract companies are, by statute, receivable as evidence in the courts of such State or Territory, in the same manner and to like extent that abstracts certified by the recorder are now admitted; provided, that proof be furnished that the abstracts so certified by abstractors or abstract companies are receivable as evidence in the courts as aforesaid.

50—The rights granted to locators under Section 2322, Revised Statutes, are restricted to such location on veins, lodes or ledges as may be "Situated on the public domain." In applications for lode claims where the survey conflicts with a prior valid lode claim and the ground in conflict is excluded, the applicant not only has no right to the excluded ground, but he has no right to that portion of any vein or lode the top or apex of which lies within such excluded ground, unless his location was prior to May 10th, 1872. His rights to the lode in its onward course or strike, intersects the exterior boundary of such excluded ground and passes within it. The end line of his survey should not, therefore, be established beyond such intersection.

51—Where, however, the lode claim for which survey is being made was located prior to the conflicting claim and such conflict is to be excluded, in order to exclude all ground not so excluded the end line of the survey may be established within the conflicting lode claims but the line must be so run as not to extend any farther into such conflicting claims than may be necessary to make such end lines parallel to the other end lines and at the same time embraced the ground so held and claimed. The useless practice in such case of extending both the side lines of a survey into a conflicting claim, and establishing an end line wholly within it, beyond a point necessary under the rule just stated, will be discontinued.

A protestant who seeks to defeat an application for a mineral patent will not be heard to set up the rights of third parties for his own benefit.

In the absence of an adverse claim asserted within the period of publication, the department is warranted in the assumption that no such claim exists.

Questions arising on the applicant's defeat of title are solely between the government and the applicant, and cannot be raised by a protestant who sets up a specific abstract but has no adverse claim within the statutory period.

There is no authority for the amendment of a patented entry for the benefit of a transferee.

Where a petition is addressed to the General Land Office asking for a suit to set aside a patent, the matter should be reported to the department with an expression of opinion as to the advisability of ordering a preliminary hearing.

A lode or vein within a placer claim, and known to exist at the date of the placer entry, is, by the terms of the law, excepted from the operation of the placer patent, and a lode patent may be thereafter issued for the excepted lode or vein upon proof of the proper compliance of the law.

The United States should not attack its own patents, duly and regularly issued, without clear and convincing evidence that fraud was used in procuring their issuance.

THE following is from the Denver *Republican:*

People should look out for the reports on the outputs of California and Colorado for the year 1895. It will not be long after the opening of the new year before they are issued, and it is expected by Colorado people that this State will be shown to be in the lead in gold production. California has held the place of honor so long that the public has been led to believe that no other State could surpass it. If Colorado takes the lead it will set the whole world to talking about our gold resources.

In answer the Salt Lake *Tribune* says: "California has many Cripple Creeks. She has a great mother lode which extends nearly half the length of the great State, that is filled with ore chutes, which, up to date, whenever found, have never failed; further, as they go into the deep, they broaden out until they seem more like quarries than like veins. She has, outside the mother lode, innumerable quartz veins, and Colorado will never equal her in production unless new discoveries beyond anything yet found shall be made. We published yesterday a half-sneering article from the Denver *News* repudiating the figures of the comparative products of Utah, Colorado and Montana, but neglected one most important factor. Near Denver are some of the most extensive smelting works in the world. They receive ores from Utah, Nevada, Idaho, Montana, Arizona, New and Old Mexico, and reduce them, and the product of that reduction is, we believe, always credited to Colorado. There is no doubt about Colorado being a magnificent mining State, but when it begins to repudiate the figures of other States, it is well enough to have the truth told, because the truth ought not to hurt any one."

THE holidays being over, the real work of Congress begins. Our California delegation, if united and persistent, can do considerable toward securing the appropriation asked for to improve the Sacramento and Feather rivers. A commission of U. S. engineers, after mature and intelligent consideration of the subject, twice reported officially to Congress recommending an appropriation of $300,000 to begin the work outlined in their plan of reclamation. It is a necessary internal improvement, as needful at least as other improvements for which the Government has applied millions. California has poured millions into the Federal treasury, has long been neglected in the way of appropriations, and can justly claim the receipt of the small amount asked as an integral part of the nation in work immediately necessary in the broadest sense to the nation's prosperity.

IT is evident that the revival of the mining industry means much for the manufacturers of mining machinery. In no department of mechanical industry is the horizon broader. The demand for improved machinery is a growing one, and, if for a time suppressed, is sure to arise again like a hidden stream, with greater force than ever.

FROM several districts come reports of "jumping" and disputes about claims, customary at this time of year, but noticeably more numerous than usual, indicating the increased activity and appreciation. As in questions of title, so in these instances, no miner is ever bothered by adverse claims till his property proves valuable.

## Concentrates.

THE Mono Mining Co. has levied an assessment of ten cents.

THE Thistle mine near La Porte, now employs about 100 men.

UTAH to-day becomes the forty-fifth State of the American Union.

THE trial of the cyanide patent cases in South Africa begins February 15th, '96.

AT the Esperanza mine, Calaveras Co., the 5-ton chlorination plant will be finished May 1st.

THE new plant of the Katie Mining Co., at Basin, Montana, includes a 500-ton concentrator and a smelter.

DE LAMAR, Lincoln Co., in the southeastern part of the State, is now the liveliest mining town in Nevada.

ALL work on the Green Mountain mine in Plumas Co. was suspended last week, the men paid off and discharged.

THE machinery for the electric milling plant to be put up at Kennedy, Nevada, by the New Era company, has arrived there.

THE Alder Creek Gold Mining Co., of Placerville, Idaho, has filed articles of incorporation, fixing its capital stock at $1,000,000.

THE Rand, South Africa, gold output for November was 195,218 ounces, making 2,099,207 ounces for the first eleven months of '95.

THE De Lamar, Idaho, Mining Co. made a profit of $34,690 on its November operations, 3,236 tons of ore yielding $57,495 bullion in the mill.

THE Northwest Mining Association will have a convention of its second vice-presidents, 300 in number, at Spokane, Wash., on February 22d.

BUTTE, Montana, and Boise, Idaho, now propose each organganizing a mining exchange. Colorado has nine mining exchanges and Pueblo talks of the tenth.

THE old buildings of the Colville, Wash., smelter are being taken down, thus removing the last vestige of a smelting plant from which so much was once hoped.

THE net earnings of the Anaconda, Montana, Mining Co. from February 1, 1891, to June 30, 1895, were $10,147,555.01. So certifies the accountant of the company.

SUPERINTENDENT POWER of the Golden Reef Mining Co., Billings, Montana, is running a 1500-foot tunnel this winter, and will build a 500-ton plant next summer.

SIXTEEN DOLLARS per foot is the contract price paid by the Montana Ore Purchasing Co. to R. J. Filce to sink 150 feet on the Maggie mine, at Camp Creek, Montana.

THE mining bills introduced in the House of Representatives by Congressman Johnson last week were introduced in the Senate last Monday by Senator Perkins.

THE Boise, Idaho, assay office estimates the total mineral product of the State for '95 at: gold, $2,700,000; silver, $5,000,000; lead, $3,000,000, an increase over '94 of $906,940.

THE Anaconda mine at Butte, Mont., emulates the Comstock of former years in the amount of timber it swallows, requiring an average supply of 160,000 feet per day.

AT the annual meeting of the Cassel Gold Extraction Co., Lt'd., in Glasgow, on December 11, '95, the chairman reported a profit for the year of £33,146 8s 5d. A dividend of 5% was declared.

THE Winnemucca, Nev., *Silver State* says John Taylor, who recently struck a ledge of antimony in his mine at Bloody canyon, between Unionville and Star, has shipped a carload of ore to New York city.

STATE MINE INSPECTOR JEFFRIES of South Dakota in his annual report to the Governor places the gold output for that State at $3,500,000 for 1894, $5,000,000 for 1895, and estimates a yield of $7,000,000 for 1896.

J. M. DAY of Redlands, Cal., who is half owner of the Golden Chariot mine, near Perris, says that thirty-five feet of drifting on the ledge from the bottom of the shaft justifies the purchase of new machinery.

IN '95 Russia employed in her mines 250,000 men, and produced gold to the value of 43,800,000 rubles; silver, 3,500,000; platinum, 3,800,000; iron, 63,000,000; coal oil, 35,000,000; salt, 9,000,000; coal, 49,000,000.

THE Richmond Con. Mining Co., at its annual meeting reported that during the year 458 ounces of gold and 17,990 ounces of silver were produced, principally by tributors, the proceeds being $27,515. A dividend of 2s per share was declared.

THE San Francisco Stock Exchange has decided to list gold mining stocks, and suspend article 3 of the by-laws for 12 months, which is to the effect that a fee of $500 shall be charged for placing mining stock on the regular list of the board.

ABOUT thirty Comstock miners who are out of work have chartered a box car in which to go to Cripple Creek. The car will be fitted up with bunks and cooking apparatus, cabin fashion. In this way the men expect to make the trip for about $12 each.

THE increase in the amount of prospecting in '95 is illustrated by a Leadville, Col., paper, which shows by a complete printed list that in '95 to December 22 in Lake county 1493 mineral locations were made, more than double the aggregate of '94.

NEVADA'S estimated mineral output for '95 aggregates $6,000,000, an increase of three-quarters of a million over '94. Recent gold discoveries at Buckeye, Pine Nut and Dayton, in the western part of the State, indicate a doubling of last year's yield in '96.

REGARDING the gold output of the Yukon, Alaska, for '95, Capt. Hayes of the steamer Bertha estimates it at $750,000, and says most of the 200 men he brought down from there last October will go back again next spring. They had about $200,000 in gold, which was sent to this city.

THE fact that the Alaska-Treadwell Co. clears $600,000 annually from ore running $3.72 to the ton, is a good practical illustration of what economical business methods, even in far-off Alaska, can do with large quantities of low-grade ore. It is now being handled at a total cost of $1.20 per ton.

OWNERS of unpatented mining claims who put the required amount of work or improvement on the claim in '95 have until the 31st inst. to file the necessary affidavit. This affidavit may not be required, but it is better to make it, as it is ready and legal proof that the work was done on the claim.

THE coinage at the San Francisco U. S. Mint in 1895 was as follows: Double eagles, $22,870,000; eagles, $490,000; half eagles, $560,000; standard dollars, $400,000; half dollars, $554,043; quarter dollars, $441,170; dimes, $112,000; total, $25,427,213; being $2,550,000 greater than the aggregate of '94.

ON the 12th ult., the Consolidated Goldfields of South Africa announced the striking of a reef at a depth of 1,125 feet in the Simmer and Jack mine, with regularity of width and value. All the first row deep levels shafts are now claimed to have struck the reef and established the value of the ground.

FOR the week ending November 28, '95, in the Broken Hill Proprietary, Australia, 5884 tons of ore were treated, yielding 452 tons of lead, containing 135,064 ounces silver; 993 tons treated by amalgamating and leaching plants producing 14,941 ounces silver, also 56,842 ounces silver produced from matte during half a year.

IN '95 Colorado's gold output exceeded in value that of silver. A Denver estimate places the year's yield as follows: Gold, $14,340,495; silver, $14,259,049; lead, $395,114; copper, $877,492; total, $32,772,150. For '94 the output was: Gold, $11,235,506; silver, $14,721,751; lead, $3,268,613; copper, $767,420; total, $29,993,290.

SOMETHING is always lacking. The Salt Lake, Utah, *Tribune* says: "If we had four or five men who possessed the nerve of some Colorado mining men, and some reporters who possessed the gall of the ordinary Denver reporter, neither Cripple Creek nor South Africa would be in it by comparison with our own Mercur district."

THE Supreme Court of this State has decided that a laborer's lien cannot be enforced against the property of a corporation unless the employment be for wages "due weekly or monthly, on such day in each week or month as shall be selected by such corporation." According to that no lien exists as to laborers employed by the day.

THE South African Mining Department has issued a statement of revenue derived from the various gold fields of that republic for the first nine months of '95, showing that the total amount received by the government, after repayment of private owners' dues, was £1,142,252, an increase of £410,996 as compared with the corresponding period of 1894.

THE same statement is made about the Utica mine in this State and the Independence mine in Colorado, viz: that the owners of each mine have refused offers of $6,000,000 for their several properties. In each case, also, the same answer is said to have been given: "Why should we take $6,000,000 for the mine when there is $10,000,000 in sight?"

THE total output of Leadville, Col., last year was about $12,000,000, of which about $2,000,000 is gold. The number of men engaged in mining, hauling and smelting ore as compiled from official returns from superintendents of the various properties shows miners and mine laborers, 2716; smelter hands, 800; haulers, 300. Total, 3816, an increase of 785 over 1894.

WELLS, FARGO & CO.'S statement of the mineral product of Utah for 1895 shows a total export value of $8,312,352. The total includes the following items: 2,164,757 pounds of copper at 7 cents per pound, $151,532; 70,762,249 pounds unrefined lead at $42 per ton, $1,486,427; 8,223,804 ounces fine silver at 65.25 cents per ounce, $5,366,032; 64,418 ounces fine gold at $20 per ounce, $1,308,360.

THE Telluride, Col., *Journal* says that a good, hard-rock miner does not have to lie idle a moment longer than he desires in that camp. The Smuggler, Union and Silver Pick are both putting on men and paying current wages. Saw Pit will be in condition to use more men as the mines open up, and although not a second Cripple Creek, good miners are in demand in San Miguel county.

W. H. BUSH, of Denver, has a big scheme to run a 12,000-foot tunnel from Cripple Creek to a point below the Victor mine. A company has been formed, capitalized at $5,000,000. The tunnel will be ten feet wide, nine feet high, will have a double track tramway, and it is figured will cost $1,000,000. Beneath the highest point over the line the tunnel will be 1589 feet below the surface, and at the end will be 1400 feet below the Victor mine, passing through the richest part of the district.

THE Idaho Mineral Land Commissioners have wound up their season's work. Major Goode and Colonel McLauren have gone to their respective homes in Virginia and Mississippi. A. A. Crane, the other member, will remain in the Cœur d'Alene during the winter. The Commissioners will return to their duties next spring. During the season the Commissioners examined and classified 110,000 acres of land; 90,000 acres had been previously patented to the Northern Pacific.

THE following is the wording of the bill recently introduced by Congressman Shafroth of Colorado: "Be it enacted that the boundaries of all mining claims located after the passage of this act shall be distinctly marked on the ground by substantial square stakes or posts, at least three inches square, set in the earth at intervals of at least 100 feet apart, with the name of the mining claim distinctly written upon that side of the stake or post which faces the claim, and upon the two sides of the corner stakes or posts which face the claim."

THE Northern Mineral Miners' Progressive Union of America, organized at Iron Mountain, Mich., on the 1st of last month, by delegates representing several thousand iron and copper miners of Wisconsin, Michigan and Minnesota. The resolutions adopted indorse the eight-hour system; approve employers' liability as adopted by the American Federation of Labor; demand the election of mine inspectors by the direct vote of the people; ask the governors of the various States to appoint commissioners to examine inspectors as to their competency as master miners; and demand the right to employ their own physicians.

THERE were 112 delinquent mining assessments on companies represented in this city in '95, representing $1,261,216. In '94 the corresponding amount was $1,543,600. Of the 112 assessments for the year, 66 were levied by Nevada mines, 42 by California mines and 4 by Mexican mines. The Nevada mines took $1,068,266 of the total, California mines $171,950 and the Mexican mines $21,000. The assessments in 1895 were the smallest since '84.

THE Fellow Craft Mining Company—directors, J. W. Provard, A. N. Lewis, G. W. Lewis, J. S. Myers of Alameda, and E. H. Cottrell of New York, capital stock, $100,000, all subscribed; the Segregated Consolidated Virginia Mining Company, capital stock, $11,000,000, M. W. Fox, P. J. Savin, R. M. Collins, E. H. Gould and P. H. Andross, directors; the Birney Mining and Development Company, capital stock, $500,000; L. Ayer, J. F Sheehan, S. C. Denson, J. C. Anthony and P. McCarthy, directors, have incorporated in this city.

IN the case of McCowan vs. McKay, 40 Pac. Rep. 602, Montana, it is held that Section 2332 of the revised statutes of the United States, providing that evidence of the possession and working of a mining claim for a period equal to the statute of limitations of the State shall establish a right to a patent, in the absence of any adverse claim, merely authorizes a patent to issue to an applicant who has held for such period, provided no one files an adverse claim in the land office; and does not give one a right to the claim merely because he has worked it for the statutory time without any adverse claim being made.

REGARDING the bill noticed elsewhere as having been introduced in Congress to mark the boundaries of mining claims by stakes at least one hundred feet apart, with the name of the claim marked upon the inner side of each post, Congressman Shafroth, of Colorado, who fathers the measure, says that such an act would make it possible to locate claims without overlapping existing ones, would to a great degree do away with the endless litigation which is now caused by the filing of new claims on blind surfaces, and cheapen the cost to locators who are compelled now to have surveys made in every instance.

THE Silver King, Utah, mine, which has disbursed dividends to the amount of $450,000 and is considered capable of doing it again, is about to file suit enjoining the Alliance, an adjoining mine, from working ground upon which it (the Alliance) has already driven a tunnel, sunk a shaft and run 2,700 feet of drifts. The cause alleged is that the further prosecution of the Alliance work would tap subterranean water courses and flood the Silver King property. It is thought the outcome will be a costly determination of the mutual rights of both parties to the patented ground under the troublesome "laws of apex."

ARIZONA'S mineral output for 1895 is estimated as follows: Gold, $6,200,000; silver, 375,000 ounces; copper, 60,000,000 pounds; lead, 400,000 pounds. A Prescott dispatch says: The gold output for the year was marked by a steady rise of production, and 1896 is expected to double the above figures. The cyanide process is becoming general for secondary treatment of ores. Silver is declining steadily, and nearly all the output is produced in conjunction with gold. With the renewed production of the Old Dominion and New England works at Globe, the application of the sulphuric bleaching process at Clifton, the copper product for next year is expected to reach the hundred million mark.

AT St. Louis, Mo., this week the United States Court of Appeals decided a case that has been in litigation for over eight years, awarding $404,804 to the plaintiffs, M. Billings, J. A. Wood et al. vs. J. C. Wheeler and the Aspen Mining and Smelting Company. The suit was appealed by the defendants from the United States Circuit Court for the District of Colorado. The plaintiffs asked for two-sevenths of the profits of the Emma mine in Colorado, which was worked by Wheeler in 1884, and later was sold by him to the smelting company, in which he was the chief stockholder and president. The mine was productive for a number of years, and is said to be yielding ore yet. The lower court awarded plaintiffs $439,000.

THE Mountain Mines Co. expect to be ready to haul ore from Iron Mountain to Keswick, Shasta Co., next week. The *Free Press* says they now have eight hundred graders at work, but by the time the road is completed the force will be reduced to two hundred, which number will be employed to keep the road open. Numerous slides are occurring daily, and as some of the cuts are over thirty-five feet in depth, considerable trouble from slides is expected with the heavy winter rains. The company is now expending over $50,000 per month, and have already expended $750,000. During the fall months twelve hundred men were employed, and in the month of November one hundred and two carloads of materials and supplies were received over the lines of the Southern Pacific Company.

IN Boise, Idaho, last week, an opinion was filed in the State Supreme Court in the case of W. S. Haskins vs. Curran & Hussey, denying the application for a rehearing. The case is one involving the distinction between a mining bond or escrow agreement and a direct purchase of an interest in such bond or agreement. Haskins, according to the allegations of defendants, purchased their interest in an escrow agreement for $200. He did not pay them, and when he brought suit against them for money advanced, they sought to set up their claim for $2,000 in a cross bill. This was denied them in the District Court in Shoshone county. The Supreme Court reversed it, and a petition was filed for a rehearing. Justice Sullivan says: "The payment of the $5,600 mentioned in the escrow agreement was optional; the payment of the $2,000 mentioned in the appellant's exhibit was not optional, if the averments of the answer are true."

JOHANNESBURG, SOUTH AFRICA, presents a present field of wealth to the makers of gold-mining machinery and plant. Forty-stamp mills, of about 7000 tons crushing power per month, appear to be the general run of crushing machinery erected at the newer gold mines in the Johannesburg district, but many of the older establishments, where the development has proceeded farther, have 100 to 160. Everywhere large expenditure is being incurred in winding and hauling machinery, and plants already erected are being extended all over the Randt. At the new Primrose mine, Johannesburg, machinery equipment is of the first order. The mill engines have been altered to triple expansion, to cope with the increased output, and 160 stamps are in operation. The crushing at this mine amounts to 25,000 tons of gold quartz per month, and its development is gaining on the crushing mill power to the extent of 2000 tons per month. The management are considering the advisability of erecting forty more stamps, which would raise the crushing mill power to 32,000 tons per month.

## Notes on Gold Milling in California.

NUMBER VIII.

By E. B. PRESTON, M. E., Field Assistant State Mining Bureau.*

*Sodium Amalgam.*—As sodium amalgam is frequently added to the quicksilver by millmen, the following method of preparing it is given: Dissolve small, dry chips of clean sodium, freshly cut from a stick, in pure, dry mercury, gently heated in a flask or porcelain dish; add it piece by piece until the mass has attained the consistency of soft putty, which should always be kept dry and well bottled, as it deteriorates rapidly in the air. This preparation is added to the mercury when dressing the plates, and to know when the proper amount has been added, dip a brightened nail into the quicksilver, which will adhere slightly to the edges of the nail if the amount be correct; whereas, if it becomes entirely coated, too much has been used, and more quicksilver must be added; on the other hand, if there be no signs of adhesion, more sodium amalgam must be added.

Nearly all commercial mercury needs cleaning. The handiest way is to digest with dilute nitric acid for twenty-four hours, taking one part of acid to three of water. It retorting foul quicksilver to purify it, the retort should only be half filled and the quicksilver covered with a layer of quicklime or charcoal powder. The heating should then be done very gradually, the retort not being brought to a full red heat.

*Cleaning Up.*—When ready to clean up a mortar, the feed of ore is shut off, and the speed of the stamps reduced until as much of the sand, etc., as possible has been discharged and iron strikes on iron. The battery-water is then shut off, the self-feeder pushed back, the stamps hung up, the splash-board or canvas removed from in front of the screen, and the face of the latter washed off with the hose. The aprons and plates are then scraped, and the aprons, if fixed, covered with planks near the mortar, to protect them while working around the mortar. The keys that hold the screen in place are withdrawn and the screen-frame loosened and slightly raised, permitting the water that is still retained in the mortar to gradually run out; a too sudden raising of the screen-frame from chock-block would cause the water to escape in a body and possibly wash amalgam from the plates. After raising the screen out of the grooves, the chock-block and inside plates are removed and all of them carefully washed over the apron, scraped, and set to one side or removed to the clean-up room for treatment. The sand mixed with ore on and around the dies is taken out by trowels and passed through some other mortar, or retained to place around the dies when returned to the mortar. The dies are broken out of their beds with the help of chisels and crowbars; when the center or end die has been successfully worked loose, the remaining ones are easily taken out, washed, examined for any adhering amalgam (which is scraped off), and placed on the floor, *in the same order* they occupied in the battery, ready to be replaced. The remainder of the material in the mortar is then easily removed, and placed in the clean-up barrel; in small mills it is panned in a water-box provided for the purpose in the clean-up room. In the revolving clean-up barrel, pieces of quartz or old iron, with an additional amount of quicksilver, are added, and the barrel is half filled with water, where it is left revolving for a couple of hours. As all battery sands contain more or less nails and chips of iron and steel, these are removed by a magnet while panning out. The clean-up barrel is discharged through a manhole into a bucket placed over a riffled sluice. The bulk of the quicksilver and amalgam is retained in the bucket, and the overflow passes into the sluice.

After all the sand, etc., has been removed from the battery, the inside is washed out, and any amalgam found adhering to the sides or linings is carefully scraped off with a case-knife and placed with the rest of the amalgam for further cleaning. A bed of dry tailings-sand is then spread over the bottom of the mortar, and the dies *replaced exactly* as they were before. The tappets are then set, plates and screens put in, the feeder replaced, water turned on, and the battery once more started.

The operation of cleaning-up the batteries is performed usually once or twice a month, and in some mills once a week at which time tappets are re-set and any necessary repairs made; also, any shoes that are too thin or broken are knocked from the boss and new ones substituted. As one new shoe in a battery of old ones causes irregular working, it is best to replace all the shoes at the same time, and if any of them are not worn down thin enough to discard, they may be set aside and used to replace a broken one at some future time. The same thing holds good with the dies, for if they are of uneven height they interfere with the regularity of "splash," and the higher die will be pounding iron while the remainder have still a sufficient cushion of quartz.

The amalgam obtained from a clean-up is washed in small batches in the gold-pan, to free it from all sand, fine iron, or sulphurets, and then stirred up with an excess of mercury in a wedgewood mortar, bringing all impurities to the surface; this dross is skimmed off and collected for further cleaning. The superfluous quicksilver is squeezed through a straining cloth or closely woven drilling, or through buckskin, and the resulting balls of amalgam retorted. This squeezing is best done by hand. After first thoroughly wetting the cloth or skin, it is laid loosely over a cup or bowl, and a convenient amount of amalgam poured in the center, enough to make, when squeezed, a ball of twenty to thirty ozs. The ends of the cloth are then gathered tightly together, and commencing near the ends, it is twisted until the amalgam is compressed to a hard ball, the strained quicksilver dropping into a pan of water beneath. It is not good practice to squeeze the balls too dry, as the last quicksilver expressed is heavily saturated with gold.

In large mills the retorting is done in pans placed in an iron cylindrical retort built into a furnace, where the flame passes under and around it. But in the majority of cases in California they use the cup-shaped iron retort. These are made in different sizes, numbered from 1 to 7; No. 1 containing 150 ozs., and No. 7 2,000 ozs. They are made of cast-iron, with flat or half-spherical lids, which are secured to the retort by clamps and wedges or thumb-screws, the flanges being ground together. From a vent-hole in the cover a curved condensing-pipe, securely screwed in, extends several feet. The retort is placed in a ring-standard, or suspended when retorting, and should always have a space of about 6 inches beneath it. In preparing to retort, the inside is well rubbed with chalk and the balls of amalgam broken up and dropped in loosely; not pressed down into a solid cake, as is sometimes the practice, as that retards the operation. The flanges of the retort and lid are then luted together with a thin paste of flour and water or sifted wood ashes and water (the former is preferable), and securely fastened. The extended end of the condensing-pipe is placed in a vessel with water, and as this pipe must be kept cool, fresh water is kept passing over it during the entire operation. The retort should never be filled to its full capacity, to avoid danger of an explosion through the amalgam swelling and closing the vent. At first a light fire should be started at the top, and the heat gradually increased until drops of quicksilver issue from the end of the condensing-pipe. The retort should then be kept at a red heat until no more quicksilver is seen to issue from the pipe, when the temperature should be raised to a bright "cherry heat" for a short time. The retort should be kept covered by the fire during the whole operation. If during the retorting the condensing-pipe should suck water, it should be raised momentarily out of the water to permit of the latter flowing out. A better arrangement, and one that obviates this difficulty, is to attach firmly to the end of the pipe, a rubber or canvas bag in the water, which will distend itself as soon as the mercury commences to flow, and collapse when the distillation ceases. When the operation is completed, which usually occupies about two hours, if the amount be not very large, the quicksilver is removed and the retort taken from the fire and allowed to cool; the lid is removed and the retort turned over a *dry* gold-pan. If the gold adheres to the retort, a few taps with the hammer on the bottom or the help of a long-handled chisel will release it. Well-cleaned and retorted amalgam should show a good yellow color. If black spots be seen it is proof that the cleaning was not thoroughly done, and a pale-whitish color shows that it still contains quicksilver. Care should be observed, when removing the lid of the retort, to avoid inhaling any fumes retained therein. All retorted amalgam should be melted and run into a bar, before shipping, as it saves losses incurred by abrasion where the distance is great to the shipping point. The melting is performed in a black-lead crucible, which, when new, must first be dried and annealed by placing the inverted crucible and lid in the furnace with a slow fire, which is gradually increased until the crucible is red hot. When ready to commence melting, the crucible is placed on a firebrick in the furnace, after introducing the retorted bullion, in not too large pieces, with borax, and covered with the lid, adding, if necessary, more of the bullion as the metal subsides. After all is melted down, the slag is skimmed off carefully from the top of the metal, which should show a bright surface. It is then ready for pouring. Should the surface not appear bright, but show a scum on top, some lumps of borax must be added, the crucible again covered and heated, when the scum will be slagged and skimmed as before, when it is ready to be poured into a mould. Should the second addition of borax fail to produce a bright surface, a very little niter may be added with the borax. Before using the mould it should be warmed and smoked on the inside by holding over the flame of a lamp or over a dish with burning rosin. The metal in the pot should be stirred before pouring; the stirrer, an iron rod, must be heated before introducing it. The bar, when solid, is turned out of the mould, and any adhering slag is hammered off; it can then be dipped into water to thoroughly cool it, dried, and weighed. Two small chips should then be taken—one from an upper corner, the other from the diagonally opposite lower corner—to be assayed.

ASSAYING AND SAMPLING.

Although at present most California mills have their own assayers to test the ore and the tailings, the time was not so very remote when it was not considered requisite to do *any* assaying. The expert millman could tell (?) by horn-spoon test how much his ore would mill to the ton; and if a horn-spoon test of the tailings showed no amalgam, he confidently asserted that all was being saved. It was decidedly a case where "ignorance was bliss." No gold milling can be carried on under-standingly without light being thrown on the different results achieved, and which can only be given by careful sampling and assaying. It is not sufficient to know that a certain loss has been sustained. It should be accompanied by a knowledge in what particular part of the operation the loss has been incurred, to enable the operator to remedy the evil; hence, the necessity of constant sampling and assaying. In some cases the loss will be found entirely in the coarse sands, indicating that the screens are not fine enough; again, the loss may be entirely through sliming of the ore, or the missing percentages of gold will be found mostly in the sulphurets. The assay test alone, *with correct sampling*, furnishes the knowledge.

*Sampling.*—Samples should be taken regularly of the ore as it comes to the mill, as well as of the tailings *as they pass off*, for without the knowledge derived from these two operations there is no means of controlling the work.

Ore, as it arrives at the mill, is sampled by taking a stated amount (shovelful) from each ore-car or wagon, and throwing the samples together in a pile on a clean-swept floor or into a small bin. The pile should be shoveled over after breaking the pieces to the size of macadam; or if the pile be too large, cut through it at right angles, throwing the rock from the trench thus made in a pile by itself. This should be crushed or broken to a nearly uniform size, mixed by shoveling, and made into a low, truncated cone, which is divided into four equal parts by making a cross on the surface, and throwing out two diagonal quarters, which are again reduced in size, made into a second similar cone, and treated as before. This quartering and crushing is continued until a half-pound sample is obtained for fire assay. Great care must be observed when removing the different quarters to see that all the fine dust is swept up and added to the pile each time, as otherwise very defective results will be obtained. The rest of the ore is returned to the main ore bin Samples taken in this way from the aprons of the self-feeders are likely to give a more correct average, having been crushed, and the coarse and fine duly mixed. Samples should be taken at regular intervals from the pulp *with the water* that has passed over all the plates, and also from the concentrators.

Tailings samples should be taken at stated intervals by passing a vessel across the entire width of the discharge, where they leave the mill, without permitting any to flow over, and gathering at each interval an even amount. This is allowed to settle in a bucket and the clear water then poured off carefully or drawn off with a siphon. The residue is dried and thoroughly mixed, and several packages of 5000 to 10,000 grains each weighed out. In some mills, tailings samples are obtained automatically, using their current as the motive power for the sampler, which works by intermittently deflecting a spout through the tailings where they finally drop from the sluices, obtaining the sample across the entire section of the current.

To ascertain the amount of slimes in the tailings sample, put one of the packages into a bucket, add water and stir it. After settling two or three minutes, pour off the muddy water into a separate vessel. Repeat this operation until the water comes off clear; add a little powdered alum in the vessel containing the muddy water, and, when the mud has all settled, draw off the top water carefully and evaporate the remainder. Dry the washed sands of the sample, and pass through different sized screens, weighing the different amounts as they have passed, and assay each size. This will show where the greatest loss is sustained.

To ascertain where the loss in sulphurets occurs, it is sufficient to pass one of the 10,000-grains samples through a 60-mesh wire screen; weigh that which passes through and that which remains on the screen, and pan out each lot carefully by itself, from one pan into another, as long as sulphurets can be recovered; then weigh each batch separately.

The use of 10,000 grains is recommended, as every 100 grains is 1%, and each grain is $\frac{1}{100}$ of 1%; it is also a convenient size for obtaining accurate results. By using pulp samples instead of tailings, the amount of sulphurets in the ore may be ascertained.

If the sulphurets assay $75 per ton, and the quantity per ton is 1.7%, the value of the sulphurets in one ton of ore is found by multiplying $75 by 0.017, which would be $1.27 per ton. If the loss of sulphurets in the tailings is 11 grains out of the 10,000 grains sample, and the value of the sulphurets is $75 per ton, then multiply $75 by 0.0011, and the value of sulphurets in the tailings is found to be $0.0825 (8¼ cents) per ton of tailings.

*(To be Continued.)*

* Bulletin No. 6, California State Mining Bureau.

## The Fauvel Process.

The Fauvel Gold Recovery Co. held a meeting in London, Eng., on the 13th ult., at which Mr. Fauvel gave the following description of his process:

Mr. Chairman and gentlemen, I will endeavor to describe the process in which we are interested. I may, first of all, say that the work has cost me about nine years, and nearly twice as many thousand pounds, in the endeavor to bring it to a state of simplicity and efficiency, combined with economy. The great trouble which the mining community has suffered from in the past, has been the recovery of gold from refractory ores. Here are two classes, arsenical pyrites and sulphides of iron. In the one case we have some of the sulphide of iron reduced to powder. In the other we have some of it as passed through our furnace, and a third box contains some that has passed through the fire, air and water process. First, we get the refractory pyrites; then we get the roasted ore, which is of a dark reddish color; and, finally, we get it after it has been through the water of a pale salmon color. In this ore we had nearly 10 ozs. of gold when treated. When it passed through the furnace the gold was still there, but of the ore only two-thirds in bulk, and when it came through finally we had extracted 97 per cent. That, with our original furnace, was very satisfactory indeed, to me, but in those days it cost much more than it does now. The embodiment of many improvements, suggested by experience, are thrown into the present structure of the plants, and details have gone to America. Mr. Fauvel here exhibited some diagrams of his furnace, but part of his description would not be intelligible without an illustration of the diagram itself. Continuing, he said: You see there the diagram of a longitudinal section furnace when ready for working. When the ore has passed through some form of crusher or krom rolls, it is deposited in the lower hopper, then raised by the elevator to another hopper, and by a patent automatic feeder is fed into the furnace.

Now, the furnace working is not a theory, but the embodiment of a true principle, and the demonstration of a metallurgical fact. While the ore is falling down the furnace, it meets a gradually increasing temperature, combined with a gradually increasing purer oxidizing medium. The atmospheric air is heated in the chambers round the furnace, and passed into the tower, ascending against the falling stream of ore. The ore falls down, and, as I shall show you by experiments, the refractory elements are eliminated almost instantly; and as it goes down through the tower, it gets cleaner and cleaner, until at last it is thoroughly oxidized, and the gold is left free from the film of sulphide of iron, or any other refractory element which may surround and keep it from that contact with mercury which is necessary. When it reaches the highest point of temperature—1600°—the ore falls through a shower bath of cold water, as described in the pamphlet. You can understand what takes place, and why the ore is found in such a fine powdered state after it has passed through the cold shower bath, and the temperature reduced from 1600° to the ordinary temperature of 100°; the time occupied in this work is only about two minutes. It is the act of Nature, I repeat—it is a metallurgical feat, and not a theory. The ore comes down the tower perfectly free and clean, and, dropping through the shower bath, is further reduced, the crystals separating along their natural line of cleavage. Another stream of water carries them to a series of amalgamating plates, so that by the time it reaches the end nearly the whole of the gold is recovered, and only the valueless tailings are left. The whole time occupied here is five or seven minutes. I do not think there is much reason to fear any one else doing the work quicker. The speaker here proceeded, by a simple experiment, to show how quickly the refractory elements were burnt off, leaving the rest of the ore to descend into the water bath. Continuing, he said: For simplicity, economy and efficiency, I do not think it possible for any superior process to be brought forth. We are not in opposition to cyanide, which will treat free-milling ore; our work is only with refractory ore. I went to America, and showed what I had done there, and never met with any one who could condemn the process. As to the prospects of the company, we came out at a fairly bright time, but latterly things have not been so encouraging, and recently the various parties under contract with the board have asked for an extension of time over the holidays, which has been granted. That was a judicious act, and I have no doubt the various engagements will be satisfactorily carried through.

Since the company came out hardly a day has passed in which some one connected with mining companies has not come to make inquiries about the process. There are at least forty mining companies asking for detailed particulars, with a sketch of the plant, to send out to various parts of the world, so that their engineers and managers may see whether the process is suitable for their ores or not. I have not the slightest doubt that the large majority of these companies will adopt the process. I understand, also, that Prof. Mead has entered into twenty-seven or twenty-nine contracts in the United States for the building of furnaces in different parts, and that he is about to enter into nine contracts so soon as everything has been settled satisfactorily between us. There are upwards of forty contracts likely to be entered into in America, and with thirty or forty possibly here, and some that have already adopted the process, we have a very big business on hand. I visited the Portuguese mines to see where the plant was to be erected, and came back with fresh plans for plant, suitable to the position and the ore to be treated. Several Australian gold mines, which were coming out in London, have had to wait on account of the bad state of affairs, but these companies have adopted the Fauvel process, and have made it a part of their prospectus, stating that the capital is required for the new machinery and for the erection of the Fauvel plant. There is a wealthy gentleman in the city, connected with a strong group, who is spending £6000 or £7000 in erecting a furnace in Tasmania and another in New Zealand. Another gentleman has taken up Victoria and another Queensland, and everything is encouraging for us to proceed. Assuming that only fifty furnaces were erected, the return to us in royalties would be £37,500, which would be a bad dividend; but one mining expert said to me, "I will put up a thousand plants in a corner of Colorado alone." The figure is rather big, but he no doubt meant Cripple Creek, where there are thousands of tons of refractory ore. As a matter of curiosity, and not serious calculation, I worked out what 1000 plants would mean to us—£750,000 from that corner of Colorado alone. Of the bulk of the world, eighty to ninety per cent are refractory. The other ten or twenty per cent are free milling. The former are for us to deal with; the latter for the cyanide or amalgamation processes. Our process is very much cheaper than cyanide, and the gold returned is purer, being worth £3 17s 6d, as compared with £3 cyanide. Our prospects are enormous, for the field is wide which is before us. The costs, I believe, can be reduced to less than 1s per ton, when the ore is rich in sulphur, and where the sulphur, when burning, supports its own combustion and keeps the interior of the furnace heated without the aid of coal, and where coal can be obtained at about 25s or 30s a ton.

## How To Make a Million.

A sprightly little sheet called *Results*, published in Chicago, devoted to advertising, gives an account of a meeting of prominent business men in St. Louis. It was, in fact, a meeting of commercial clubs of several cities, and among those present were a number of millionaires who were interviewed with the question, "How can a man make a million dollars?" and these are some of the brief replies:

George M. Pullman: "Could not tell you—really, I could not. I did not come down here to be interviewed, and anyway this is too short notice to give a comprehensive opinion."

Marshall Field: "Oh, pshaw! What do you ask such a question for? There is no general recipe that I know of, unless it be industry, economy and a cheerful disposition."

P. D. Armour: "Oh, my gracious, what a question! I have lost my patent for making money, and now don't know any more about it than anybody else. Go ask Marshall Field. He is making lots of money now."

Lyman J. Gage: "I did not come here to talk about money making. It occurs to me that men who want to make money will know how and where to proceed."

Charles Fargo: "What do you ask me for? I've got no money. Pullman could tell you if he would."

N. K. Fairbank: "I could not give you a rule, for there is no such thing in money making."

Marvin Hughitt: "Work like the devil, and hold on to what you make. A man must solve his own problem—nobody can do that for him."

Franklin MacVeagh: "Well, that is a poser. I will indorse all that Mr. Hughitt has said, however."

E. M. Phelps: "Go talk with those men who know—I don't."

Which all goes to show, adds *Results*, that the reporter went to the wrong people. He should have interviewed the "financial experts." It is clear that the reporter never did any interviewing for an advertising journal.

What does a millionaire know about making money, or a successful advertiser know about advertising? The men who have really done anything never want to tell how they did it.

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THE Chattanooga *Tradesman* says: The copper mines of Ducktown, Tenn., are in active operation, and 1100 men are employed with a weekly pay roll of $25,000. This is one of the most renowned copper regions in the United States, outside of the Lake Superior region. The supply of copper is practically inexhaustible and the ore is very rich.

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MINAS PRIETAS, Sonora, Mexico, reports the recent discovery in the ancient mine known as La Brojuda, situated between El Zubiate and La Colorada, of a body of rich ore which assays 1435 ounces in silver per ton. The property is owned by the Minus Brothers.

## California's Mining Possibilities.

The following is from the Boston, Mass., *Journal* of December 17, '95:

Prof. McCaw of California says that if California had $100 to put into the development of the lode for every $1000 put into the Witwatersrandt she would easily run $50,000,000 to $100,000,000. Hayward, at the Utica-Stickles mine, in Calaveras county, turns out five times as much as the Robinson, the most noted of the African mines. The Utica-Stickles employs 700 white men at $2.50 to $3 a day, while the Robinson has 2500 Kaffirs at 30 cents a day. The African miners, however, have hurt California. They have taken away most of the competent mining superintendents, giving them $8000 to $10,000 a year and expenses, on a contract running several years. Young men, however, are being trained, and California will continue to supply the demand, as well as take care of herself.

California, as Prof. McCaw puts it, has been but scratched. It has never been explored, except for but a narrow belt. The mother lode is 100 miles long, running through the counties of El Dorado, Amador, Calaveras, Tuolumne and Mariposa. It consists of a number of parallel veins, trending northerly and southerly, and dipping easterly. It is not one vein, as might be supposed, but a series of veins, 50 to 1500 feet apart, the series having a width of one to four miles. In developing it has been the custom to sink as near the center of the lode as possible. The formation of the country rock on the west half is generally slate footwalls and greenstone hanging walls. In the center it is generally a double-block slate—that is, both foot and hanging. In the east half the foot is slate and the hanging a transformation called diabase, but really serpentine or quartzite.

Calaveras county has the Utica-Stickles turning out $800,000 a month; the Sheep Ranch, which has a vein with an average of but 12 inches, but which has turned out millions, developed to a depth of 1200 feet; the Utica, with a vein of 100 feet between walls, which is growing richer with depth. The town of Angels is the principal camp. It has a population of but 2000, but it is booming wild, and contracts are being let to sink shafts 1000 to 1500 feet, at intervals on the lode. Some of the shafts are as deep as 2300 feet, with pay bottom. A great many of 1000 feet are being sunk. The ore is of low grade, but it is in immense quantities, and handled at a minimum cost, water power being used for hoisting and to run the mills. The Zeila, near Jackson, in Amador county, has an average assay value of only $4, but the ore body averages 40 feet in width and the chute is 1000 feet long, and gradually growing richer with depth. It now has ore for 30 years ahead blocked out.

## How It Is Worked In London.

The process of floating a mine on the London market, as described in an English paper, is interesting. It is the working of this machinery, and not the yield of the mines themselves, that has made most of the enormous fortunes which have been accumulated the last few months. The company promoter buys up most of the private mining claims, as the agent of a promoting or exploitation corporation or syndicate. There are plenty of these corporations now in the field, and the profits of their operations within the last year have been in many cases almost incredible. Take, in illustration of their plan of operation, the case of a single mining claim: They have paid the discoverer, say, $10,000 in cash for it; they send a few men and sink a test shaft thirty or forty feet on the reef and take out several tons of ore. An expert examines the mine and reports, and some of the best specimens of ore are assayed. The result is embodied in a prospectus and printed in all the London newspapers. Subscriptions are invited for the shares in the Struck-It-Rich mine, "capital £100,000 ($500,000), of which 60,000 £1 shares are offered to the public at par." It is explained that 40,000 fully paid shares and £20,000 in cash are to be paid to the vender company. Public subscribers are notified that they must pay 2s 6d upon application and the same sum upon allotment of each share. Five shillings more per share will be due a month after allotment, and the balance of 10s as called for by the directors.

If the promoting company is a concern in which the public has confidence—that is, if it has engineered similar deals successfully before, and if the directors named also command respect, then, if the experience of the last six months holds good, the public subscriptions will call for 300,000 shares instead of the 60,000 offered. In that case the public subscribers will receive one-tenth to one-fifth of the shares they applied for, or perhaps none at all. Such a demand for shares, of course, insures their advancing to an immediate premium, and as the directors can allot to whom they please among the subscribers, it is natural that their friends are supplied first. It happens almost daily, therefore, that shares in new companies are quoted at a high premium as soon as or even before they are issued.

# Mechanical Progress.

### A Drill Sharpening Machine.

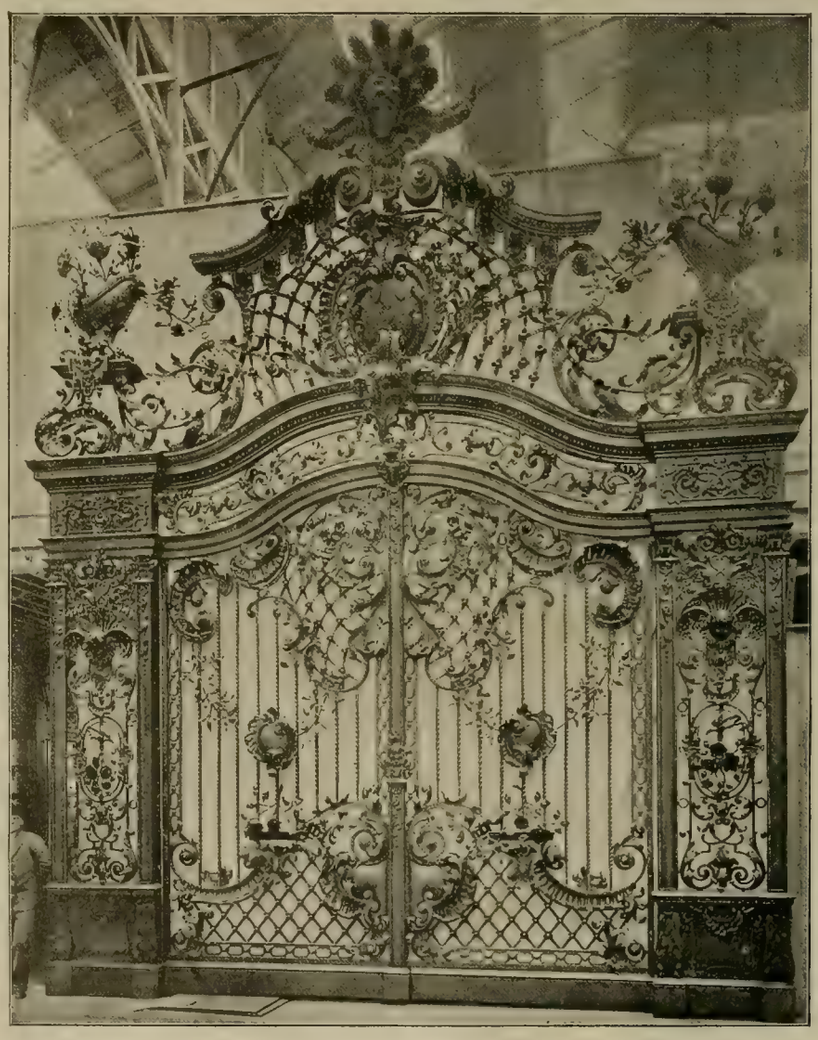
The man who sharpens the drills for the miners is one of the most important employees on top of the mine. This work has been done by hand so long that it would seem as though there were no other practical way. In 1868 E. W. Walton invented a drill sharpener, and in 1879 another invention of like intent was made, but so far as we are aware neither was ever put into practical shape. An American named Myers has recently brought out an invention that is said to be a success in this direction. He is in Johannesburg, South Africa, and reports from there say that Myers' machine will sharpen a star bit. At a recent trial of the invention worn steel star bits were made hot in the forge, put into the machine, and in a few seconds were practically re-made, and true to gauge. Plain bars of drill steel were similarly heated in the forge, and were fashioned into new bits as rapidly as the old were re-made. The machine is so simple that it is difficult to describe. It is practically an almost solid wheel 16 inches in diameter, and 4 inches wide, turned at a speed of 300 revolutions a minute. The inner part of the wheel is fixed firmly as a sort of axle, and the outer part turns freely on it by means of a series of eight friction rollers, each of the diameter of about an inch and a quarter, this being the whole space between the outer wheel and the inner fixed center. In this center are four spokes which converge to the center, and when closed down leave a hole or opening on the one side in the exact form and size of the bit to be forged, on the other considerably larger. These spokes each protrude into the roller path between the outer wheel and the inner fixed center to the extent of less than the sixteenth of an inch. As the outer wheel revolves the rollers revolve with it, and in their passage press down these spokes, the rollers being so placed that each of the four spokes is pressed inwardly for the small distance simultaneously. The inventor describes these spokes as dies working in guides, and coming to a common center. By their simultaneous action they hammer the steel all over, improving the quality and making the drills all of one size. Dies, or as they are called above, spokes, can be supplied of various patterns, and any bit of any shape can be fashioned, star, rose, chisel, or any other, with equal facility. One machine can deal with all the steel and bits that two forges can make hot, and if there was only a man who could keep up the rapid supply of heated steel, could turn out completely thirty forged bits an hour. These while still hot would then after the forging be passed on to a similar machine in which, instead of forging, the edges of the drill would by a similar succession of blows be cut sharp. It was marvellous, says the report from which we quote, to see this small machine forging the bits from the bar-steel, and these virtually doing the work of a steam hammer. At 300 revolutions a minute, and with the eight rollers, no less than 2400 blows are delivered on the steel every minute. The machine is at present quite in the rough, this being the first occasion on which it had been really suffered to appear beyond the inventor's workshop. It has much to accomplish and many trials to pass through; but if it can continue to work as it did at the trial, it has unquestionably a great future.

### Silver from Silver Bromide.

Silver is usually recovered from silver bromide wastes, incident to photographic processes, by mixing them with nine-tenths their weight of calcined sodium carbonate, and fusing in a crucible, whereby carbon dioxide and oxygen are given off. Metallic silver gathers at the bottom of the crucible, and a double salt of sodium carbonate and sodium bromide floats on the top as a clear liquid. On cooling the crucible down to a red heat the silver solidifies, and the flux, still in a liquid state, may then be easily poured off. The silver thus obtained is of a fine white color. The flux usually has an intense yellow color and still contains about ten per cent of silver. The latter may be obtained (Pharm. Centralh., xxxvi, p. 632) by mixing the flux with plenty of water and stirring occasionally to facilitate solution of the flux. The unchanged silver bromide is allowed to settle, washed by decantation, and preserved for a subsequent operation.—Scientific American.

### Ornamental Iron Work.

In San Francisco and elsewhere mechanical progress is manifest in many forms of use and beauty that elicit admiration for their artistic production. Ornamental iron work is no new art.



ORNAMENTAL IRON WORK: GATEWAY OF FINE HAMMERED WORK.

The work of Quinten Matsys in Antwerp has for centuries been admired, but that artistic Belgian blacksmith did not take his art with him. In the progress of the mechanical arts the ability to skillfully wield a hammer has kept pace with other pursuits, and in every country are found artisans who, with no other appliances than an ordinary blacksmith's outfit, can reproduce in forged and hammered iron the graceful tracery and delicate outline of fragile form that one would presume applied only to more facile material; this, too, combined with strength and tenacity. Herewith we illustrate one of the finest pieces of forging in the world. It is a hammered iron gateway originally viewed and admired by thronging thousands at the Chicago Exposition, and now in position at the entrance to the grounds of Gen. Joseph T. Torrence on the Lake Shore Drive in Chicago. While no engraving can give a full idea of the original, yet the one on this page is a good portraiture of the elegance and richness of detail characterizing this magnificent piece of hammered iron work. It was manufactured by Winslow Bros., art metal workers, Chicago, Ill., to whom we are indebted for the accompanying illustration.

### Production of Alumina from Clay.

An important contribution appears in *Comptes Rendus*, by Heibling, indicating the production of alumina from clay, so as to be absolutely free from silica and readily convertible into sulphate, etc. To this end the clay is thoroughly incorporated with a mixture, in equal parts, of ammonia and potassium sulphates, in such proportion that three molecules of ammonium sulphate may be present to every molecule of alumina, and the mixture is made into hollow bricks, which are then heated in an oven at 270° to 280° C. At this temperature both gaseous ammonia and acid ammonium sulphate are given off, which immediately reacts with the potash salt present, acid potassium sulphate being formed—the latter, at the above temperature, combining with the alumina of the clay to form alum. The alum is finally extracted from the bricks by means of water and freed from iron by recrystallization, and the insoluble silica remaining behind may be employed in cements. Granular alumina is prepared by spreading out the powdered alum in a thin layer on shelves arranged in a vertical tower, which is traversed by the warm, moist, ammoniacal fumes derived from the brick oven. Thus the alum is transformed *in situ* into alumina, retaining the form of the original powder, and potassium and ammonium sulphates.

### Car Wheels on Track Curves.

When an ordinary wagon turns a street corner, the wheels on the inner side of the curve travel a shorter distance, and hence revolve a trifle slower for the moment than do the outer wheels. But on a railroad car both sets of wheels must move together, being affixed to the axle, and therefore on a curve either the inner or outer ones must slip. The resulting friction and resistance adds to the amount of power otherwise required to haul the load. Several years ago an inventor tried to improve street-cars by leaving the wheels free to turn on the axle, somewhat as do those of a wagon. But the idea never came into favor or public use. Such a plan involves difficulties more serious than those he sought to remedy. Francis Blanding, of Putnam, Conn., proposes a new solution of the problem. He would secure the wheels to the axle, as now, but cut the latter in two in the middle, so as to allow unequal rotation of the halves. The flange would keep each wheel from getting too far away from its mate; and to prevent the inner ends of the severed axle from wearing each other down, Mr. Blanding would fasten to each section a stout collar, which would abut against a sieve inclosing the middle portion of the axle. Of course, this would introduce friction at a new point, and whether the consequent loss of power would be less or greater than that due to the slip of wheels on curves under the present system is an interesting question.

### Confidence Will Win.

"If the vast sums of money which have been put into the development of the South Africa gold mines had been invested in California mines, this State would be producing twice as much gold as South Africa."

Thomas J. Barbour, mechanical engineer with the Risdon Iron Works of San Francisco, and the man who secured the first franchise for an electric street-car line from Los Angeles to Pasadena, descanted thus on one of California's partly-neglected industries, at the Hollenbeck, yesterday.

"Here we have a mother lode of gold which has been conclusively proven to be 284 miles in length, and yet capital goes to the wild extremity of the Dark Continent for investments in gold mines. It is true that here it is necessary to go down about 1000 feet to reap a big reward for money put into the business, but our California mines are so much more convenient that there can be no comparison drawn with the mines of Africa. Capital is very obtuse sometimes. California mining has always paid, and confidence is all that is needed to make it pay in the future.

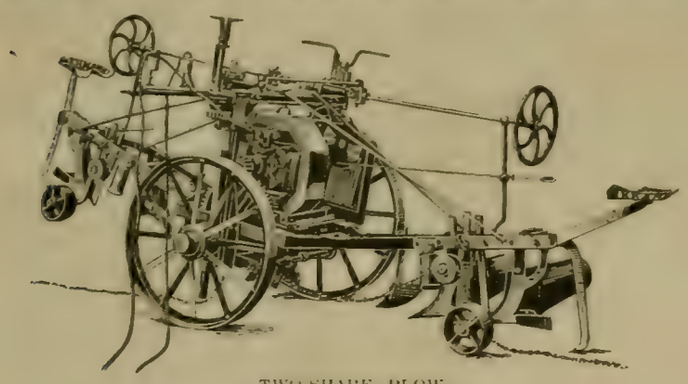
"Take Los Angeles and Pasadena, now, as examples of what confidence can do when it has the handling of money. Five years ago, after I secured the first franchise for an electric line to Pasadena, the idea was ridiculed, but, even then, it could be seen that the growth of Los Angeles and Pasadena would soon justify the risk. This section of California has simply kept pace with its great possibilities, and men of foresight and keen business judgment have been quick to grasp the opportunities in a section favored with great natural resources and a climate created by nature in her most genial mood."—Los Angeles Times.

HEREWITH is a formula for making a superior bearing metal for railroad car brasses, and other heavy stock, in which a small amount of silicon is used as a flux: Copper 80 pounds, tin 12 pounds, lead 8 pounds, silicon copper 2½ pounds. Phosphorus is also used for fluxing copper and bronzes, and accomplishes about the same results. It is more effective than aluminum for this purpose, but not so effective as silicon.

# Electrical Progress.

## The Electric Plow.

Steam plows, in conjunction with locomobiles, have long shown great advantages over manual and brute labor, and now electricity invades this as well as other industrial domains. Herewith is illustrated the latest and most successful attempt to utilize electricity in farming, as now in operation in the vicinity of Leipsic, Germany. Consul Doederlein writes that he has visited the factory of Zimmerman & Co. there, from whom the accompanying cuts have been secured, and says that in actual practice the apparatus here portrayed is in every way satisfactory, doing good work at less expense than any other form of power hitherto employed in turning over the ground.



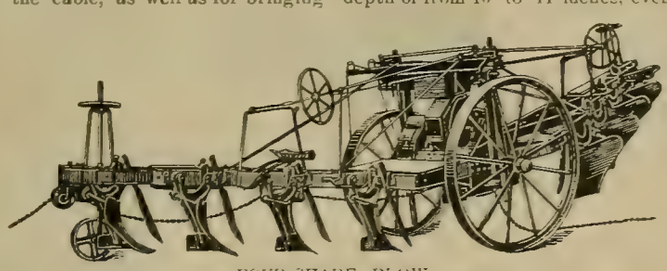
TWO SHARE PLOW.

A stationary engine or locomobile transfers its elementary power through an electromotor to the plow, the motor being mounted on the plow itself. The anchor shaft of the motor sets in motion a double spur wheel, which, in turn, drives a pinioned shaft.

A chain extended over the field and held taut at both ends by triple ground anchors is worked by this pinioned shaft, which draws the plow along the chain across the field. On reaching the end of the chain, the plow is tilted to the other side, and the reversal of the current sets the plow in motion in the opposite direction. In returning, it deposits the chain sideways ready for the next row of furrows. A laborer, by turning a lever, draws up the three ground anchors, and thus sets the traveling wheels affixed to the anchor axles in motion, so that the anchors are moved to the next furrow. The motor tightens the chain before starting.

The source of power may be any ordinary agricultural locomobile of from 8 to 12 H. P. It drives the dynamo, which is placed on a car.

This car also serves to transport the gauging apparatus for measuring the strength and current of tension, a reel for the cable, as well as for bringing the plow to the field. One end of the tipping plow is fastened behind this primary station car by means of a cramp iron, while the guiding roller in the rear is placed so as to rest on the ground and guide the plow. As soon as the locomobile is set up accurately by means of brake blocks, the dynamo car is placed straight before it, fastened into the ground by means of an anchor placed opposite to the belt tension; the driving belt is placed over the driving wheel of the locomobile and the disc of the pulley of the dynamo machine, and the primary station is then in working order.



FOUR-SHARE PLOW.

Two cables, corresponding with the two poles, serve to transfer power from the dynamo to the electromotor. One end of this pair of cables is affixed to a projecting bar of the plow, and moves backward and forward with it, like a pendulum, while the other pair of ends is secured to the dynamo machine.

The friction of the cable on the ground is avoided by means of light cable carriages fitted with insulating nippers. These carriages follow each motion of the plow automatically, as the wheels are fitted into forks which, pivoting in every direction, answer to all the movements of the plow.

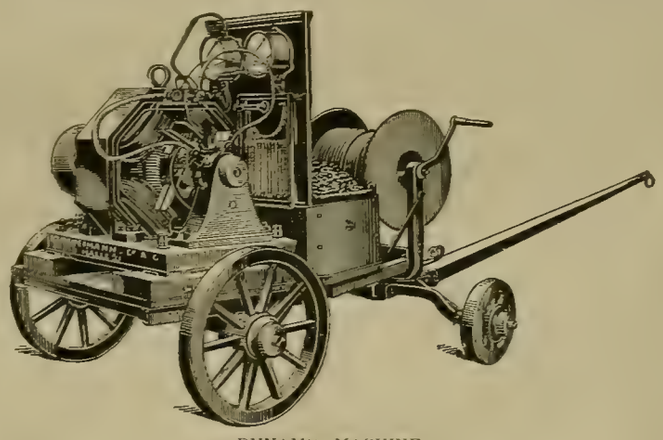
Five or six such cable carriages, according to the length of the area to be plowed, are easily watched by a boy, who has to take care that, in reversing the motion of the plow, they follow such motion.

A tilting plow for small farms is fitted with two shares each. In front of each of these is a forecutter to prepare the ground. The frame and body, as also all other parts of the plow, are of iron and steel, so strongly made that it is powerful enough to cut furrows to the depth of from 10 to 11 inches, even in heavy, clogging ground. The plow may also be fitted with underground looseners, which follow the plow and loosen the subsoil to as much as 15¾ inches in depth, but do not turn it over.

The iron frame of the tipping plow bears in the center shaft an arrangement on which are two main wheels of different diameters; these are adjustable perpendicularly and turnable sideways. The adjusting or placing of the wheels is effected from the driver's seat by means of a spiral and wheels, so that the driver has the plow under control. An electromotor is mounted on the plow frame. A spur wheel is wedged on to the motor's anchor shaft. The motion of the electrometer is transmitted from this spur wheel with the aid of an intermediate appliance to a roller with a chain wheel. The dimensions of this appliance, which is made of cast steel, are so determined that the compass of the chain wheel receives a lineal speed of 70 meters per minute. The plow is, therefore, moved at this rate of speed across the field by means of the stretched out chain, the links of which are seven-sixteenths of an inch thick.



ANCHOR.



DYNAMO MACHINE.

The chain is directed on to the chain wheel by guiding rollers in such manner that the tautly stretched chain end is constantly striving to raise the forward end of the plow as well as to press the rear end into the soil. This results in a steady and certain progression of the plow.

For extensive operations the aim is to produce an electric plow capable of plowing 4 to 5 hectares (1 hectare= 2 471 acres) to a depth of 35 centimeters (13¾ inches) in ten hours. As this requires about 35-horse power, the ordinary locomobiles at hand are not available.

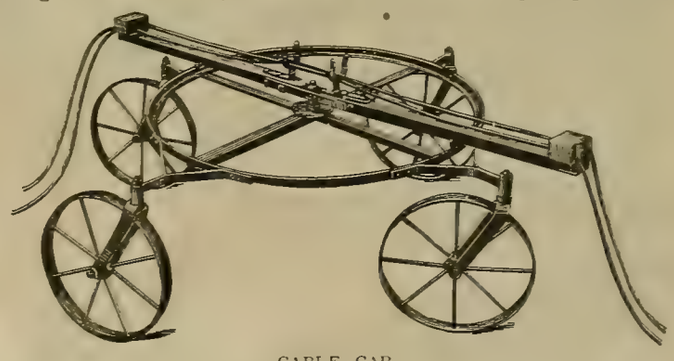
As in the case of small farming, the operation is comprised under three headings: the primary station, the transmission of power, and the plow with electromotor.

A dynamo machine of the requisite power is attached by driving belts to the stationary engine, being, of course, fitted with the necessary appliances for gauging the force of the current and tension. Water power where available in the necessary degree, may be very advantageously used to drive the dynamo machine, which can be done either by taking the power direct from the turbine or the water wheel or by indirect beltings.

Here, again, it is essential that the elementary machine be prevented, by the introduction of suitable regulators, from too much variation in its revolutions. In like manner, when land is being reclaimed or improved, the stationary power must be used rationally. Thus, instead of driving machinery of the pumping works, a dynamo machine should be used to produce the electricity, which can be conducted thence to any desired distance and for any wished-for purpose. It is only in such manner that a stationary engine can be intelligently turned to account in husbandry, inasmuch as uninterrupted use materially reduces the cost in creating steam, both per hour and per horse power. Moreover, as the electric current is available, the electric plow may, with the aid of electric light, be worked all night.

Two bare copper wires are carried from the dynamo machine to the field which is to be plowed, in like manner as telegraph wires are borne, namely, on poles. According to the size of the field, this connection by copper wire is either brought to the further end of the field, or where its length is 800 to 1000 meters (2625 to 3281 feet), to the center division line of the field's length. Both the cables are affixed to the copper wires by nippers in such a way that they can be easily moved backward or forward. These cables are borne by the cable carriages and move forward or backward with the plow like a pendulum.

A three or a four-share plow is used for farming on a large scale. It is made on the same principle as the two-share implement, already described, only proportionately stouter. The frame of the tipping plow, which carries the cast-steel plowing contrivance, as its dimensions, etc., necessitate, is made of strong iron and carries a proportionately powerful electromotor. This, by means of an intermediate wheel gear, sets a chain wheel in motion, which, in turn, draws the plow along the chain stretched across the field. Both the chain and its ground anchors are like those used with the two-share



CABLE CAR.

plow, only corresponding in power to the demands made upon them. These anchors require two men to turn them. One of them may be the plow driver, while another man is stationed at each anchor to help in tipping the plow and shifting the anchor.

The experiments were made on heavy, binding, loamy, clay soil near Halle-on-the-Saale. A ten-horse power locomobile, fitted with a very exact regulator, was used, with the following result: Gauges showed a current tension of 110 volts and a current force of 60 to 80 amperes, an average of 8000 volt amperes, this being equal to the capacity of the locomobile up to eleven-horse power; two furrows 60 centimeters broad by 24 centimeters deep (23⅝x9½ inches) at each plowing; power gauge varied between 600 and 700 kilograms (1344 and 1568 pounds), giving a mean of 650 kilograms (1456 pounds) a resistance of from 45 to 48 kilograms (100.8 to 107½ pounds) per square decimeter (3.937 inches) of the cross section of a furrow.

At a progression of 0.9 meter per second, 7.8-horse power was made really useful, so that the loss of power between locomobile (11 electric horse power) and plowing (7.8-horse power), arising from transmission of power and tooth and chain friction, was 3.2-horse power.

With eight acres in ten hours, on heavy soil, with a depth of 24 centimeters (9.24 inches), the cost would be $1.29 per acre.

Here in California the subject is of considerable economic importance. Wheat growers must compete with the world, and somewhere on the globe wheat is always being harvested. On the great plains of the Sacramento and San Joaquin may yet be seen electric plows built and operated on the same general principles herein outlined, with less resultant cost than under the present system.

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A great electrical exposition opens in New York the first week in May, under the auspices of the National Electric Light Association. It will last a month. The exposition is to be held in the New York Industrial building, which was built about five years ago for the distinct purpose of trade shows of this nature. It has cost about two million dollars. It joins the Grand Central depot on the east, and switching facilities have been extended into the building from the New York Central railroad. There is in the building 500,000 feet of exhibit space, and the construction is such that the floors will carry the weight of an ordinary steam railroad train. Among many interesting features will be the running of Tesla motors with a current generated at the big Niagara plant. Mr. Tesla has agreed to superintend the arrangement, and has guaranteed the current will be delivered to the exposition over 400 miles away from the turbine shafts at Niagara.

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THE manager of an electric street railway may now determine at any instant, without leaving his office, whether the cars of his system are running regularly, whether there is a stoppage at any point, how long the stoppage lasts, how many cars are blocked, and when running is resumed. This is made possible by a special chronograph, the use of which was first suggested about two years ago by Superintendent George Baumhoff of the Lindell Railway Co. of St. Louis. The apparatus consists primarily of a sheet of paper moving at a uniform rate under a series of pens or points, operated by electromagnets, each magnet point representing a point on the road. Each time a car passes this point on the road it makes contact, and the magnet point on the chronograph pricks the paper. It is found convenient to use a roller driven by accurate clockwork at the rate of one revolution per hour, each revolution moving the paper four inches. A line running on a one-minute schedule will show fifteen cars or pricks to the inch, under each magnet point, a five-minute schedule three to the inch, and so on. A break of three inches would show a stoppage of forty-five minutes, and even regular dots would indicate correct running at that point of the road. When filed away the daily chronograph sheets become a permanent record of operations.

## Scientific Progress.

### Twentieth Century Telegraph.

The system recently proposed by P. B. Delaney for quickening the intercommunication of messages between cities by the substitution of cheap telegrams, which would be answered in a few hours, for the present mail system has caused much uneasiness to some of the existing telegraph companies, who are quite satisfied with the plant that they have established at the cost of much time, trouble and expense. One of the officials of the Western Union says that Delaney's method of transmission is too fast for him, and he wouldn't know what to do with it if he had it. An electrical journal, by way of comment on this assertion, says: "How a telegraph service can be too speedy is not quite clear; but one of these days the fact will dawn on some people that the telegraph is too slow." That this remark is justified is seen in the figures recently published on the extraordinary extent to which improved telephone service is eating into the profits of the telegraph companies. Unless certain radical reforms and improvements are introduced into the telegraph service within the next few years it will run a great risk of being practically superceded by the telephone, which is already found a quicker and very much more desirable means of intercommunication. Such a system as the Delaney would unquestionably have a most important influence on future developments in telegraphy. Mr. Delaney gives some excellent reasons for believing that it will be well established before the beginning of the new century. He says that speculation as to the future of the electric telegraph would be within extremely narrow bounds if the question of Government control were eliminated. It may be somewhat remote, but it is hard to avoid the conclusion that the Government will not always draw the line as to the vehicles to be employed in carrying the mail. It now uses over 3000 railway cars on 150,000 miles of road, and keeps 6000 clerks on the move, traveling in crews 140,000,000 miles a year, during which time 9,000,000,000 pieces of mail matter are handled. About 300 mail cars are wrecked, a dozen clerks are killed, and 150 injured during the same period.

The total expense of the postal service is about $75,000,000 per annum, and the department not far from self-sustaining. How can so vast a system ignore the difference between railway and electrical speeds. A car travels 40 miles an hour, a current 200,000 a second. The automatic telegraph now projected will send a message of 16 words from New York to Chicago every second, and 50 words—about the average of an ordinary business letter—in 3 seconds. If time be reckoned as the basis of value for business correspondence, which will appeal most to the business man, a letter occupying 24 hours covering 2000 miles for 2 cents, or a telegram going the same distance in 3 seconds for 15 cents? Mr. Delaney asks: "Would not a very large proportion of business communications warrant the extra 13 cents?" The public desire for quick facilities of communication is strikingly evident in the avidity with which it has taken advantage of the quick delivery system instituted by the postoffice a few years ago. Every such letter is an evidence that the writer is willing to pay 10 cents in order to expedite the delivery of his letter a half hour. If these letters could be telegraphed for, say, 15 cents, or 3 cents more than the ordinary and extra postage, there can be little doubt that nearly all would go that way. Already Italy is about to make the experiment of 5-cent telegrams. It seems inevitable that sooner or later, either in a monopolistic or a competitive way. It cannot go on restricting the postal service to hauling actual paper by rail. Among other of its beneficent aims its mission is to place its people in communication by the quickest means at the lowest cost, and for this purpose an up-to-date telegraph will answer.

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THE oft-mooted idea of utilizing the earth's internal heat for power and domestic purposes is assuming practical shape in Hungary. It appears that for many years the artesian wells there existing have supplied hot water which has been used for public baths and buildings, and for warming greenhouses and winter gardens. The plan is now being seriously considered, it is stated, of sinking such wells to 12,000 or 15,000 feet. It is thought that the water from such a depth would have a temperature of about 200 degrees C., and should, therefore yield steam for power as well as the heat required in buildings.

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FOR a gas-light unit Herr Blondel proposes as a unit of illumination the light received by a square metre of surface at one metre distance from a source of light equal to one decimal candle, or 1-20 Violle's platinum units. This he calls a "lumen." It is equal to the brightness per unit of surface (one lux) multiplied by the surface.

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A REPORT to the French Academy of Sciences states that seven well equipped expeditions have been sent out to gather material for a magnetic map of the earth.


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# Mining Summary.

## CALIFORNIA.

### Amador.

ZEILA.—*Ledger*: Messrs. Wardner, Gillian and Dwyer have now about constructed a plant behind the Zeila mill, very similar to the Gates' plant at the Kennedy mine. They expect to stop most of the metal which has in the past been going down the creek in gold sulphurets form too fine to save on the van-ners.

### Butte.

E. H. Gale of Oroville, has bought the interest of S. Titus in the Big Sam mine, south fork of Feather river.

The shaft on the Magalia mine is down 500 feet. The old works of the mine are about 70 feet distant from the bottom of the shaft, so that a tunnel will have to be run for this distance when the shaft is completed. Twenty men are employed.

Machinery for the Bootjack mine at Bangor is now being set up.

Both of the Bishop mines have been bonded by the Burback Company of North Bloomfield.

### Calaveras.

The Pioneer mine, situated in the Smith Flat district, has been bonded to James Kinny for $8000. The bond is for one year, and work of developing the property has already begun.

A Gwin mine correspondent of the Amador *Republican* says: The new drilling machine works very satisfactorily. Owing to poor workmanship in the welding of the drill stem, the end next to the drill parted and left the drill and piece of stem in the hole. Having no suitable fishing tools to recover the drill, Superintendent Thomas put miners to work to sink a small shaft thirty feet to where the drill is lodged.

Another strike of rich gravel is reported in the North Star mine, Mokelumne hill.

The Tulloch estate has bought back the Tulloch mill and mine, paying $6000 therefor.

RICH ROCK.—*Prospect*:—We learn that very rich rock was struck in the Pure Quill mine the fore part of this week. The shaft is down something like 80 feet, at which depth a crosscut was started. No more than 8 feet of this crosscut had been penetrated when rich ore was revealed. It is said that 60 sacks of this rock taken out will represent at least $30,000. The ore carries a good quantity of sulphurets and is not of the pocket character. The mine is owned by the Godbe Company and superintended by Harry Routledge.

### Del Norte.

Henry C. Langrehr has been examining and has located the group of Native Trilby mining claims, which, together with the Klamath Bluffs and two other smaller claims that the company have made arrangements to secure, will make in a solid body 480 acres hydraulic ground. If the deal is made machinery will be put in and operations begun.

### El Dorado.

(Special Correspondence).—C. W. Kenny, of San Francisco, has bonded the Sam Kaiser mine, near greenwood, and is sinking a double compartment shaft.

The Henry Welsh mine, on the Taylor belt, is being opened under bond.

J. Ramsdell has started a 5-stamp mill on his claim in the neighborhood of Greenwood.

Rock taken from the Blakemore mine, 14 miles from Placerville, mills $15 per ton. The shaft is 70 feet, and the drift on the ledge—which averages 3 feet—is 40 feet.

J. H. Tong, at Clarksville, has reached a depth of 70 feet on the Cram & Berry mine, his own property. The ore averages $20 per ton.

The Starlight is rapidly becoming one of the rich producers in the county. A recent 60-hour run with a small mill yielded $1,300. This is owned by San Francisco parties.

The Sacramento Development Company is reopening the old Snyder mine, 3½ miles south. The shaft is down 140 feet. The ledge, showing low-grade ore, is 23 feet wide.

Properties are now being bonded on 12 and 18 months in all sections of the county.

The Independence, adjoining the Starlight, is a famous old-time producer. Authentic records show a production of $150,000. There are three shafts of 65, 70 and 100 feet. The property is owned by N. W. Mountain, of Placerville, and others. It is now receiving the attention of outside capital.

Hoisting works have been erected on the Larkin, and depth is being rapidly attained.

New hoisting machinery is being placed in the Grand Victory, to fill the increasing demand following upon the new ore veins discovered. This and the south extension known as the Salisbury will form one of the greatest and lasting producers of the State.

The ten-stamp mill at the Kenna mine on Mt. Gregory is finished.

Thomas Swansborough takes charge of the Channel Bend gravel mine as foreman of the underground work. The mine is in a bar of the American river, about thirty feet above the present channel, and is located about two miles from Volcanoville. Eight men are employed at the present time and the property is owned by the company operating the Taylor and Idlewild mines.

### Humboldt.

At the Alexander placer mine at Orleans, last week, a landslide carried away and destroyed about 150 feet of pipe.

### Los Angeles.

The Los Angeles Petroleum Smelting and Mining Company has incorporated for the purpose of working ore from a mine purchased by them, the crude petroleum now being taken from wells around Los Angeles to be used as fuel for the smelter furnaces. The company has in contemplation the erection of a custom ore smelter in Los Angeles, which will use this crude petroleum as fuel; the crude petroleum can be purchased in Los Angeles for 50 cents a barrel; three barrels of petroleum equal one ton of coal for smelter fuel purposes.

### Lassen.

The *Mail* predicts considerable activity at Diamond Mountain, as soon as Spring opens. There are now three mills there, two of which have ten stamps each, the other five. These running steadily will crush considerable rock and if indications are to be considered of value, at least another ten-stamp mill will be erected next Summer.

### Mono.

The Con. Pacific, U. P. and Trust mines have been bonded to J. A. Brown and N. Tobias. The bond runs to July 1st, and Brown must keep a force of men at work until that time.

### Mariposa.

Captain Thomas Couch tells a Butte paper that it is his belief that Mariposa and Calaveras counties in California are capable of a production from the quartz mines alone that in the next five years will equal the amount of the national debt.

### Modoc.

The following doubtful item is from the *Surprise Valley Record*: "We are informed that an English mining company now has a complete smelting outfit on the way to this valley, and will put it up at the Soldier Creek mines. An assay of thirty-three per cent of good tin is said to have been made from the ore sent back. We hope that the report is true, and that a full force of men will soon be put to work."

### Nevada.

TO LAY THE PIPE.—*Transcript*: Men arrived here yesterday from San Francisco to put in place the heavy iron pipe that is to carry water from the flume to the power house of the Electric Power Co., out on the South Yuba river. The men were sent up by the Risdon Iron Works, which firm had the contract to furnish the pipe and put it in place. It is expected that everything will be ready to start the big dynamos on the 3rd of January.

THE CON. WYOMING CO. TO DISSOLVE.—*Herald*: A special meeting of the stockholders of the Con. Wyoming Mining Co. has been called for the purpose of dissolving the company as a corporation and surrendering its franchise.

The Wyoming mine, situated on Deer creek about a mile and a half below Nevada City, has been a great mine (and is now), and paid its owners handsomely. The principal stockholders were John M. Buffington Sr., A. G. Gurnett, Charles Pace, Marchutz & Cantrell, Isaac Hecht and H. L. Van Wycke. H. X. Thompson was one of the original owners of the mine, which was located in '51 and has been worked almost continuously since, and he built the first mill for it.

Thomas Mein, who is now superintending a great mine in South Africa, was one of the Wyoming's first superintendents. He began the development of the property and conducted it for six or eight months. John M. Buffington was then installed as superintendent, and ran the mine from 1877 to 1889, when it was shut down. During that time Mr. Buffington took out over a million dollars for the company, with a mill of sixteen stamps. He continued in charge of the mine, doing a little prospecting now and then, until '94, when the mine was sold to the Champion Company. Mining men generally are familiar with the details of the sale. The Con Wyoming Co. sued the Champion Co. for $200,000 damages for ore extracted from their ground. Plaintiff won the suit in the United States Circuit Court at San Francisco. Defendants then compromised by selling the property to the Champion Company for $80,000. The latter company paid for the mine in monthly installments and has recently made the last payment, so that the Con. Wyoming Co. has no longer any excuse for existence.

The contest between J. Glasson and A. Henderson et al., involving the Woodpecker Gravel Mining Company's placer claim, near the W. Y. O. D. and Pennsylvania quartz mines, is finally decided by Secretary of the Interior Smith in favor of the Woodpecker G. M. Co.

### Orange.

Action to foreclose mortgage has been brought by C. H. Gray against E. H. Miller et ux., to secure payment of an indebtedness of $8,965.35. The mortgage is upon the Red Butte, the Africa, the Lometa, the Prize, the Gray Eagle, the St. Louis, the Washington, the Colorado and the California mines, a one-half interest and a one-third interest in the Alabama, Ironwood mining district, Orange county.

### Placer.

The Erie Mining Company are running a tunnel at their tailings claim at Bear river dam, near Colfax.

The mill at English Mountain mine sixteen miles north of Emigrant Gap, has ceased active operations till next Spring. Five men remain and will work on the lower tunnel during the winter.

An assessment of one cent per share has been levied on the Haskell mining stock.

*Republican*: The Cinnamon Bear mine is situated three-fourths of a mile from the Lost Emigrant. The vein is from two to ten feet wide and has been traced for half a mile. The ore assays 17 ounces in silver, 31 per cent copper and $3 in free gold. The mine is at an altitude of about 6000 feet. The country rock is of porphyry formation.

Rich ore was struck in the Doig mine last week, and the development work is being vigorously pushed. This mine is one of the properties of the Gold of Ophir Mining and Development Company, recently organized by B. M. Berry.

### Plumas.

THE TAYLOR DIGGINGS.—*National-Bulletin*: Work progresses at the Taylor Diggings, near Genessee Valley, owned and fitted up by Chicago capitalists, represented by Mr. Clapp, superintendent.

The water supply is drawn from Taylor lake, two miles southeast of the Lucky S mine. In the flood season this lake is over a mile long and about 300 yards wide. Its depth is not known. At the lower end of this lake it is proposed to build a dam ten feet high, and by tunnel at the lower end to tap this lake fifty feet below the present level of the water. This will enable them to use most of the water husbanded from the rain and snows.

During the past season a ditch nearly fourteen miles long has been cut. Its carrying capacity is 2500 inches of water. Much flume work also has been done, and large quantities of iron pipe manufactured. Of this pipe, 3500 feet is to be riveted together and laid this winter.

The extensive area of gravel deposits to be worked by the Chicago Company is said to be a part of the big ancient river channel extending from Light's canyon across through Grizzly ridge.

Works to restrain debris can be erected at very small expense, the topography of the country below the mine being very favorable for such work.

Probably $20,000 has already been expended in fitting up the mine, and a considerable amount will yet be used in completing the work planned.

### Riverside.

*Sun*: In the Perris district, Riverside county, are located some mines that are making good records, the most prominent among them being the Santa Rosa. This mine was purchased about twelve months ago by some Colorado men from ex-Governor Blaisdell.

The main shaft was then 225 feet deep, with but little development work done. The company immediately erected a ten-stamp mill and commenced development in a systematic way.

They soon found a ten-stamp mill inadequate to handle the output of the mine, and last month commenced the erection of ten new stamps.

The new mill started to drop the stamps December 20th and was a success in every way. A contract has been let to sink the main shaft 1000 feet. The boiler was changed two months ago to use oil, which is brought from Los Angeles in tank cars, the consumption being about 800 gallons per day.

The Santa Rosa is without question one of the most promising mines in the State.

The proprietors of another prominent mine in the same district, the Good Hope, are working their twenty-stamp mill on pay ore, most of which is taken out by lessees, the company having found it more profitable to lease to the miners than to pay them regular wages.

Several mills are in course of construction in this district, from which good reports will be heard.

The big English grant is located but a short distance from the Santa Rosa mine, and is being thoroughly investigated by H. B. Vercoe, who is the representative of the London syndicate owning the grant. He has in contemplation the erection of a large stamp mill in the spring. He has just finished a millrun of fifty tons of ore, taken from his different discoveries, and it was so satisfactory that the mill will undoubtedly be built.

### San Diego.

*Sun*: The mining outlook in southern California is particularly brilliant just at present. All the biggest mines in this section were overlooked twelve or fifteen years ago, through the fact that at that time the silver, lead and copper mines were more certain and attractive to capital than low grade gold mines. It was impossible to interest capital in mines containing from $4 to $5 in gold when silver mines all over the West could be obtained running from $50 per ton and up in silver. And there were many disadvantages years ago connected with mining in southern California, such as high transportation, high price of living, expensive labor, scarcity of water, danger from Indians in Arizona, and in many cases even where it was of sufficient value to be worked, it was of such a rebellious nature that no process was known with which to work it.

But now everything is changed; there are different processes, such as cyanide, chlorination and many other processes by which every class of ore can be profitably worked, provided there is sufficient value for economic working.

There are railroads, good labor at a reasonable price, living is as cheap as anywhere in the United States. Water has been discovered in various places, and the fact that lead, silver and copper have fallen to such a low price has driven all the miners who formerly operated silver, copper and lead mines, into gold mining, and as all the high grade gold mines in the mother lode and other sections of the West are held at prices at which only capitalists of the largest means can own and operate them, has brought the low grade gold mines to the front.

There is now in southern California the largest gold mill under one roof in the State. The mine on which this mill is working, the Gold Cross, located at Hedges, San Diego county, was examined at different times by mining experts, but declared to be too low grade to be operated successfully.

The present company is milling over 300 tons per day of ore that yields to the stockholders a handsome profit over and above working expenses. They have two pipe lines running from the Colorado river, thirteen miles distant, which furnish the mill and camp with an ample supply of good water.

There are several other strong companies investigating the ledges in the vicinity of the Gold Cross, and within twelve months there will be more mills in operation.

TOURMALINE VEIN.—A tourmaline mine has been discovered near Escondido by C. Chapman and J. M. Best in the employ of H. C. Brown of the Consolidated Mining Co. The crystals are white, green and black. The white is almost as brilliant as the diamond, being six-sided transparent crystals, with the green and black spars running through them, and when polished will make beautiful jewels. The green crystals are what are known as the three-sided crystals, some of them being one-half of an inch in diameter and running in length to as high as five or six inches. The black crystals are considered the lowest grade and are of no great commercial value.

### Shasta.

MINING SALE AGREEMENTS.—*Free Press*: An agreement between John J. Franck, John J. Kelly, Timothy Madden, Jr., and W. G. Van Matre with David B. Hunt was filed with the county clerk and recorder December 23rd, wherein the first named parties agree to sell to the last named the Alexander, Queen of Diamonds, Lucky Jack and Gould quartz mines; also the Thomas Greene dwelling house, the Queen of Diamonds mill site and quartz mill of five-stamp capacity, and water rights to 160 inches of the waters of Summit gulch. All the property is situated in French Gulch mining district, and is to be sold for $25,000 on or before July 16th, 1896.

An agreement between Mrs. L. M. Fox, J. C. Johnson, W. G. Van Matre, V. L. Fox, Mrs. Eliza Simpson, Mrs. Luke McDonald, Mrs. Josie McConnell, Mrs. Mary J. Reineke, Mrs. Kate Everhart and William W. Matthewson with David B. Hunt was filed with the county recorder, December 23rd, 1895, wherein the first named parties agree to sell the J. I. C. quartz mine, in French Gulch mining district, for the sum of $12,000 on or before July 16th, 1896.

### Sierra.

*Union*: Gravel has been struck in the Lucky Dog tunnel, which was run in some 360 feet. This tunnel lies between Forest City and the Mountain House, and shows that the Bald mountain gravel channel extends down that way. The North Fork main tunnel has been steadily pushed ahead and will probably reach the channel by spring, when Forest City will again be prosperous. Things have a brighter look in that section already.

In the Hope quartz mine at Alleghany stringers of quartz that is heavily sulphuretted have been struck. They have 280 feet yet to drive before reaching the old works, the ore shoot in which was very rich.

There is a likelihood of the old Rainbow mine at Alleghany being opened up again. Several hundred thousand dollars have been extracted, and more than $150,000 have been spent looking for a lefthand shoot, which is known to dip to the right. A comparatively small amount of money will now set them right on the way to success, for the Rainbow shoot of ore when worked was very rich.

Work is progressing at the El Dorado and Plumbago mines, and the outlook is very encouraging. Rich developments are expected before long.

### Siskiyou.

The Seiad creek mine of W. T. Grider is running with a good supply of water.

Work will be continued during the winter on the old Spencer tunnel, on the north fork of Humbug. The ledge will be struck at a depth of 400 feet, where it is expected to be rich and permanent.

The Portuguese Bar mine, owned by R. E. Neil of San Rafael, is in readiness for the winter run. G. A. R. Lewington is superintendent.

At the Montezuma drift claim, Scott bar, Hunt & Nesbitt have been taking out about $300 a week for the last five months.

The Columbia Mining Co. at China creek is ready to commence operations as soon as the water season opens. Lee and Silva are managers.

A force of twelve men are employed on the Commodore mine—the property of Quigley, Humphrey & Billups—and two arrastras are constantly running. The ledge is about two feet wide and will average about $30. Since the discovery of the Commodore, last July, some $3000 has been taken out, and $75,000 is reported as being in sight.

The Siskiyou Mining Co., on Clear creek, below Happy Camp, last week turned the water into their new ten-mile ditch for the first time. This is a very valuable property, and will no doubt soon be ranked among the best gold producing mines in Siskiyou county. F. D. Fraser, the energetic superintendent, deserves great credit for the able manner in which he has handled this large enterprise.

The Seattle Co. at Seiad have their new ditch well under way. They propose completing about four miles of it this winter, and now have a force of seventy-five men working on it. When completed this ditch will take the water from Thompson creek. A. A. Booth is manager. Woodville is the name of the new place.

The Gold Nugget hydraulic mine, near Sawyer's Bar, has commenced operations, and others will soon be started up.

Work has commenced on the Chinese Oak mine, near Happy Camp. Two giants are at work now, and others will soon follow.

The McCauley mine, on French Bar, near the mouth of Scott river, still continues to pan out well. The main tunnel is about 250 feet long, and the work is being pushed.

The drifting claim of B. F. and C. Maplesden, at Hamborgh Bar, still continues to turn out well.

The flume of the Siskiyou Mining Company, at Clear creek, which is nearly eleven miles in length, has had the water turned on, and is naturally causing some work on account of land slides. Two giants will be in operation next week.

Improvements are going on at the Bunker Hill mine. Messrs. Hughes and Gilbert are owners.

Preparations are being made to turn the giant loose early in February in the Wingate Hill mine, on the Klamath, about eight miles below Happy Camp. This property is owned by G. B. Temple, who recently sold the Bunker Hill mine to Hughes & Gilbert for $10,000.

Work on the Narcissus quartz mine, owned

by Egli & Dawson, is being pushed with favorable indications. The quartz in sight shows considerable free gold, and they expect to strike the main ledge before long.

The Gum Boot mine of Simon Bros., Sheller and Humphrey, seven miles from Scott Bar, the ledge averages from four to eleven feet in width and shows considerable free gold. It is a new claim just being opened.

The river claim of G. A. Hicks, Martin Andrews and Thomas Miner is still being worked. This is one of the largest and most substantial wingdams ever put in the Klamath river. The claim is just below the mouth of Scott river, in a section that has always paid well.

*Journal:* The Henshaw Bros.' mine, at Greenhorn, closed down. On the 21st ult. the pump broke, which caused a suspension of work, and when the pump had been repaired the men refused to go to work until they had been settled with. The mine has not been started up yet, but it is expected that everything will be settled soon, and work will be resumed.

Mrs. N. E. Hilt, owner of the Harrison quartz ledge at Bailey Hill, in the Siskiyou mountain foothills, has men at work running a long tunnel to tap the shaft sunk some time ago on that lode. The tunnel was started at head of west fork of Bogart gulch, about the 1st of December, and is now is about seventy feet, with nearly water enough already coming from the tunnel to operate a five-stamp mill. She thinks the tunnel will have to be extended about 250 feet to tap the lode, which will also be about 250 feet below the surface. This ledge has always shown good prospects, and it is expected will prove a rich gold yielding property when the tunnel is completed to get out plenty of quartz.

The Chinese Company, working the Benz Bar mine at Honolulu, Klamath river, still continues operations, notwithstanding the severe cold weather of the past week. They struck a rich crevice last week, from which they realized $1,800 in one day, and feel hopeful of taking out a big pile of gold before freshets prevail to drive them out. The gold in this claim is the output of Dutch creek, and sells at about $15.75 an ounce, while the gold from the old Kanaka claim just above the mouth of Dutch creek sells at $17.50 an ounce.

The Spengler Brothers have been obliged to suspend work in their claim at mouth of Humbug creek, owing to the water supply freezing along that stream, and especially in the deep snow on the Humbug mountains.

The chinese working the claim in Klamath river, just above the mouth of Humbug creek, are working day and night shifts, and have huge bonfires blazing continually to keep warm. They are undoubtedly realizing good pay, else they would not work during the storms and freezing weather lately. This claim shows a regular rock bed canal, with perpendicular walls on each side, in which there is a great mass of boulders and gravel, interspersed with coarse gold.

The winter work at the Schroeder quartz mine on Deadwood mountain, is carried on with good success in getting out quartz for crushing. There is only about a foot of snow on the mountain at present to cause any interference in the communication, although the snow causes no trouble with the work in the tunnels.

### Trinity.

AT TAYLOR'S FLAT.—A. Pelletreau's Highland placer mine is being put in shape and is expected to be in operation by next February. A ditch, about a mile and a quarter long and carrying about 500 inches of water, is now completed, while the flumes are in course of construction.

The last rains furnished sufficient water to some of the miners along the Trinity river to commence mining. The big French company's mine at Junction City has started up.

W. Huestis is now fixing up the Don Juan mine and operations will begin before long.

### NEVADA.

The *Enterprise* hears that A. Livingston has purchased the interest of William Zirn in his three marble quarries in Pine Nut. Many experts are of the opinion that at a little depth it will turn into gold-bearing quartz. Almost immediately under the surface the marble assumed a crystallized form.

#### ON THE COMSTOCK.

CHOLLAR.—From the stopes above the south drift from No. 2 crosscut, 450 level, we are working north on the 7th floor. The pay bunches continue to look about the same.

In the stopes above No. 2 crosscut, work has been confined to the 3d and 4th floors.

From these points we have saved and shipped to the Nevada mill during the week, 72 tons and 1800 pounds of ore, the average of the battery samples being $29.63.

We are making repairs to the main shaft; also to the main west drift on the 550 level.

POTOSI.—In the stopes above the north drift, 850 level, work has been confined to the 10th, 11th and 12th floors, from which we have saved and shipped to the Nevada mill for reduction 135 tons and 300 pounds of ore, the average battery assay of which was $28.53 per ton.

From the old workings from the south drift, 550 level, we have drifted south along the hanging wall 30 feet on the 4th floor, which shows old fillings and bunches of ore.

We are repairing where most needed.

We have shipped two bars of bullion of the par value of $5549.

OCCIDENTAL. — 550 level — The southwest drift from northwest crosscut has been extended five feet; total 143 feet; the face is in hard porphyry. 650 level.—The north drift from northwest crosscut is in sixty-two feet and continues in low grade ore. The upraise from north drift is sixty-two feet, having been extended eighteen feet during the week. The top is in quartz, clay and porphyry, the quartz showing value. 750 level.—The northwest crosscut from north drift started at a point 310 feet north of the main winze has been extended nine feet; total sixty-five feet; face is in hard porphyry.

ALTA.—825 level—The south lateral drift, 825 level, was extended nine feet in quartz, carrying bunches of good ore; total length, 189 feet. The north drift same level was advanced eight feet in hard porphyry carrying seams of quartz of low assay value; total length 160 feet.

#### ORMSBY COUNTY.

J. C. Stanley, mining in White Horse district, seven miles from Wadsworth, has brought some quartz to Reno from the White Horse mine, which is prospected by a shaft to a depth of 100 feet. The samples are from the bottom of the shaft and contain wire gold.

#### LYON COUNTY.

*Times:* The barge which contains the screening plant of the Carson River Dredge Company has been hauled down the river and pulled up on the bank for repairs. The company intends to commence operations again as soon as the ice leaves the river.

#### LINCOLN COUNTY.

The Pioche *Record* says all prospectors who have been through the region agree that the country from DeLamar south to the Colorado, and beyond, is a good field for gold prospectors. The biggest developments thus far are those of Ferguson district.

### OREGON.

#### DOUGLAS COUNTY.

(Special Correspondence).—The history of this mining district (comprising Starveout creek, with Hogan creek as main feeder) is a repetition of the gold mining camps on the Pacific coast since 1850—up and down. Interest was again awakened in 1893, and with the beginning of the season of '94 about thirty-five men were ready to begin work.

Beginning farthest up the creek we have the claim of J. L. Cotton, whose output was over $400 in coarse gold pieces from $21 to $128.

Adjoining below is C. C. Grimes' claim, his output being about $500, with one $144 and one $176 nugget.

The next claim belongs to C. C. Wilkeson, and owing to sickness but little work was done by him.

This brings us to the claim of P. H. O'Shea. This is one of the best on the creek. His ground covers the junction of the east and west forks of the creek and is quite extensive. He leased the ground to A. M. Britt and N. Peterson, reserving the right to work over tailings, and the total taken out was about $1500.

All of the above claims were worked with pick and shovel, the surface ground sluiced off and the bedrock cleaned up with a light head of water through small boxes.

The next property is the 100 acres owned by S. W. Miser and leased to the Dyer Bros. of Myrtle Creek. This was the only hydraulic claim on the creek last season. Their dead work was extensive and output small.

Below we have the claims of J. McCormack, J. Bailey and W. Wiley. Being from three to four miles below the source of coarse gold, their claims average well in fine gold.

This season Messrs. Cotton, Grimes, Wilkenson and Dyer have pipes playing on the bars, an improvement over last season.

#### JOSEPHINE COUNTY.

OPERATIONS RETARDED.—*Oregon Mining Journal:* The work of destruction commenced a week ago by a dynamite fiend on the bridge of the Siskiyou Mining Co., over the Illinois, was this week completed by the elements. The snows and rains of the past week sent an immense body of water down the river, with the result that the bridge was lifted from its supports and carried down the stream. This loss is most embarrassing to the company at this time, and will retard operations for several months. Supplies will be taken across the river on a wire rope, and in the meantime the 1000 tons of copper ore on the dump will be at once smelted.

A PROMISING PROPOSITION.—*Mail:* There is probably not another mining proposition in southern Oregon, practically undeveloped, that is promising a brighter future than the one now being opened at Bolt by the Lance Mining Co. The property which this company owns comprises 700 acres and is located almost squarely at the door of the Bolt post-office. Work is now being pushed for early and earnest working of the mine. There are now eight or ten men at work. One hundred and fifty sluice boxes, twelve feet long, are being built, 5000 blocks are being sawed, a sluice way 2300 feet in length is being made, and a tunnel from Foots creek to the Rogue river is being put through, this latter for dump grounds. The company will put in 2000 feet of pipe and will have plenty of water, during an average wet season, to run eight months in the year. A reservoir, with a capacity of from two to three million gallons, is also being made. From this the company expects to be able to run eight hours. The ground is very rich—in no pan which has been tested has there been found less than five cents in gold. The average of a yard of dirt where work is to commence is seventy-five cents. Three miles of water ditch is also to built; this work is to be done by contract. Work is expected to commence with pipe and giants about February 1st.

### WASHINGTON.

#### OKANOGAN COUNTY.

The Spokane Mining Company at Golden, Okanogan county, will soon start up their works. There is a 10-stamp mill and concentrators on the ground. Sixty thousand dollars have been spent in machinery and development on these properties. The Tribune mine will resume operations. This mine is also equipped with a stamp mill and concentrators.

### BRITISH COLUMBIA.

One of the remarkable mining events of the year in the Similkameen country was the find of copper on the Tulameen on Wolf creek, about seven miles from the Anglo-American Company's property. The place is known as Copper mountain. There W. R. Brown and partner from Kettle river staked three claims —the Helen, the Gardner and the Discovery. The vein is reported to be 400 feet wide and can be traced through three mineral claims, or 4500 feet, and assays have been got from 40 to 76 per cent copper, 15 and 16 ounces silver and $6 in gold.

AT ROSSLAND.—*Miner:* The receipts at the office of the mining recorder in Rossland from January 1st to date amount to $24,430. This does not include the total provincial revenue from this district, as taxes on real estate and personal property are paid at Kaslo, but during the last year this amount would be a mere trifle, though next year it will be a considerable item. It does not, of course, include customs collections, which go to the Dominion revenue.

Two thousand quartz claims and four placer claims have been recorded in the Trail creek mining division since the first of last January. Probably 100 more quartz claims located prior to that date have been kept alive by assessment work, making a total of 2100 or more quartz claims alive at this date.

Certificates of work to the number of 215 have been issued on these claims during the same period. Five certificates of improvements have also been issued. Applications have been made for certificates of improvements on a great many more claims, but owing to adverses and other causes the certificates on these claims have not yet been obtained.

The *Miner* also says: Orders have been received at Trail to proceed at once with the erection of two more reverberatory furnaces, which will have the result of giving the smelter a capacity of 300 tons a day from the start. Nothing could speak more eloquently of the development of the camp than this. When the smelter was first planned it was to have a capacity of from 50 to 100 tons a day, but before the buildings could be erected it has been found advisable and necessary to increase the daily capacity to 300 tons.

RIVER BOTTOM GOLD.—*Kamloops Sentinel:* F. W. Young, of Lytton, who has been working on the problem of obtaining the gold from the bottom of swift streams, and the result of his study has been an apparatus of entirely new features, which has just been patented in Canada and the United States. This new machine he will operate on the Fraser, above the Cottonwood, not far from Quesnelle. As a result of his work at Lytton, Mr. Young concluded that the largest amount of gold was lodged from two to three feet below the boulders, which formed the bottom of the river. To remove large boulders would be out of the question, and to accomplish the required purpose he has devised a means by which the bottom to that depth is agitated without necessarily raising the stones. From the bow of his scow a heavy boom projects, through the end of which, and working on a swivel, passes a heavy casing, enclosing the suction pipe of the pump. At the bottom of this pipe is a heavy piece of iron resembling a knife blade. When in operation the pipe is lowered to the bottom of the stream, drawn, like a plow, toward the scow by chains carried to a hoisting gear on the scow. This loosens the small gravel and sand, which is drawn through the suction pipe and pump to the sluice boxes. The pipe is carried forward from the scow again by another cable, and is thus kept going backward and forward all the time. This part of the machinery is operated by two pony engines traveling on a circular track, so that the dredge can be moved 25 feet backward and forward, and has a swing of 180 degrees. The pump is a powerful one, and delivers the water and gravel into the sluice boxes on one side or other of the scow, where, with quicksilver the gold is saved. While a clean-up is going on upon one side, the other sluice can be used, so that the machinery is kept constantly employed. The scow is held in place by speeds opposite the center of the boat, and stern wheels furnish the motive power. The scow to be built at Quesnelle will be 26x80 feet, or over all, with stern wheel and boom, 126 feet in length. The owners of the machinery and grounds will be known as the Pittsburg & Cariboo Gold Dredging company.

#### VANCOUVER ISLAND.

Supt. McQuillan of the Duke of York mine at Alberni, is in this city to examine hydraulic machinery for the company's mining properties. He says there are two hydraulic claims, each employing ten men, and numerous other locations which have gold, both quartz and placer. There are two companies operating the hydraulic mines, but the combined investments do not exceed $30,000. Men have taken up claims and are waiting for money. The country is not rough, nor in any sense disagreeable, and the work can continue upabated the year round so far as weather would interfere. In August or September the supply of water might give out, but at other times there is any amount of water. The men are now engaged in building the flumes, and these will not be required for a greater length than one and one-half miles. His company pays good workmen $2 a day and board. Alberni is in about the middle of Vancouver Island and is fifty miles from Victoria and seven miles from boat landing.

### UTAH.

"LIQUID GOLD."—Idaho *World:* Mrs. Gerard Huppertz brought from Utah some of the handsomest specimens of copper ore we ever had the pleasure of gazing upon. It is rich in gold. This ore is from the Mammoth, Utah's greatest producer, with possibly one exception. The copper the ore carries pays all expenses of mining, transportation and reduction, leaving the gold clear profit. The mine has been developed to a depth of 1300 feet, and, strange to say, is perfectly dry. The Mammoth carries a form of gold that is not metallic, which, she says, is termed there "liquid gold"—perhaps for the want of a better name. The same form of gold in found in Deadwood, Dak., and is also termed "liquid gold" there. This is the fifth form in which gold is found non-metallic, or at any rate, if it is metallic those who still hold to the theory that gold in nature is always in the metallic form are unable to upset this new theory.

PARK CITY.—*Record:* The new dynamo, with which to increase the present horse power of the Ontario electric plant, and the Pelton water wheel have arrived and are being placed.

The slime tables for the Daly-West concentrator have arrived. The mill will not be ready to start before the last of January and may not be started on a steady run until warm weather comes, as it is cold at the Daly-West, and the mill is not yet provided with steam coils or other means of keeping the frost away.

S. L. *Tribune:* Director W. S. McCormick has returned after a visit to the Bullion-Beck and confirms the report of improved ore bodies in the old bonanza, which has now distributed dividends amounting to $1,950,000, and which promises additional dividends as developments progress. The recent strike on the 600-foot level, says Mr. McCormick, has proven up as well as was predicted, and is yielding some very good ore, while in the winze between the 800 and 900-foot levels the size of the ore body has increased until it is a very large one, but of a grade inferior to that which is produced above.

A report that an Eastern syndicate had made an offer upon the basis of $1,000,000 for a controlling interest in the Ajax is denied by Henry M. Ryan, through whom the negotiations at this end of the line are going on. The facts are that a telegram was received by Mr. Ryan from Chicago, announcing that representatives of a foreign syndicate whose attention had been drawn to the Ajax had signified their readiness to put $300,000 into mines.

### MONTANA.

A Helena dispatch says: Montana produced in metals about $47,115,000 during '95, taking the value of the silver at the coinage rate and estimating the last two months of the year on a pro rata basis. The official report of the assayer for this office will not be ready until some time in March, but it is believed that the figures given will not vary more than a few thousand from the real amount. The production of gold was $4,100,000; of silver, 4,500,000 ounces; of copper, 212,000,000 pounds, and of lead, 24,500,000 pounds. The output of copper is estimated as being 65 per cent of the production of the United States. The receipts of bullion at the Helena assay office during '95 were 10 per cent greater than last year and 47½ per cent greater than during '93.

The Stone Creek Copper Belt Mining Co. is incorporated by Butte men to operate copper properties at Stone Creek in Madison county, and to concentrate the ores, lease, purchase and develop tunnels, etc.; capital stock, $200,000; trustees, J. M. Montgomery, G. Fitschen, R. A. Carder, A. W. Barnard, J. F. Beck.

Coal mines have been opened up near Missoula recently and are being operated by Missoula people.

THE ANACONDA.—The *Inter-Mountain* has it from good authority that the Anaconda has earned nearly four cents per pound on all the copper produced in 1895, and in addition has been spending thousands of dollars in machinery, new electrolytic works and in sinking its principal shafts. It is believed that the profits of 1896 can be forced up to five cents if desired, which would leave a surplus of over $1,000,000, after paying a ten per cent dividend.

### IDAHO.

Dan Reber, owner of the Golden King mine in the Dixie district, near Mountain Home, said to a Boise *Statesman* reporter recently that his mine was now under option and would probably be sold within a few days. "I have the largest body of ore in Idaho," said Mr. Reber, "and if the mine is not sold I will prepare to treat 100 tons per day by the cyanide process by the first of March. I have sunk a shaft of 210 feet to the ledge and run two levels of about 300 feet each. The ledge is sixty feet wide and will average $10 per ton. In one of the levels we have struck a streak in the ledge of eighteen feet in width that averages $20 per ton." Mr. Reber stated that development work had been suspended on the Golden King pending the negotiations for a sale, but that a large force would be put to work within a short time.

CŒUR D'ALENE CAMPS.—The are about forty men at work in the Mammoth.

The Consolidated Tiger and Poorman is employing about 125 men, the Tiger being run night and day. Work is progressing on the tramway connecting the Tiger shaft with the ore bins at the Poorman mill.

At the Standard mine on Canyon creek there are 80 men employed. The Campbell tunnel is in 800 feet. This will require a total length of 2587 feet to cut the lode, which it will intersect at 436 feet in vertical depth below the Banner tunnel.

At the Gem sinking is the only work in progress. They have just made a record of 85 feet in 30 days. The shaft now lacks 60 feet of the third level, when a station will be blasted out and a full crew of about 130 men put on. This will probably occur some time in February. The property now employs 35 men, all told.

The Hunter mine at Mullan has closed down for the winter.

The owners of the Wyoming are doing some development work this winter. They have a tunnel 100 feet long and several crosscuts and raises, all in ore.

The Morning is working about 90 men, and is running from 220 to 240 tons of ore through one side of the concentrator daily.

Work on the Standard mine in the Cœur

d'Alenes is suspended. New machinery will be installed which will double the output of the property. The new tunnel will be the largest in any mine in the northwest and will be wide enough to accommodate three tracks. This mine is the most remarkable producer of any in that section. In October it paid, clear of all expenses, $23,000, and in November $35,000.

The product of the Last Chance mine, near Wardner, is now about 600 tons a month. After March 1st the product will be about 1000 tons a month.

SALE OF FLORENCE QUARTZ CLAIMS.—Grangeville *Free Press*: J. S. Rhoades and J. P. Fitzgerald have sold the Ozark quartz claim in Florence to Messrs. Gilbert, president of the First National bank of Moscow, Jacobs and McCrea of Kendrick for $10,000. The purchasers have contracted with Mr. Fitzgerald to do 100 feet of tunneling at right angles at the end of the tunnel now on the property. If the tunnel work shows up the property as expected machinery will be taken in this winter.

ON SNAKE RIVER.—Boise *Statesman*: A. H. Butler has returned from Froman's ferry, on Snake river. He has just completed the big barge for E. H. Lewis. On the barge is an immense engine which will furnish power for the pumping apparatus, the idea being to pump the gold-bearing sand from the bottom of the river. The machinery has the capacity to pump and treat 2500 yards of dirt a day. It is expected several other barges will be put on the river this year. Mr. Butler has also been working his claim near Parma with a small force of men. The ground goes 75 cents to $1.50 a yard. The dirt is run through sluice boxes, yielding $5 a day of ten hours to the man.

### SOUTH DAKOTA.

1000 STAMPS.—The directors of the Homestake and associate mining companies, aware of the small milling capacity compared to the ore supply, have been maturing plans for increasing the number of stamps. Additions have been made from time to time to the number of stamps already in operation, but these have only been makeshifts at best. Recently plans and specifications have been submitted to the directors at their office in San Francisco for four mills of 250 stamps each. These plans, so our informant says, have been adopted and the mills will be erected during the ensuing year. They will be located on Whitewood creek above Pluma. Our informant further says that some radical changes will be made in the method of mining; that a large area of the old workings will be caved in and the work done more from open cuts. The vein itself is known to be 600 feet in width, and at a depth of 950 feet the grade and width improves. As only an occassional fault occurs in the vein or deposit, something of its magnitude can be comprehended.

### MISSOURI.

On the 1st inst. was organized a zinc trust which is expected to unite all the zinc smelters of the country except four under one management practically, and the result will be, the promoters claim, better prices for zinc in all branches and a general revival of the industry. The money involved is about $2,000,000, which is to be furnished by New York and Connecticut capitalists. The deal was engineered by B. F. Hobart, president of the Kansas and Texas Coal Company, which controls a big zinc smelter at Pittsburg, Kan. The new company will control all the zinc smelters in what is known as the southwest Missouri district, embrazing the zinc production territory in Missouri and Kansas. Two smelters in Indiana are in also.

### MICHIGAN.

At the Ropes gold mine at Ishpeming a vein of quartz has been encountered on the sixteenth level which assays between seven and eight dollars to the ton. The quartz in the stock pile of the Michigan gold mine is being treated.

### COLORADO.

FLORENCE OR COLORADO CITY.—C. M. MacNeill, manager of the reduction works recently destroyed by fire, says: "We will not rebuild at Lawrence, owing to its not being on any railroad, and in addition, the mill has always had to lie idle three or four months of the year on account of lack of water. In all probability work will be commenced on a 250-ton chlorination plant at either Florence or Colorado City soon after the first of the year. The chances are that the plant will be located at the latter place, but it has not been definitely decided."

THE MOOSE.—At the Moose at the present time the depth of the shaft is 650 feet, being the second deepest in the camp. Over 7,000 feet of drifting has been done. Since February, 1894, the mine has paid regular monthly dividends ranging from $6000 to $12,000. The present output is about 700 tons per month.

### NEW MEXICO.

HILLSBORO COUNTY.

*Advocate*: A carload lot of ore shipped from the Richmond mine to El Paso last week gave returns of 20 ounces of silver, 7.4 ounces gold and 5.7 per cent copper, being over $170 per ton gross value. It was produced by lessees Story and Titus, and their second-class milling ores from the same chute gave returns of 2 ounces of gold per ton. Only 60 days of two men's work accomplished this result and in that short time they made more than a miner's average year's wages, besides paying a handsome royalty to the mine.

### ARIZONA.

The Yuma mine near Tucson has been purchased by the Pima Mining & Smelting Company. The work is being carried on under the superintendency of Mr. Wemple.

Montana parties have bonded the Green Mountain group of mines on Big Copper creek, near Prescott, for $80,000. Work will be pushed on an extensive scale after Feb. 1.

AROUND CONGRESS. The Congress has 340 men at work. Workings in the mine are over 1500 feet deep, with good ore in the bottom. Two large boilers are being put in to sink the shafts 1,500 feet deeper, which will give them a depth of 3000 feet.

A Chicago company has bonded some gold mines five miles west of Congress and started to work. The Cleveland and Mocker are the principal mines in the group. The Cleveland has two 75-foot shafts and a large body of quartz. The Mocker carries a large vein from 4 to 5 feet wide.

### SOUTH AFRICA.

GELDENHUIS DEEP. Under date of Nov. 23, 1895, H. C. Perkins, manager Geldenhuis Deep, Johannesburg, reports:

Geldenhuis Deep battery foundation entirely satisfactory. Foundation for second hundred stamps now under construction in precisely same manner. Lack of Kaffirs alone prevents running plant full time. Have in mine 300 Kaffirs; require 1,000. This necessitates stoping with air drills, and reduces grade of ore through breaking undue amount of waste. Have milled 7,000 tons from mine and 4,800 tons from dumps. Average assay value of rock milled, 9 s pennyweights. Recovery has been poor at first, as large amount of gold is absorbed by new plates, but returns are now increasing. Cyanide works started satisfactorily. They will give low returns first month, owing to absorption of gold by solutions and zincs.

## A Letter from John M. Wright.

TO THE EDITOR:—In Mr. Ford's letter, published on page 423 of your issue of December 28th, I note the following language, which conveys, probably without intention on Mr. Ford's part, a misapprehension of certain facts connected with the matter under discussion.

The writer, as chairman of the Legislative Committee, drafted a bill based on the Idaho-Montana Act, and presented the same to the Executive Committee for its approval. This bill became known as the "committee bill," and is the same bill published at page 402 of your issue of the 21st inst. Mr. Ralston moved that the bill thus presented be approved by the Executive Committee and forwarded to Congress for passage by that body. After considerable discussion, and before a vote was taken on Mr. Ralston's motion, Mr. Wright moved that the chairman of the Legislative Committee and the chairman of the Mineral Lands Committee be appointed a special committee to confer with the railroad authorities and ascertain their views with reference to the proposed legislation. The writer and Mr. Ralston thereupon, and in pursuance of the instructions contained in the above motion, communicated with Mr. Herrin, etc.

The following are the facts:

The Idaho-Montana Act was reported by the Mineral Lands Committee to the Miners' Association last October, and the action of the committee in presenting the Act to Congress through Mr. Caminetti last January was unanimously approved by the votes of 500 members present at the meeting of the Association.

The Legislative Committee, of which I am a member, but whose meetings I did not attend,—pursuing the policy thus outlined by the old Mineral Lands Committee and sanctioned by the Association—adopted anew the Idaho-Montana Act, and presented it to the Executive Committee for its approval at the meeting held in the maple room of the Palace Hotel, on the night of November 27th last. The bill had just come from the printer, and before the members of the committee had time to read it over, Mr. Ralston moved its adoption. Then followed a running debate on the principles of the bill, which finally settled itself down to the question of postponing action in order to confer with the railroad authorities. Although Mr. Ford had presented the bill on behalf of the Legislative Committee, he led the movement against its adoption throughout a debate lasting over two hours, while on the other side Judge Belcher and myself both strongly contended for its immediate adoption. I do not know who made the motion for postponement, but when the vote was taken there were but two negative votes, those of Judge Belcher and myself.

Shortly afterward some one, not myself, moved that Mr. Ford be appointed a committee of one to confer with the railroad authorities. The motion which I made was made then, and was in the form of an amendment, namely, that Mr. Ralston, as chairman of the Mineral Lands Committee, should be added to the special committee so that it should be composed of Mr. Ford and Mr. Ralston. This seemed to be a fitting courtesy to the chairman of the Mineral Lands Committee.

In another part of Mr. Ford's letter I note a statement that the substitute bill received but one negative vote. This is incorrect. There were no votes cast against the substitute bill.

I do not write the above for the purpose of reopening debate upon a question which is already understood by those interested, but in order that I may not be made to appear responsible for the initiation of any of the negotiations which have taken place with the railroad company, all of which have been against my judgment, my protest and my vote.

JOHN M. WRIGHT.

San Francisco, Dec. 30, '95.

## Dividends Paid.

THE Horn Silver, Utah, Mining Co. paid a 12½c per share dividend, aggregating $50,000, on the 2nd inst.

THE Napa Con. Quicksilver M. Co. paid a regular 10c per share dividend and an extra dividend of like amount on the 1st inst., aggregating $20,000.

THE Smuggler Union Co., operating at Telluride, Col., paid a $25,000 dividend of 50c per share on the 2nd inst.


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References:
Timothy Dwight, President Yale University, New Haven, Conn.
Henry S. Munroe, Professor, School of Mines, Columbia University, New York City.
Joseph S. Harris, President Phila. & Reading R. R. Co., Trustee Penn. University, Phila., Pa.
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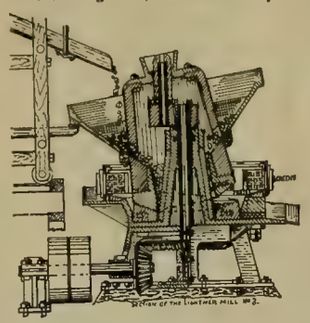
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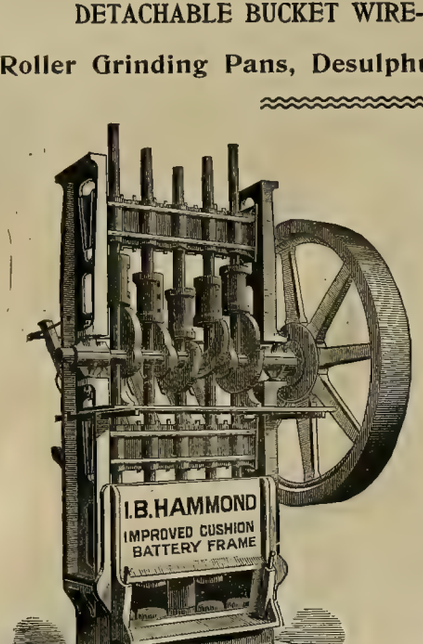
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## Coast Industrial Notes.

—Oil prospecting machinery is at work at Point Loma, on San Diego bay.

—T. M. Hale, representing Eastern men, says if San Jose will subscribe $50,000 his company will put up the additional $150,000 required to build an electric road from San Jose to Saratoga.

—The Parke & Lacy Co. recently furnished a 1200-gal. capacity station pump to the Merced G. M. & M. Co. at Coulterville, a complete sawmill outfit to Guatemala, a Gates crusher to Australia and a cableway to the Onena Sugar Co., Honolulu.

On the 31st ult. the Portland, Or., Consolidated Street Railway System was sold under foreclosure for $307,000 to the Rollins Banking Company of Boston. The property comprises three systems, including one extending to Vancouver, Wash.

—At the Atlanta Exposition, on fruit California excelled any other State, and secured the medals and awards, some twenty odd. Most of them will be gold. The State had previously won seventy-five premiums, and it looks as though the total number of awards made to California will aggregate nearly 100, and between forty and fifty of them will be highest in their class and carry with them each a gold medal.

—Despite the plain intent of Congress that one of the two new battle ships should be built on this coast, Secretary of the Navy Herbert has rejected the bid of the Union Iron Works and awarded the contract to the Newport News and Drydock Company. The act authorizing the construction said one of the ships "shall be built on the Pacific coast," but the bid had to be "to the satisfaction" of the Secretary of the Navy, and, of course, it is difficult to satisfy a man who believes that the Allegheny mountains form the western boundary of the United States.

—Moran Brothers of Seattle, Wash., have the contract for building the new Federal tugboat Golden Gate. Their bid was $38,765; the boat is to be completed by August 1st. The boat will be 110 feet long, 100 feet between perpendiculars, 20 feet 6 inches beam, molded, and 12 feet ½ inch amidships. Her propelling power will consist of a triple expansion engine, 13-inch diameter high-pressure cylinder, 21-inch diameter intermediate pressure cylinder and a 32-inch diameter low-pressure cylinder, all of them of 24-inch stroke. The engines will indicate 525-horse power when running at 160 revolutions per minute. The bid is for the vessel without her boiler or fittings; the Government is to furnish the boiler and put it in place. It is to be of the forward water-tube type, similar to the boilers furnished the cruiser Charleston, which type has been approved by the Navy Department.

—A 20-stamp mill is now being erected at the mine of the Golden Gate and Sulphuret Mining and Development Co., Sonora, Tuolumne county, Cal., of the heavy, quick drop type. The mortars are of improved design, with large screen surface. The stamps weigh about 1,000 pounds each, intended to drop from 105 to 110 short drops a minute, with a capacity of 3½ to 4 tons per 24 hours. The stems are 3½ inches diameter by 15 feet long. Cam shafts 6 inches diameter, of hammered iron. Cams, tappets, shoes and dies are made of steel. Each 10-stamp battery is operated by friction clutch pulley. The battery frames are of the "knee" type, built of heavy timbers. The entire plant is operated by water power. The Golden Gate mine has been a rich producer for many years, and when the new 20 stamps are started up, large shipments of bullion are looked for. The mill is being built by the Joshua Hendy Machine Works, and designed by their engineer, John O. Norbom. The same firm recently built a 10-stamp mill for the Golden Gate Manufacturing Company, on the old Tullock mine at Angels, Calaveras county, Cal., and a 10-stamp mill at the Two Channel Gold Mining Company's mine in Placer county.

## Personal.

T. L. Ford expects to start for Washington on the 15th inst.

Nicol Brown is expected to return to London from South Africa next March.

John Moynahan has been appointed superintendent of the Le Roi, Idaho, mine.

D. B. Hanson of the Edw'd. P. Allis Co., has returned from a trip to Milwaukee, Wis.

On the 8th inst. George H. Robinson assumes the management of the Mercur, Utah, property.

Richard Gayou has assumed management of the La Zaragoza mine at Minas Prietas Sonora, Mexico.

Geo. H. Evans has assumed the management of the River Claim, Banner, Butterfly and Rock River mines in Butte Co.

Prof. Jos. Le Conte, of Berkeley, has been elected president of the Geological Society of America, now in session in Philadelphia.

Thos. Couch, manager of the Merced G. M. Co., Mariposa county, is reported seriously ill at the Cullen House, Salt Lake City, Utah.

R. M. Raymond, recently manager Harqua Hala G. M. Co., Arizona, will superintend the workings of the company's newly-purchased properties in Kalgoorlie, Western Australia.

Henry T. Scott, A. Sbarboro, J. Knowles, C. A. Hooper and William Rutherford have been selected as delegates to the national convention of the manufacturers of the United States, to be held at Chicago on the 21st inst.

Prof. Edmund B. Kirby, who has for some years occupied the chair of mining and metallurgy in the State school of mines of Colorado, has resigned that position in order to devote his entire time to his consulting engineering practice in Denver.


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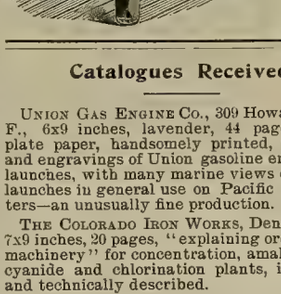
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The Colorado Iron Works, Denver, Colo., 7x9 inches, 20 pages, "explaining ore crushing machinery" for concentration, amalgamation, cyanide and chlorination plants, illustrated and technically described.

Fort Wayne Electric Corporation, Fort Wayne, Indiana, 132 pages, describing and illustrating the Woods system of electrical light and power machinery and apparatus.

☞ Any catalogue mentioned here will be sent free of charge on application to the firm issuing it.

## Obituary.

Alfred Ely Beach, editor of the *Scientific American*, died at his home in New York City New Year's Day, of pneumonia. Mr. Beach was born in Springfield, Mass., in 1826. In 1846 he formed a partnership with O.D. Munn, and they became the proprietors of the *Scientific American*. During nearly fifty years Mr. Beach was active in the editorship of the *Scientific American* and in the direction of the business of the firm.


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Office of Federal Loan Mining Company, Nevada City, Cal., Dec. 10, 1895.

*Mr. John O. Norbom, San Francisco, Cal.*—Dear Sir: Your Concentrator, which has been in use in our mill for the last six months, is still doing excellent work. At present we are running the pulp of ten stamps on one machine, without seeming to be overloaded. I can recommend the machine to do all and more than you claimed for it. Yours truly, [SIGNED] J. Vincent, Superintendent.

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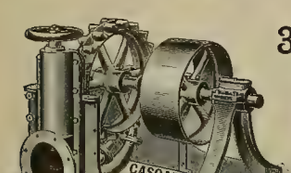
NEW YORK, 136 LIBERTY ST. | LONDON, E. C., 73 A QUEEN VICTORIA ST. | BUTTE, MONTANA. | CITY OF MEXICO, 8 CALLE DE GAN...

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# TURBINE AND CASCADE WATER WHEEL

*Adapted to all Heads from*

**3 Feet to 2000 Feet.**




Our experience of **33 YEARS** building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

**Send for a Pamphlet of either Wheel and write full particulars.**

**JAMES LEFFEL & CO.**

SPRINGFIELD, OHIO, U. S. A.




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# WIRE.

**JOHN A. ROEBLING'S SONS CO.,**

MANUFACTURERS OF

**WIRE** ROPE. CLOTH. NETTING. ✦ INSULATED TELEPHONE TELEGRAPH **WIRE.**

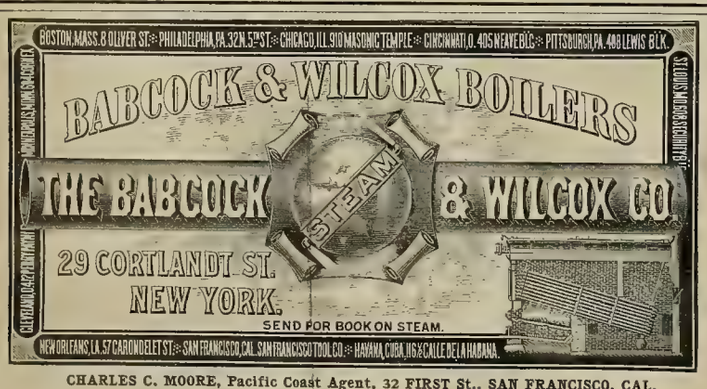
**Iron, Steel, Brass and Copper WIRE.**

BARB WIRE and WIRE NAILS.

25 AND 27 FREMONT STREET.....SAN FRANCISCO, CAL.

Works, Trenton, N. J.

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CHARLES C. MOORE, Pacific Coast Agent, 32 FIRST St., SAN FRANCISCO, CAL.

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**FRANCIS SMITH & CO.,**

MANUFACTURERS OF

**SHEET IRON & STEEL PIPE**

FOR TOWN WATER WORKS.

**Hydraulic, Irrigation and Power Plants, Well Pipe, Etc., all sizes.**

130 BEALE STREET, SAN FRANCISCO, CAL.

Iron cut, punched and formed, for making pipe on ground where required. All kinds of Tools supplied for making Pipe. Estimates given when required. Are prepared or coating all sizes of Pipes with Asphaltum.

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# Vulcan Wire Ropeway

WITH

AUTOMATIC ORE LOADER AND AUTOMATIC DUMPING DEVICE.



For Conveying Ore, Cordwood, Etc.

ENGLISH MT. G. M. Co., NEVADA Co., CAL.

VULCAN IRON WORKS.—The Vulcan Ropeway, with Automatic Ore Loader, also Automatic Dumper, together, make a COMPLETE rig for transporting ore, wood, etc., over a rough, mountainous country. Respectfully, C. H. MALLEN, Supt.

**VULCAN IRON WORKS,**

SAN FRANCISCO,

**Manufacturers of Mining Machinery.**

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# THE OLD RELIABLE!




# ALBANY

**LUBRICATING COMPOUND**

TWENTY-SEVEN YEARS' CONTINUOUS SERVICE in the great Mines, Steamships, Railroads and Mills all over the world prove it to be

**THE KING OF LUBRICANTS!**

## Tatum & Bowen

34-36 FREMONT ST., SAN FRANCISCO.
85 FRONT ST., PORTLAND, OR.

DEALERS IN MACHINERY, OILS, MINING AND MILL SUPPLIES, ETC.

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# MINE BELL SIGNALS.

**Adopted, Used and In Force in Accordance with State Law.**

FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.

# UNION IRON WORKS,

NO. 222 MARKET STREET, - - - - - - - SAN FRANCISCO, CAL.

—MANUFACTURERS OF—

## MINING AND MILLING MACHINERY,

Automatic Cut-Off Engines, High-Speed Engines, Hoisting Engines, Quartz Mills,
Manty Chill Mills, Rolls and Concentrating Machinery, Dodd Sigmoidal Water Wheel,
PUMPS--Cornish and Other, Copper and Lead Furnaces, All Classes of Marine Work.
SHIP BUILDERS. ★ BUILDERS OF U. S. WAR SHIPS. ★ HYDRAULIC LIFT DOCK.

NEW YORK OFFICE: 145 BROADWAY. CABLE ADDRESS: "UNION."

# The Edward P. Allis Company, Milwaukee, Wis.

Established 1860. Reliance Works.

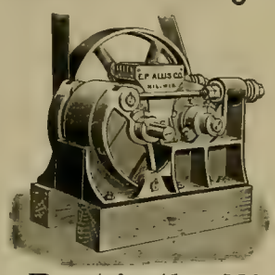
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Screens, Stamps, Pumps,
Compressors, Hoists, Boilers, Etc., Etc.

Reynolds Corliss Engines.

WORK THE BEST. PRICES THE LOWEST.

The Reliance Crushing Rolls.



The Best in the World.

BRANCH OFFICES:

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| Salt Lake City, Utah | 73 So. Main Street. |
| Denver, Col. | 427 Seventeenth Street. |
| Minneapolis, Minn. | 416 Corn Exchange. |
| Chicago, Ill. | 509 Home Ins. Building. |
| Kansas City, Mo. | 43 Armour Building. |
| Pittsburgh, Pa. | German National Bank Building. |
| New York City | 26 Cortlandt Street. |
| City of Mexico | Calle Gante, No. 12. |

WRITE FOR OUR NEW CATALOGUE.

# MINING, IRON AND WOODWORKING MACHINERY AND SUPPLIES

INGERSOLL-SERGEANT PISTON INLET AIR COMPRESSORS AND ROCK DRILLS

## ENGINES AND BOILERS

## PARKE & LACY COMPANY

21 AND 23 FREMONT STREET, SAN FRANCISCO, CAL.



NOTICE TO GOLD MINERS!

## SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

## San Francisco Novelty and Plating Works

Incorporated.

SEND FOR CIRCULARS. 68, 70 and 72 First Street, San Francisco, Cal.

Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

—DEALER IN—

Assayers' and Mining Material.

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BATTERY SCREENS AND WIRE CLOTH

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Hoskins' Hydro-Carbon Assay Furnaces.

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Rock Drilling, Air Compressing, Mining and Quarrying Machinery.

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| Monadnock Building | Chicago |
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H. D. MORRIS & CO., Agents, 141 First St., San Francisco, Cal.

# ADAMANTINE SHOES AND DIES

—AND—

CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.



STAMP DIES.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

H. D. MORRIS & CO., Agents, 141 and 143 First Street, San Francisco.

Special attention given to the purchase of Mine and Mill Supplies.



Stamp Cam.

# H. D. MORRIS & CO., DEALERS IN MINING MACHINERY AND SUPPLIES.

141-143 First Street, San Francisco, Cal.

MANHATTAN RUBBER BELTING, PACKING AND HOSE,
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL.

# Market Reports.

## The Markets.

SAN FRANCISCO, Jan. 2, 1896.

Two holidays in one week, the end and beginning of that arbitrary division of time called "a year," the general taking of stock, and disinclination to load up, the prevalent uncertainty in and out of Congress—all conspire to make this the dullest of the business season. "Inactive and dull" characterizes the market for metals all over the country.

The *Manufacturer* estimates that the production of pig iron in the United States during 1895 will aggregate 9,387,639 tons—the largest output ever reached either in this country or in Great Britain. The greatest activity before this was reached in 1890, when the production of pig iron amounted to 9,202,703 gross tons, or 184,936 tons less than the estimated output for 1895. In 1892, there was an output of 9,157,000 tons, or 230,639 tons below the expected product of the present year. From 1892 there was a decided decline in the output—7,124,502 tons in 1893 and 6,657,388 tons in 1894. The increase this year is an unprecedented jump of 2,730,251 tons. The nearest approach to it in the United States was the increase from a production of 4,044,526 tons in 1885 to 5,683,329 tons in 1886—an increase of 1,638,803 tons. In Great Britain the largest increase in the output of pig iron in any one year was the advance from 5,995,337 tons in 1879 to 7,749,233 tons in 1880—an increase of 1,753,896 tons.

The superior wealth of this country in raw materials as compared with Great Britain is very encouraging in the slight prospect of a war which, if it comes at all, will, from the nature of the circumstances, be deferred in time to permit us to make full preparation for it. The original English Jingo song was:

We do not want to fight,
But, by Jingo, if we do,
We've got the ships and got the guns,
And men and money, too.

We have what is better—the raw material, the ore from which ships and guns are made, and the patriotic citizens from which the best soldiers are recruited. The lack only is in money, and this results not from dearth of that from which money is made (for we have rich mines of silver as well as of iron, and, further than this, the faith of the people in their Government) but solely from an unpatriotic financial system, based upon a monometallic standard which keeps us at the mercy of foreign bankers.

A declaration of monetary independence of England would be far more sensible and beneficial than a declaration of war over a South American boundary line.

To restore bimetallism, even though it were done by the United States alone, would accomplish all the purposes desired. It would double the prices, in round numbers, of our cotton, our wheat and our silver, our three chief exports; and yet, while it was increasing the quantity of our exportations of the first two commodities, it would very likely tend to decrease the quantity of silver now exported. The very fact that our creditor European customers could no longer buy cheap demonetized silver in America and Mexico to make into rupees and pay out dear for wheat and cotton bought in the silver-using producing nations, which are our competitors for the European markets, would compel the foreign consumers of those commodities to turn to America.

The foreigner buys his wheat and cotton where he can get the best quality at the lowest price. To-day they can buy silver for sixty-six cents and a fraction of an ounce in New York and pay it out for $1.37 8-10 in the form of rupees for Indian wheat and cotton, and naturally they buy the Indian product. Under bimetallism, an ounce of silver would be worth $1.29 and a fraction per ounce in the United States, and with charges, insurance and freight added, the material for the rupees of India would then represent as large, perhaps a slightly larger, figure in the Orient.

### New York Metal Market.

NEW YORK, Jan. 2.—PIG IRON—Southern, 11@12.00; Northern, 12@12.50.

COPPER — Brokers', 10.25c; exchange, 10.05c.

LEAD—Brokers', $3.15; exchange, $3.05.

TIN—Straits, 13c@13.50c.

SPELTER—Domestic, $3.40.

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | 05c |
| New York Telegraphic Transfer | 10c |
| London Bankers' 60 days | $4.88 |
| London Merchants | $4.86 |
| London Sight Bankers | $4.91½ |
| Refined Silver, per oz., 1000 fine | 66⅞c |
| Mexican Dollars | 54c |

### New York Silver Prices.

NEW YORK, Jan. 2. — Following are the losing prices for the week:

| | Silver in London. | Silver in N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 30⅝ | 66½ | 10 25 | ..... |
| Saturday | 30½ | 66¾ | 10 25 | 3 05 |
| Monday | 30⅝ | 66⅞ | ..... | 3 15 |
| Tuesday | 30¼ | 67 | 10 25 | ..... |
| Wednesday | Holiday. | | | |
| Thursday | 30⅝ | 66⅞ | ..... | ..... |

### San Francisco Metal Market.

COPPER.

| | | | |
|---|---|---|---|
| Bolt | ¼ & 5-16, 21c; ⅜ and larger, 22c | | |
| Lake Superior Sheathing | 23 | @ | — |
| Ingot, jobbing | — | @ | 19 |
| Ingot, wholesale | 18 | @ | — |
| Sheet copper | — | @ | 22 |
| ZINC. | | | |
| Sheet | 9½@ | | |
| LEAD. | | | |
| Pig | — | @ | 3 85 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |
| SHOT. | | | |
| Drop, sizes *smaller* than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and *larger* sizes, " " | | | 1 65 |
| Buck, Balls and Chilled, do, " " | | | 1 65 |
| IRON. | | | |
| American Soft | 22 00 | @ | 26 00 |
| Pig, per ton | 18 00 | @ | 20 00 |
| STEEL. | | | |
| English, lb | 16 | @ | 19 |
| COKE. | | | |
| Gas Companies' | 75c | @ | bbl. |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 13 00 |
| " in sacks | — — | @ | 15 00 |
| Cumberland | 9 00 | @ | — — |
| ANTIMONY. | | | |
| Per lb | — | @ | 10 |
| PIG TIN. | | | |
| Per lb | 15 | @ | 16 00 |
| QUICKSILVER. | | | |
| Home trade, per flask | 39 00 | @ | 40 — |
| BORAX. | | | |
| Refined, in car lots | — | @ | 5½ |
| Refined, in sacks and barrels | — | @ | 5¾ |
| Powdered, in car lots | — | @ | 5¾ |
| Concentrated, " | — | @ | 4¾ |
| TIN PLATE. | | | |
| Per bx | 4 75 | @ | 5 00 |
| ZINC. | | | |
| Sheet | 8½@ | | |
| NAILS. | | | |
| Wire | | | $1 75 |
| Cut | | | 1 50 |

### LUMBER.

SAN FRANCISCO—WHOLESALE.

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

### COAL.

SPOT FROM YARD—PER TON.

| | |
|---|---|
| Wellington | $ 8 00 |
| Greta | 7 50 |
| Nanaimo | 7 00 |
| Gilman | 6 50 |
| Seattle | 6 00 |
| Coos Bay | 5 00 |
| Cannel | 8 50 |
| Egg, hard | 10 00 |
| Wallsend | 7 50 |
| Scotch Splint | 6 50 |
| Brymbo | 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 35 |
| Liverpool Steam | 5 87 |
| Scotch Splint | 6 50 |
| Cardiff | 6 00 |
| Lehigh Lump | 9 00 |
| Cumberland | 8 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

## Mining Share Market.

SAN FRANCISCO, Jan. 2, 1896.

The market the past week was interrupted by the midwinter holiday season, and now that having passed there ought to be a more favorable change, yet this is hardly to be expected with lawsuits still in court. Prices strengthened slightly along the entire line, but it does not seem to have the proper staying qualities, the absence of which cause shrewd operators to fight shy. While the market does not give encouragement to dealers to go in on the long side, still it should not cause surprise if little higher figures are reached before another slump sets in. Until conditions are more satisfactory than at present dealers would do well to keep out. Of course the strong tone is made with the view of getting them to buy in expectation that the reports made each year that a deal is to be promoted will prove correct. Experience has, or at least should have taught operators that when moneyed men are in the market the moves are made quite different from those that have been the characterizing feature for a long time past. The reported brokers, assisted by a few outsiders, who are manipulating the market evidently fear to carry prices up much owing to some large operators being ready to throw at them more shares than can be handled to advantage or at a profit. This, no doubt, causes them to be content with a five cent deal. No assessments were levied the past week, but several are pending and will probably come on before January passes. So long as holders are willing to pay assessments just so long will they be levied and collected by the different companies.

The news from the Comstock mines continues favorable, but this condition has been reported so often that it ought to be stereotyped. Several of the weekly letters from superintendents could be done the same way, for they are seldom changed in wording and are fully as unsatisfactory to shareholders as a dry bone is to a hungry person. In the Alta group the work is being slowly but surely pushed. This very slowness causes unpleasant remarks from shareholders. It will yet develop something, if nothing more than an assessment or two. In the Gold Hill group nothing of much importance comes to hand. The work being done in Overman is lost sight of. It ought to be laying the foundation for better work later on. In Seg. Belcher, Belcher, Crown Point and Yellow Jacket the work continues unchanged. There are miners who contend that before six months a strike of ore will be made in one if not two of the mines. At the present rate of progress, it will take some time to get to where ore is expected. Perhaps the companies do not wish to work faster. The work being done in Challenge, Confidence and Con. Imperial is essentially unchanged, but it is stated that something good can be looked for in the spring months. The west crossdrift in Con. Imperial is being pushed slowly, and is far from satisfactory to holders of shares. In Alpha the water still runs; it goes faster than the work which is being run for the west lode. The long west drift in Bullion is still being pushed ahead. In Potosi, Chollar, Hale & Norcross and Savage the work is essentially unchanged. Ore is still being raised; it is extracted from the small streaks found in prosecuting the work, some of the ore being high grade, that taken from Hale & Norcross running the highest. In Best & Belcher and Gould & Curry the work is not calculated to enthuse any one. Considerable work is being done on several levels in Con. Virginia. Ore is raised, but not in sufficient quantities to prove beneficial or of interest. It may help to get shareholders to pay assessments. Better results ought to be had in this mine before three months pass. In Ophir and Mexican there is nothing new to report. The work is being done on an upper and lower level and is closely watched by old miners. In Sierra Nevada and Union the advices are rather encouraging, but nothing of a definite character is at hand. It will take several weeks before results can be determined.

From the Brunswick lode there is nothing new reported. The work that is being prosecuted by the several mines having ground on the lode is said to be attracting more attention. The work is being pushed with a considerable degree of energy, yet it may take many weeks before the expected ore is struck. In Occidental the work is closely watched, as this mine is considered the key to the situation on that lode.

From the Bodie district nothing new is at hand. There are operators, and miners too, who have great confidence in this district. They express themselves as confident that a strike of paying ore will be made by next spring.

The following illustrates the changes of the week:

| MINES. | Dec. 26. | Jan. 2. |
|---|---|---|
| Alpha | $ 23 | $ 25 |
| Alta Consolidated | ..... | 19 |
| Andes | ..... | 21 |
| Belcher | 29 | 31 |
| Best & Belcher | 35 | 38 |
| Bullion | 47 | 43 |
| Challenge | 19 | ..... |
| Chollar | ..... | 30 |
| Confidence | 58 | 72 |
| Consolidated California and Virginia | 1 15 | ..... |
| Consolidated New York | 2 35 | 2 45 |
| Crown Point | ..... | ..... |
| Exchequer | ..... | 10 |
| Gould & Curry | 44 | 48 |
| Hale & Norcross | 98 | 1 08 |
| Justice | ..... | 05 |
| Mexican | 64 | 65 |
| Ophir | 1 40 | 1 45 |
| Overman | 10 | 21 |
| Potosi | 56 | 62 |
| Savage | 34 | 35 |
| Sierra Nevada | 54 | 53 |
| Union | 43 | 46 |
| Utah | ..... | 04 |
| Yellow Jacket | 42 | 50 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, Jan. 2, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 500 Alpha | 23 | 100 Overman | 20 |
| 100 Andes | 19 | 200 Potosi | 58 |
| 500 Chollar | 62 | 300 Savage | 31 |
| 1000 H. & N | 1 08 | 300 Sierra Nevada | 53 |
| 300 Justice | 05 | 100 | 52 |
| 100 Mexican | 65 | 100 | 54 |
| 100 Occidental | 66 | 300 Yellow Jacket | 43 |
| 100 Ophir | 1 40 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 450 Ophir | 1 45 | 500 Belcher | 31 |
| 300 Gould & Curry | 48 | 50 Utah | 04 |
| 50 | 47 | 600 Exchequer | 10 |
| 450 Best & Belcher | 88 | 200 Overman | 21 |
| 300 C. C. & Va | 2 45 | 300 Union | 46 |
| 100 Savage | 35 | 100 Alta | 19 |
| 100 Chollar | 72 | 200 Challenge | 30 |
| 300 Potosi | 62 | 100 Occidental | 67 |
| 1300 Yellow Jacket | 50 | 100 Andes | 21 |
| 500 Alpha | 26 | 200 Bodie | 43 |


## DIVIDEND NOTICE.

### The German Savings and Loan Society,

**326 California Street.**

For the half year ending December 31, 1895, a dividend has been declared at the rate of four and twenty-six hundredths (4 26-100) per cent per annum on Term deposits, and three and fifty-five hundredths (3 55-100) per cent per annum on Ordinary deposits, free of taxes, payable on and after THURSDAY, January 2, 1896.

GEO. TOURNY, Secretary.

## ANGELS IRON WORKS,

**DEMAREST & FULLEN, Props.**

## Mining Machinery.

**ANGELS, CAL.**

Write for estimates on complete Milling, Mining and Reduction Plants.


## MINING SHAREHOLDERS' DIRECTORY.

*Compiled Every Thursday from Advertisements in the Mining and Scientific Press and Other San Francisco Journals.*

ASSESSMENTS.

| *Company and Location.* | *No.* | *Amt.* | *Levied, Deling't and Sale.* | *Secretary.* |
|---|---|---|---|---|
| Challenge Con M Co, Nev | 20 | 5c | Dec 20, Jan 22, Feb 12 | C L M'Coy, Mills Building |
| Con Cal & Va M Co, Nev | 5 | 25c | Nov 22, Dec 28, Jan 16 | A W Havens, 309 Montgomery |
| Confidence M Co, Nev | 26 | 30c | Nov 13, Dec 18, Jan 8 | A S Groth, 414 California |
| Chollar M Co, Nev | 41 | 25c | Nov 12, Dec 17, Jan 7 | C E Elliot, 309 Montgomery |
| Gold Bar Con M Co, Cal | 2 | 3c | Nov 5, Dec 21, Jan 16 | E C Godfrey, Crocker Building |
| Hale & Norcross S M Co, Nev | 108 | 15c | Dec 10, Jan 15, Feb 7 | A B Thompson, 309 Montgomery |
| Hite G M Co, Cal | 2 | 10c | Dec 17, Jan 20, Feb 10 | H E Mathews, 120 Sutter |
| Jamison M Co, Cal | 7 | 2c | Nov 9, Dec 16, Jan 6 | S W Cheyney, 120 Sutter |
| Marguerite M Co, Cal | 1 | 10c | Nov 2, Dec 2, Jan 5 | Chas. Winters, 237 12th St., S F |
| Mexican M Co, Nev | 53 | 25c | Nov 19, Dec 23, Jan 14 | C E Elliot, 309 Montgomery |
| Mono G M Co, Cal | 36 | 10c | Dec 30, Feb 2, Feb 25 | M E Willis, 309 Montgomery |
| Occidental Con M Co, Nev | 21 | 15c | Dec 17, Jan 20, Feb 10 | Alfred K Durbrow, 309 Montgomery |
| Overman S M Co, Nevada | 74 | 10c | Dec 2, Jan 6, Jan 27 | G D Edwards, 414 California |
| Yellow Jacket M Co, Nev | 60 | 25c | Nov 12, Dec 17, Jan 22 | W H Blauvelt |

# Assessment Notices.

WEST SIDE CANAL AND LAND COMPANY.—Location of principal place of business, San Francisco, California. Location of Works, Fresno and Kings counties, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 30th day of December, 1895, an assessment (No. 3) of one (1c) cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 8, Floor 8, Mills Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of February, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 27th day of February, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS E. NAYLOR, Secretary.

Office, Room 8, Floor 8, Mills Building, San Francisco, California.

ANCHOR COAL AND DEVELOPMENT COMPANY.—Location of principal place of business, San Francisco, California. Location of Works, Kelso, Cowlitz county, Washing on.

Notice is hereby given, that at a meeting of the Board of Directors held on the second (2d) day of January, 1896, an assessment (No. 6) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 632 Market street, Room 5, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the third (3d) day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the fifth (5th) day of March, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. D. FARISH, Secretary.

Office, No. 632 Market street, Room 5, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of December, 1895, an assessment (No. 21), of fifteen (15) cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of January, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 10th day of February, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

HITE GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Mariposa County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the seventeenth day of December, 1895, an assessment (No. 2) of 10c (ten cents) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, Room 27, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of January, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 10th day of February, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

H. E. MATHEWS, Secretary.

Office—Room 27, 120 Sutter street, San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION having received applications to mine by the hydraulic process from Joe G. De Bous in the Kerr mine, near Yankee Jims, Placer county, to impound tailings in Devil's canyon; from L. M. Sherwood et al, in the Sherwood & Snyder mine, near Chinese Camp, Tuolumne county, to impound tailings in Moccasin creek; from Henry A. Halsted in the Clay Bank mine, near Meadow Valley, Plumas county, to impound tailings in a ravine; from W. H. Glenn & J. H. Hayden in the Blue Gravel mine, near Rancheria, Amador county, to impound tailings in Rancheria creek; from J. F. Evans in the Emma Harding mine, in Cook's canyon Plumas county, to impound tailings in a swamp; from John Smith in the Roman mine, Mountain Meadows, Lassen county, to impound tailings in a swamp; and from Wiley Sexton in the Kendall mine, near Grizzly Flat, El Dorado county, Cal., to impound tailings in Dogtown creek, gives notice that a meeting will be held at room 92, Flood building, San Francisco, Cal., January 13th, 1896, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION having received applications to mine by the hydraulic process from John Spaulding in the Polar Star mine near Dutch Flat, Placer Co., and T. G. Phelps in the Liberty Hill mine, Nevada Co., to impound tailings in Bear River, and from Olonzo Engle in the Adkins mine near Ono, Shasta Co., to impound tailings in a ravine, gives notice that a meeting will be held at room 92, Flood Building, San Francisco, Cal., on Jan. 20th, 1896, at 1:30 P. M.


AMERICAN AND FOREIGN PATENTS
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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING DECEMBER 24, 1895

551,942.—SIGNAL LATCH—Barnes & Slater, Oakland, Cal.

551,989.—PILEDRIVER HAMMER—J. Munro, Astoria, Or.

551,833.—VAPOR BURNER—E. J. Nichols, S. F.

551,994.—BRUSHES—K. S. O'Keeffe, S. F.

551,909.—CAN SPOUT—J. O. Sprague, Sacramento, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CAN SPOUTS. James O. Sprague, Sacramento, Cal. No. 551,909. Dated Dec. 24, 1895. This invention relates to a spout or nozzle for oil or other cans by which the contents can be easily poured by tilting the can, and the receptacle prevented from overflowing when filled to the proper depth. The device also prevents waste by dripping. It consists of a single tube straight for the greater portion of its length, having the outer end curved, a partition fixed centrally in the tube on edge extending from the inner end to the outer extremity of the curved end so as to form independent passages conforming to the curvature of the tube, and one side of the tube is cut away so that the two passages are of different lengths. This allows the liquid to flow out through one passage, while the air enters through the other to take its place. The curvature of the outer end of the vessel is such that the can must be tilted back far enough to prevent the flow of liquid before it can be raised up from the receiver, thus preventing the waste by dripping.

ELECTRIC LATCH APPARATUS FOR SEMI-AUTOMATIC OPERATION OF RAILROAD SIGNALS.—H. C. Barnes and W. W. Slater, Oakland, Cal. No. 559,142. Dated Dec. 24, 1895. This invention relates to a latch apparatus for the semi-operation of railway signals. It consists of the combination with a movable signal or semaphore, of a mechanism independent of the signal device for controlling the same, comprising a centrally pivoted latch lever to the outer end of which a connection from the signal is detachably connected so that the signal is normally held in safety position and allowed to move to the danger position when the connection with the lever is broken. In conjunction with this is a depending stop pivotally held at its opposite end, and adapted to engage and hold the inner end of the latch lever, an electro-magnet and intermediate mechanism controlling the free end of the stop and an air-cushion mechanism whereby the movement of the signal, when released, is regulated.

STATION INDICATOR.—Chas. E. Larrabee, of Berkeley, Cal. No. 551,502. Dated Dec. 17, 1895. This indicator belongs to the class of devices used in railway and street cars for automatically exhibiting the name of the station or street to which the car is approaching. It is one of that kind of indicators in which the names are shown by means of connections deriving their motion from contact with a fixed lug or projection in the roadway. The improvement consists chiefly in the power transmitting connections which are so arranged as to obviate the use of springs and to provide for a nicely regulated and accurate contact whereby the operation of the indicator is positive.

DEPARTMENT OF THE REGISTRAR OF PATENTS, South African Republic.—Application for improvements in traction engines—Registered No. 1004 (official Dutch title verbeteringen aangebracht in locomobielen).

Notice is hereby given for general information that Daniel Best, residing at California, America, deposited on the 20th day of October, 1895, at my office, an application for letters patent for the invention above named, with specification relating thereto.

Now, whereas the said D. Best has given me written notice that he wishes to proceed with his application, I have decided that all objections thereto shall be filed at my office before Friday, the 14th day of February, 1896, at 3 o'clock P. M., after which time the Attorney-General will fix the date of hearing.

I therefore summon all persons interested in objecting to a patent being granted for the above named invention to the above mentioned D. Best to deposit with me a document clearly setting forth their objections before the aforesaid date, as they will otherwise be excluded from submitting the same.

Done this 29th day of October, A. D. 1895, at Pretoria, South African Republic.

(Signed) CARL VECKERMANN, SR.
Registrar of Patents.


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## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Middle Fork Feather River, Plumas county, near La Porte.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 2) levied on the 5th day of November, 1895, the several amounts set opposite the names of the respective shareholders, as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| L. M. Hoefler | 24 | 2,500 | $75 00 |
| L. M. Hoefler | 25 | 2,500 | 75 00 |
| L. M. Hoefler | 88 | 1,000 | 30 00 |
| L. M. Hoefler | 89 | 1,000 | 30 00 |
| L. M. Hoefler | 90 | 500 | 15 00 |
| L. M. Hoefler | 91 | 100 | 3 00 |
| L. M. Hoefler | 92 | 100 | 3 00 |
| L. M. Hoefler | 93 | 100 | 3 00 |
| L. M. Hoefler | 94 | 100 | 3 00 |
| L. M. Hoefler | 95 | 100 | 3 00 |
| L. M. Hoefler | 96 | 500 | 15 00 |
| L. M. Hoefler | 97 | 500 | 15 00 |
| L. M. Hoefler | 98 | 500 | 15 00 |
| L. M. Hoefler | 99 | 500 | 15 00 |
| Raymond Parry | 15 | 625 | 18 75 |

And in accordance with law, and an order from the Board of Directors, made on the 5th day of November, 1895, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, 37 and 38 Crocker Building, San Francisco, California, on THURSDAY, the 16th day of January, 1896, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.


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## DELINQUENT SALE NOTICE.

JAMISON MINING COMPANY. LOCATION OF principal place of business San Francisco, California. Location of works, on Jamison creek, near Johnsville, Plumas County, California.

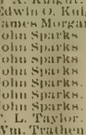
Notice. There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 29th day of November, 1895, the several amounts set opposite the names of the respective shareholders as follows:

| Name. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| George Hackett | 135 | 250 | 5 00 |
| J. C. Kluckrem | 141 | 70 | 1 40 |
| B. A. Knight | 142 | 500 | 10 00 |
| Edwin O. Knight | 144 | 500 | 10 00 |
| James Morgan | 130 | 150 | 3 00 |
| John Sparks | 164 | 1000 | 20 00 |
| John Sparks | 165 | 1000 | 20 00 |
| John Sparks | 166 | 2000 | 40 00 |
| John Sparks | 167 | 1000 | 20 00 |
| John Sparks | 168 | 1000 | 20 00 |
| John Sparks | 169 | 500 | 10 00 |
| John Sparks | 216 | 500 | 10 00 |
| C. L. Taylor | 123 | 500 | 10 00 |
| Wm. Trathen | 139 | 500 | 10 00 |
| Chas. Troon | 124 | 500 | 10 00 |

And in accordance with law, and an order from the Board of Directors, made on the 16th day of December, 1895, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, rooms 50 and 54, 120 Sutter St., San Francisco, California, on MONDAY, the 6th day of January, 1896, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

SAM. W. CHEYNEY, Secretary.

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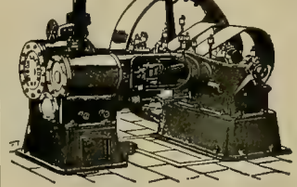
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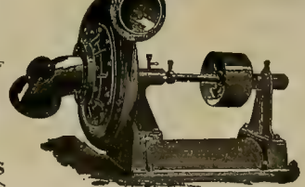
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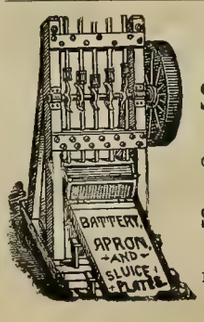
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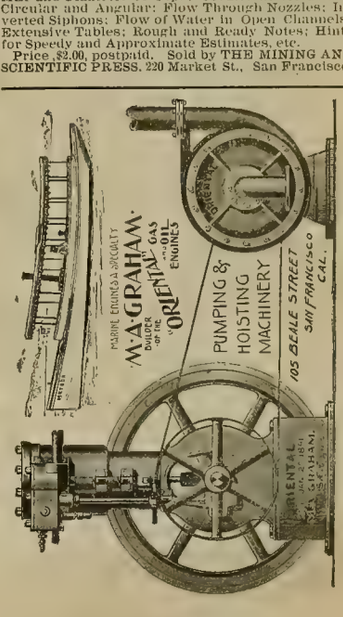
This work is by one of the most experienced hydraulicians of the country. It abounds with useful tables for ready reference, in which the results of abstruse calculations are all placed in a form so that one can find what he wants in a moment. For the engineer the principles, formulæ, coefficients, etc., are given; and for those not familiar with higher mathematics, examples, rules and tables are prepared. Thus the needs of the scientist and the practical miner or millman are each met. It is the most complete work on the subject yet published, and is specially applicable to the Pacific Coast.

TABLE OF CONTENTS.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan: Discussion of the Principles of Hydraulics; Rules Deduced from Formulæ Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated and Expressed in Formulæ and Rules; Flow of Water Through Openings; Weir Coefficients; Triangular Weirs; Flow of Water over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend Circular and Angular; Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels. Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

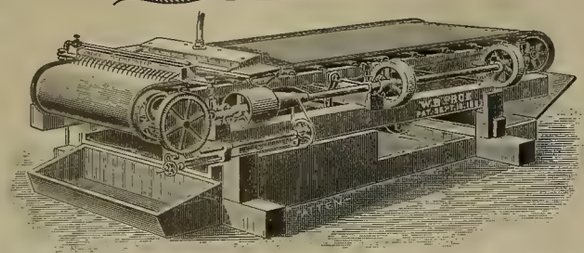
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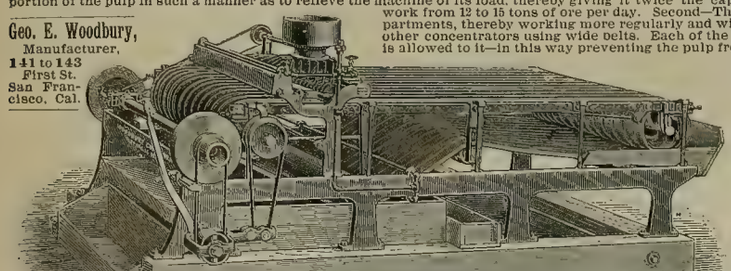
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Geo. E. Woodbury,
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PATENTED, Aug. 19, 1890.

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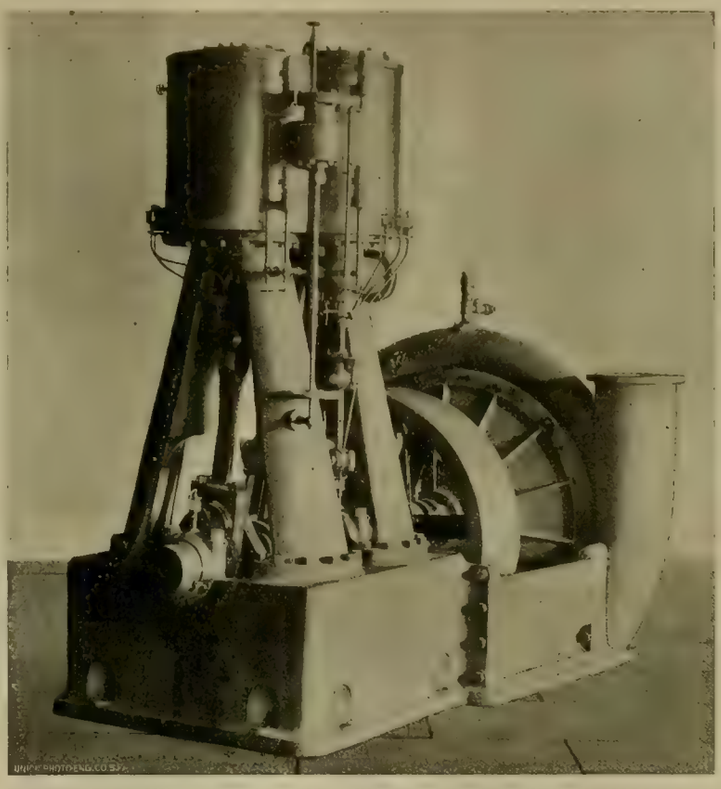
VOLUME LXXII. Number 2.

SAN FRANCISCO, SATURDAY, JANUARY 11, 1896.

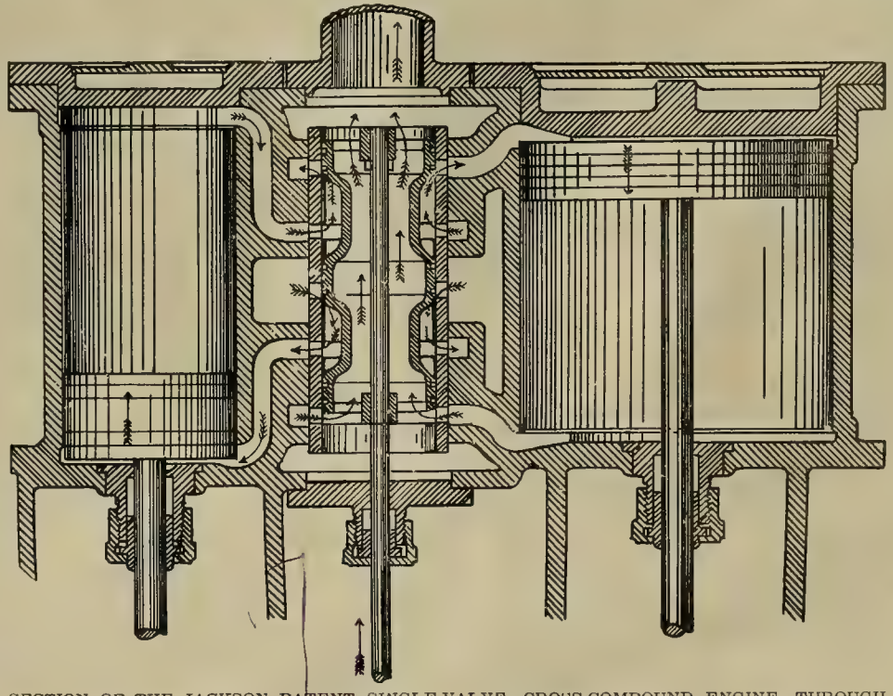
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## Single-Valve, Cross-Compound Engine.

Herewith is illustrated a single-valve, cross-compound engine, made by Byron Jackson for the Edison Light and Power Co. of this city. It is 175 H. P., 6000-gallon centrifugal pump, for 70-foot head. It pumps all the water for condensing from San Francisco bay to the three power stations of the company, aggregating nearly 10,000 H. P. The engine and pump are guaranteed to run thirty days and nights continuously "without showing any signs of distress," the pump to give 60 per cent efficiency, and the engine to not consume more than fourteen pounds of water per indicated horse power per hour. The engine is so made that it can be changed from condensing to non-condensing, though it is deemed advisable to go to the expense of adding a condenser. The main between this engine and other compound engines is in the absence of any kind of extra pipes or passageways or receivers between the two cylinders. In other double-cylinder engines there must be some extra pipe or passageway of some kind, through which the steam must travel from one end of the small cylinder to the opposite of the large cylinder; and when the communication is open at the end of the stroke, the steam, passing from the small cylinder, has to expand and fill the passageway, or receiver, before it enters the large cylinder; and if this passageway, or receiver, be large the steam must necessarily suffer a reduction of pressure, which must cause serious reduction of pressure in the large cylinder. This loss of pressure may be so great as to almost neutralize the gain by expansion. In the engine under discussion there is no extra receiver or extra pipe or passageway, as will be seen by reference to the sectional view, which shows in sections the two cylinders, the single valve located underneath and between the two cylinders, and all of the steam ports. The arrows indicate the direction the steam is traveling, showing the course the live steam takes as it enters the small cylinder, and its route from the small cylinder back through the port and valve chamber into the low pressure cylinder, and from thence into the valve chamber, and through the center of the valve to the exhaust at the end of the valve chamber. This exhaust may be piped away from either end of the valve chest, as is most convenient, but is usually in practice connected at the front end under the engine, which leaves the back end of the engine clean and readily accessible to the valve and pistons without removing any pipe. The valve, being located below, drains all condensed water from the cylinders. Three sets of cards taken while the engine was running at a uniform speed of 200 revolutions per minute on the governor, the boiler pressure being raised from 47 to 80 lbs., illustrate how the compression changes with the cut-off and boiler pressure always nearly reaching the initial steam line, thus filling the clearance space with the steam trapped in.



JACKSON'S SINGLE-VALVE, CROSS-COMPOUND ENGINE, 175 H. P., 6000-GALLON CENTRIFUGAL PUMP, FOR 70-FOOT HEAD.



SECTION OF THE JACKSON PATENT SINGLE-VALVE, CROSS-COMPOUND ENGINE, THROUGH BOTH HIGH AND LOW PRESSURE CYLINDERS, TO CENTER OF VALVE.

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Assistant Secretary Hamlin, in a letter to the Collector of Customs at El Paso, Texas, makes the following ruling: "The department duly received your letter of the 28th of September last, submitting an application from the Consolidated Kansas City Smelting and Refining Co., for permission to import and enter under the same entry a mixture of silver-lead ores from different mines. From a report dated October 17th last, of Special Agent G. W. Whitehead, it appears that said company owns in the mining camp of Sierra Mojada, Mexico, three groups of mines—the San Salvador, the Volcan Dolores and the San Jose Jesus Maria; that the Volcan Dolores mine has changed recently so that the ore taken therefrom contains very little silver, and if imported separately would be classified under paragraph 165 of the tariff as lead ore, dutiable at the rate of ¾ cent per pound of its gross weight and not, as heretofore, on the weight of the lead contained therein; but that a mixture of this ore with the products of the other mines, which are richer in silver, would be classified as silver-lead ore, subject to duty on the lead contents only. As the mixture of ores from different mines for the purpose mentioned would be contrary to the requirement of paragraph 2 of the department's special regulations of July 17, 1889, (S. 9492) viz., that the entry of any ore from Mexico shall contain a declaration that "the importation embraces no mixture of ores or concentrates from different mines;" and as, in the opinion of the department, said requirement is indispensable to the proper classification of ores under the provisions of paragraph 165 of the act of August 28, 1894, a strict compliance with said regulations must be insisted upon in order to protect the interests of the revenue and therefore the application is denied."

# MINING AND SCIENTIFIC PRESS.

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J. F. HALLORAN.....General Manager

San Francisco, January 11, 1896.


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THE new Gold Mining Exchange has organized for business, the San Francisco Stock Exchange has announced its willingness to list the stock of gold mining companies, and the additional opportunity will probably be embraced in any case where the inducements seem to be sufficient.

CIRCULARS and statements are received from Colorado to the effect that the gold yield of that State for '95 is $17,000,000, and that "Colorado's annual gold yield at last exceeds California's." As will be seen elsewhere, the Director of the Mint does not share that opinion, he, in his estimates, giving Colorado $15,000,000 and California $15,600,000. Competition and rivalry, except of a friendly nature, need not enter into the matter, and it is probable that when the exact facts are obtainable, or a more correct approximation is secured, it will be found that this State led in '95 as in all other years in the amount of gold produced.

ACCORDING to a long dispatch from Helena, Montana, an astute attorney of that place has discovered that the law requiring the annual expenditure of $100 in work or improvement on unpatented mining claims is unconstitutional. The dispatch concludes as follows: "This prominent attorney stands ready to dispute the claims of those he advised not to do the statutory development work, and says he will fight the matter through every court in the land until the Supreme Court of the United States in Washington is reached. He has made long and careful search in this particular case, and evidently knows what he is talking about, although he refuses to make known the grounds for his assertion." The result will be that long before he gets to the Supreme Court his unfortunate clients will regret having put any trust in such assumption, which only needs notice to be contemned and does not deserve serious comment.

CALIFORNIA'S HYDRAULIC MINERS are greatly interested in the new members of the Debris Commission. The outgoing members have creditably filled a most difficult task. With no increase in salary, they took up a new work in addition to their other duties and so conducted the U. S. Debris Commission as to compel the respect and acquiescence of valley residents who were opposed to the idea of any resumption of hydraulic mining. They have treated all sides and interests with absolute fairness, have given every detail of their duties active personal attention, and, though at times apparently rigid in their enforcement of the law, at no time have they made any requirement to which any miner desiring to exactly comply with the law could reasonably object. The high character of the U. S. Engineer Corps justifies the belief that the gentlemen who succeed to the recently vacated places will be found equally acceptable to all parties, though it may be said with no invidious comparison that the long residence in this State of the former members of the Commission, and their intimate acquaintance with the subject, made their work of great value.

SOME TIME ago the fact was cited herein that the appropriation made for the maintenance of the U. S. Debris Commission of this city was running short. The California Legislature promptly memorialized Congress asking for necessary funds for its continuance, but the movement was checked by Gen. Casey the then chief of the U. S. Engineer Corps. It is to be briefly stated that only one appropriation was ever made for the maintenance of that Commission, and that was a paltry one of $15,000 in the act that created that body, that by the most rigid economy the board has so far been enabled to maintain official existence, that the work is of the greatest importance to the hydraulic mining interests of the State, and that there is hardly enough now on hand to last till March 1st. of this year. The matter is of immediate importance and is commended to the attention of the Executive Committee of the California State Miners' Association at its special meeting next Tuesday evening.

IT is now proposed to segregate national jurisdiction in land office cases, and thus facilitate determination of that class of questions in the Department of the Interior by transferring the authority now vested in the Secretary of the Interior and the Commissioner of the General Land Office to three boards of three members each, appointed by the Secretary of the Interior, one board to pass upon mineral land contests, another upon agricultural land contests and the third to have charge of cases not included in the first and second classifications. The plan embraces a "Public Land Board of Appeals," consisting of five members appointed by the Secretary of the Interior, whose decisions shall be final. Nothing further in the way of legislation can be more adverse to the miner than recent rulings and decisions in that department, and any change in the manner of administering "justice" need not be negatived. Senator Baker, of Kansas, has introduced the bill outlined above.

## Three Proposed Bills.

The proposed "compromise" mineral land bill has heretofore received considerable discussion in these columns. The objections to it being unanswered because unanswerable, their repetition is unnecessary. In addition to that measure, three others have been prepared by the Legislative Committee of the California State Miners' Association, which are admirable in tone and intent, and deserve the hearty support of every one in the State in any way connected with the mining interests. They have all been presented by Senator Perkins in the Senate and Representative Johnson in the House. Their full text is as follows:

A BILL TO AMEND CHAPTER SIX, OF TITLE THIRTY-TWO, OF THE REVISED STATUTES, RELATING TO MINERAL LANDS AND MINING RESOURCES.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:*

SECTION 1. That section twenty-three hundred and twenty-four of the Revised Statutes be amended so that the same shall read as follows:

"SEC. 2324. Miners of each mining district may make regulations not in conflict with the laws of the United States, or with the laws of the State or Territory in which it is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground so that its boundaries can be readily traced, such marking to include one post or monument at each corner of the claim. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such description of the claim or claims located by reference to some natural object or permanent monument as will identify the claim. On each claim located, and until payment of the purchase money and a certificate of entry has been issued therefor, not less than $100 worth of labor shall be performed or improvements made during each year.

"Where such claims are held in common, such expenditures may be made upon any one claim by any work or improvements tending to develop any of such claims. The period within which the work required to be done annually on mineral claims is to be performed shall commence at 12 o'clock meridian on the first day of January succeeding the day of location of such claim.

"When the labor required by this Act shall have been performed, or the improvements made, an affidavit may be filed within thirty days after the time limited for the performance of such labor, or making of such improvements, with the Recorder of Deeds in the county in which the claim or mine is situated, particularly describing the labor performed, and the improvements made, and the value thereof, which affidavit shall be *prima facie* evidence of the facts therein stated; and upon a failure to comply with the conditions of this Act, in the performance of labor or the making of improvements, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location had ever been made; provided, that the original locators, their heirs, assigns or legal representatives, do not resume work upon the claim after such failure, and before such relocation, and continue the same with reasonable diligence until the required amount of labor shall have been performed or improvements made. Upon the failure of any one of several co-owners to contribute his proportion of the expenditure required hereby, the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent co-owner personal notice in writing, or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if at the expiration of ninety days after such notice in writing, or by publication, such delinquent shall fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners who have made the required expenditure. A copy of such notice, together with an affidavit showing personal service or publication, as the case may be, of such notice, when filed and recorded with the Recorder of Deeds in the county in which such mining claim is situated, shall be *prima facie* evidence of the acquisition of title of such co-owners. Where a person or company has run or may run a tunnel, or constructed roads or trails, for the purpose of developing a claim or claims owned by said person or company, the money so expended in running said tunnel or constructing said roads or trails shall be taken and considered as expended on said claim or claims; provided, further, that said claim or claims shall be distinctly marked on the surface, as provided in this Act."

SEC. 2. That section twenty-three hundred and twenty-four of the Revised Statutes be amended by adding thereto the following:

"And the surveyors appointed under the provisions of this section shall have power to administer oaths to their assistants."

SEC. 3. That section twenty-three hundred and thirty-five of the Revised Statutes be amended so as to read as follows:

"SEC. 2335. All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths in the State or Territory where the claims may be situated, having an official seal, and all testimony and proofs may be taken before any such officer, and when duly certified by the officer taking the same, attested by his seal of office, shall have the same force and effect as if taken before the Register and Receiver of the Land Office. Whenever any contest shall arise as to the mineral character of any land claimed to be subject to entry or sale under an Act of Congress, all proceedings shall be stayed until the controversy shall have been settled or determined by a court of competent jurisdiction in the county where such land is situated, or the contest withdrawn; and it shall be the duty of the Register of the Land Office in which such contest is made to immediately certify such contest to such court, and to immediately notify the contestant and contestee thereof.

Within thirty days after filing such contest, the contestant shall file in such court a verified statement of the facts upon which he bases his contest, in plain and concise language, and shall serve the same upon the contestee; and thereafter, and within the time provided by the laws of the State or Territory where such land is situated, for answering in any civil action, the contestee shall file his verified answer to such statement, and thereupon the contest shall be tried and determined as are ordinary actions in such court; and, when determined, such determination shall be certified to the Register, and such determination shall be binding upon him, and shall be forever conclusive as to the character of the land in question; provided, that the presence of rock, earth or gravel, bearing gold, silver, cinnabar, petroleum or other valuable mineral, shall be regarded as *prima facie* evidence that the land containing the same is mineral in character; and provided, further, that in investigating the character of land with a view to ascertaining whether it is more valuable for mineral than for agricultural purposes, evidence may be taken of the mineral discovered or developed adjacent to such land, proof of which shall be taken as presumptive evidence that the land in question is mineral in character; and provided, further, that wherever land is proven to be within a well-defined mineral belt, such land shall be deemed, presumed and taken to be mineral land, unless the contrary is proven; and provided, further, that the provisions of this chapter shall be liberally construed, with a view to aid the applicant in procuring title to the mineral lands of the United States, and that the rules and regulations prescribed by the Land Department for its government and that of its officers, in disposing of said lands, shall be so formulated and administered as to assist the Government in disposing of said lands to *bona fide* applicants; and provided, further, that all applicants for patent for lands, upon which exists a valid mining location, the notice of location of which, designating the section and township in which such location is situated, shall have been recorded in the office of the Recorder of Deeds of the county wherein the land in question is situated, must, except when otherwise in this act provided, give to such mineral claimant notice of such application in writing, or by publication in the newspaper published nearest such mining location, at least once a week for sixty days."

SEC. 4. That Section twenty-three hundred and thirty-seven of the Revised Statutes be amended so as to read:

"SEC. 2337. Where non-mineral land not included in a lode claim is used or occupied, or is intended to be used or occupied, by the proprietor of such vein or lode claim for mining or mineral purposes, such non-mineral surface ground may be embraced and included in an application for a patent for such vein or lode claim, and the same may be patented therewith or separately, subject to the same preliminary requirements as to survey and notice as are applicable to vein or lode claims; but no location hereafter made of such non-mineral land shall exceed ten acres, and payment for the same must be made at the same rate as fixed by this chapter for the superfices of the lode claim. The owner of a quartz mill or reduction

works, not owning a mine in connection therewith, may also receive a patent for his mill site as provided in this chapter."

A BILL TO APPROPRIATE MONEY FOR THE CONSTRUCTION OF WORKS TO IMPOUND MINING DEBRIS, AND THEREBY TO PROTECT THE NAVIGABLE STREAMS OF CALIFORNIA.

*Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled:*

SECTION 1. That there is hereby appropriated out of any money in the treasury not otherwise appropriated the sum of one million and thirty thousand dollars, which sum shall be immediately available and shall be expended under the direction of the Secretary of War, in accordance with the plans, specifications and recommendations of the California Debris Commission, appointed under the Act of Congress entitled, "An Act to create the California Debris Commission and regulate hydraulic mining in the State of California," approved March 1, 1893, for the purpose of constructing works for the restraining and impounding of mining debris upon the tributaries of the Sacramento and San Joaquin rivers in California and the branches of such tributaries.

SEC. 2. Whenever any such works for the restraining and impounding of mining debris shall have been constructed out of such appropriation, or shall have reached such a stage as, in the opinion of such commission, it shall be safe to use the same, it shall be lawful for such commission to make the order provided for in section 13 of said act, upon proceedings being first had and taken in accordance with the provisions of sections 9, 11 and 12 of said act, but in such cases the owners of the mines affected by said orders shall not be bound by the proviso to said section 13 of said act nor by the provisions contained in section 16 thereof.

SEC. 3. The said commission shall also have the power to make the order provided for in section 13 of said act as to any mine or mines whenever it shall appear to the satisfaction of said commission that no impounding works are necessary other than the means already provided by nature to protect from material injury the navigable streams mentioned in said act and the land adjacent thereto, upon proceedings had in accordance with sections 9, 10 and 12 of said act.

A BILL TO AMEND AN ACT ENTITLED "AN ACT TO CREATE THE CALIFORNIA DEBRIS COMMISSION AND REGULATE HYDRAULIC MINING IN THE STATE OF CALIFORNIA," APPROVED MARCH 1ST, 1893, BY AMENDING SECTION TWENTY-TWO THEREOF.

*Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled:*

SECTION 1. That section twenty-two of an act entitled "An act to create the California Debris Commission and regulate hydraulic mining in the State of California," approved March 1st, 1893, be amended so as to read as follows:

"SEC. 22. Any person or persons who willfully or maliciously injure, damage or destroy, or attempt to injure, damage or destroy, any dam or other works erected under the provisions of this act for restraining, impounding or settling purposes, or for use in connection therewith, shall be guilty of a misdemeanor, and on conviction thereof shall be fined not to exceed the sum of $500 or be imprisoned not to exceed five years, or by both such fine and imprisonment, in the discretion of the Court; and any person or persons, company or corporation, their agents or employes, who shall mine by the hydraulic process, directly or indirectly injuring the navigable waters of the United States in violation of the provisions of this act, shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding $500."

## Concentrates.

DURING December the Comstock paid out $68,272.41.

PIERCE CITY, IDAHO, placer miners are happy over three feet of snow.

A STATE GEOLOGIST is represented to be one of Montana's present needs.

INTERIOR papers chronicle columns of filing of affidavits of assessment work performed.

THE Boise, Idaho, Mining Exchange has a membership of 225. The membership fee is $20.

VENEZUELA, which has such present prominence, yields about $1,000,000 in gold annually.

THE Gold Drop and Monarch claims, Greenwood, Boundary creek, are sold to Montreal men for $20,000 each.

ARCHULETA CO., NEW MEXICO, reports extensive petroleum deposits, which are receiving considerable present attention.

IN distinction to the usual term "output" in speaking of the gold yield, the lumber journals now refer to the "input" of logs.

IN the territory adjacent to Deadwood, South Dakota, there are 1703 mines at work. Last year at this time the total was 1280.

DURING '95 one hundred and twenty-six mining companies incorporated in Colorado, mostly in Cripple Creek, the aggregate capital stock being $461,061,500.

A BAKER CITY, OR., mining man says "forty or fifty new mills will be built" in that vicinity this year. If so, that will be an interesting locality for makers of mining machinery.

THIS week the San Francisco and Alameda county supervisors memorialized Congress in favor of the four mining bills recently introduced by Senator Perkins and Congressman Johnson.

A CONTRACT has been let to run the Strickler tunnel near Colorado City, one and one-half miles in length, through Pike's Peak at an altitude of 11,580 feet, through solid granite.

LAST Tuesday President Cleveland sent to the Senate the names of Colonel Charles R. Suter, Major C. E. L. B. Davis, Captain C. E. Gillette, corps of engineers, as members of the California Debris Commission.

W. S. STRATTON, the Cripple Creek millionaire, proposes an organization of gold producers to hold or sell their product at the highest market price and make the $10,000,000 expected by Morgan et al. on the bond deal.

UP in Plumas and Sierra counties in deep snow the stage horses wear snow shoes. Any one curious to see what kind of a snow shoe a horse wears can see one at the State Mining Bureau on Fourth street, this city.

SENATOR PRITCHARD of North Carolina has introduced an amendment to the tariff bill restoring the McKinley duty on clays, marble, lime, stone and iron ore, and increasing the duty on mica to fifty cents per pound.

E. A. STENT of Sonora, Tuolumne Co., one of the projectors of the proposed railroad from Stockton to Sonora, says articles of incorporation will soon be filed and work begun. A smelter at Stockton is part of the scheme.

VICTOR, COLORADO, dispatches say that valuable mining claims thereabouts have been jumped "because assessment work thereon was not done in '93." That is a poor plea. No assessment work was required in '93 nor in '94.

AN unusually big find is reported from the Silver King mine, sixty miles east of Phœnix, Arizona. It is stated that W. S. Champion "took out $40,000 in silver ore in three days," which is probably no greater than the usual exaggeration.

R. S. CATES, the manager, says work has been permanently resumed at the Baisley-Elkhorn mine, at Elkhorn mountain, Baker Co., Or., employing forty men. The property is now owned by the Deming Loan and Investment Co., Osage, Kan.

W. F. KENDRICK, of Denver, says: "The gold product of Colorado for the year just closed, as accurately as can be ascertained from the reports on the first of the year, is $16,995,919.51, or an increase of $6,379,456.51 over the product of 1894."

AT the Golden Cross group of mines, San Diego county, which has the largest number of stamps under one roof—140—in the State, about $275,000 has been spent. The cost of mining and milling the ore, including all expenses, is a little less than $1.50 per ton.

AT the Broken Hill Proprietary, Australia, for the week ending Dec. 19, '95, 5982 tons of ore were treated, yielding 440 tons of lead, containing 135,943 ounces silver; also 1158 tons, treated by amalgamating and leaching plants, producing 13,881 ounces silver.

NINE Leadville mines are reported sold to an English syndicate for $1,500,000. All the mines were fully investigated by experts from London before the transaction was closed. It has taken nearly six months to reach terms. The purchaser is the New Elkhorn Mining Co. of London.

LAST summer nineteen Portuguese rented ground at the old Cherokee mine, Butte Co., and proceeded to work it. The company has disbanded and in settling up found that they averaged $3.16 a day for each man. The ground they worked had already been worked over once.

THE British Columbia *Mining Journal* wants a law which will allow consolidation of mining leases so that work can be done on some one claim instead of each lease a company may hold. This legislation would be more particularly in the interests of the lease holders of placer ground.

THE wire tramway from the Hall mine to the smelting works at Nelson, B. C., has been completed and is in operation, bringing down ore to the bins at the rate of ten tons per hour. The buildings at the smelting works also are completed. The smelter has a capacity to smelt 100 tons per day.

POWDER is on the rise, and a cent a pound advance in dynamite is imminent. Since Oct. 1 glycerine has advanced three cents per pound, being now quoted at 12½. Though doing considerable business, none of the California powder companies are making much money, owing to excessive competition.

THE mill of the Champion mine in Bohemia district, Or., has shut down for the winter, the snow being about nine feet deep at the mill. Supt. E. P. Jennings announces that he has supplies and wood ahead at the mine for sixty days' continuous run, and expects to resume operations about the first of next April.

IN '49 came the California mining excitement, in '59 Pike's Peak, in '69 White Pine, in '79 Leadville, in '89 South Africa; '94 is "49" reversed and the mining activity that began in '94 bids fair to exceed in extent and value the first named period. California is destined to see greater stir in gold mining than ever before.

SINCE silver was found in sandstone and gold in coal nothing is surprising, yet it is, to say the least, a little startling to hear that at Perris, Riverside County, the Good Hope mine is running on adobe that averages $7 per ton. Feeding adobe to a stamp mill is new. The local paper says "it is a surface formation." It certainly is.

THE Pelatan-Clerici process, which has been in operation at the Midnight, N. M., mine, will be tested this month for the first time on a large scale in a 50-ton plant at De Lamar, Idaho. Another 50-ton plant is being put in at the Esperanza mine, near the City of Mexico. Mons. Pelatan is at present in Paris, and Mons. Clerici in Milan.

COL. LIGHTNER is superintendent of the Cinnabar mine, Savonas, B. C. Twenty-three men are at work, all but four being white miners. No smelting is being done at present. Drifts are being run and the mine opened up. This mine is said to be the only producing quicksilver mine in operation that is under the protection of the British flag.

THE United States Supreme Court has decided that a man, who was put off a train because a conductor refused a silver dime that was very much worn, was entitled to the $315 and costs which had been awarded him by the New Jersey courts, the Chief Justice declaring that silver coins were a legal tender as long as they bore the resemblance of coin.

THE Senate committee has decided to report favorable on the bill granting to each of the States of California, Oregon, Washington, Montana, Idaho, Nevada, Wyoming, Colorado and South Dakota, 25 per cent of all moneys paid to the United States by each of the States for mineral lands for the maintenance of a school of mines in each of the said States.

LAST Monday W. B. Cranston, working in the Virtue mine, near Baker City, Or., fell from the 470-ft. level 112 feet to the bottom, being instantly killed. He was in charge of a pump and had fallen asleep, allowing the pump to stop. When suddenly awakened by the car man, in a dazed condition, he raised the cross bar and stepped into the shaft, probably thinking that he was entering the cage.

FORTY representatives of the leading mining companies of Jackson, Josephine and other counties of Oregon met at Grant's Pass, Or., last Monday, and effected a permanent organization of the Southern Oregon Miners' Association. Officers were elected and future meetings arranged for. The object is to secure better legislation for the protection of mutual interests, and a diffusion of knowledge of interest to miners generally.

TO DATE there have been 198 applications to the U. S. Debris Commission at their office, 92 Flood building, this city, for application to mine. Of these, 5 were from Butte county; 15 from Nevada county; 29 from Sierra; 36 from Plumas; 14 from Placer; 23 from Amador; 9 from Shasta; 20 from Yuba; 10 from Calaveras; 2 from Sacramento; 32 from El Dorado; 2 from Tuolumne, and 1 from Lassen. Of the 198 applications, 141 have been granted.

THE receipts of treasure at San Francisco per Wells, Fargo & Co.'s express during the twelve months ending December 31, 1895, were as follows: From the interior, $21,725,878; from the north coast, $747,495; total, $22,473,373. The descriptions and amounts were as follows: Coin, $16,218,580; silver bullion, $2,601,987; gold bullion, $3,652,806. The inland shipments from San Francisco were $28,062,362, and the shipments overland were $500 in silver bullion; $35,138 in gold bullion and $17,117,785 in coin.

JAMES JACKSON, an educated Indian, personally carries the mails from Juneau to Fort Cudahy, on the Yukon river, Alaska. He uses twenty strong dogs to pull the sleds across the mountains to the Canadian postoffice on Forty Mile creek. This service is a private enterprise, being maintained by miners, who pay fifty cents for each letter. The Canadian government guarantees $350 for each of two round trips. It is a most hazardous journey. Several miners have lost their lives in trying to make it.

SENATOR DUBOIS of Idaho has introduced a bill providing for purchase of necessary land and the construction and equipment of sampling works, or for the leasing of suitable buildings and equipment for the sampling and assaying of imported silver ores and other ores containing lead, at El Paso, Tex.; Northport, Wash.; and Bonner's Ferry, Idaho, this being independent of the action of the Secretary of the Treasury in establishing similar works at other points where even larger quantities of ore are entered.

SUPERINTENDENT SHELDEN and eight other miners were fatally entombed by a cave in the Anna Lee mine at Victor, Colorado, last Saturday. They were descending the shaft when, at the depth of 280 feet, great masses of rock crushed the cage and its occupants. The upper workings of the mine were known to be unsafe, and from this distance it appears to be a case of negligence. The former owners of the mine had gouged its eyes out, making necessary a complete system of timbering, which had been deferred.

IN answer to the resolution of the House, Secretary Smith has sent to that body a letter from the Commissioner of the General Land Office regarding the lands of the Central and Union Pacific railroads. It shows as follows: Central Pacific—estimated area of grant, 10,248,224 acres; amount patented to date, 2,206,881 acres; amount of unpatented selections, 1,298,576 acres. Union Pacific railroad—Estimated area of grant, 13,295,104 acres; amount patented to date, 4,180,914 acres; amount of unpatented selections, 2,610.231 acres. Secretary Smith says that his reason for suspending the patenting of land to the bond-aided railroads was to leave them in the condition where Congress would have all possible freedom of the dealing with the subject.

AN improved miners' cage is reported from Montana, the principal feature being a method of doing away with the accidents to life and limb and the destruction of property in mines using the old-style chairs. In this new arrangement the chairs being made a portion of the cage, a slight pressure of a lever suffices to throw them in or out at will, so that the station tender can in no case leave the chairs in, as they fly back as soon as the engine takes the load off them. They can also be employed very serviceably in making repairs to the shaft, such as retimbering, etc., resting as they will on any set of timbers, and the workmen in the shaft are assured far greater safety with the cage resting on the chairs than if it were hanging by a rope or cable—the fact being well known that a frequent source of trouble at all mines has been due to allowing the cage to drop on the chairs at a station. With this improved arrangement the only source of damage is that of dropping the cage into the sump or hoisting it into the sheaves.

THE Colorado "boom" goes on, and while there are undoubtedly several very rich gold producing districts, some of the statements seem exaggerated, to say the least. The following is a sample of what is being sent out, being the latest noticed: "Boulder, Col., Jan. 9.—Intense excitement prevails in this city over the new gold fields, situated between South Boulder Creek and Magnolia, and there are rumors of riches being uncovered by prospectors in holes not even five feet deep. The strike is alleged to be worth $100,000, and an offer of this amount is said to have been made and refused. Frank D. Baker came down from Walker's ranch and reports that several sacks of quartz had been sent to the sampling works from the claim discovered by the White brothers. The gold was sticking out all over the quartz, and no accurate estimate could be formed of the value of the stuff, but it will be sold by the pound instead of ton. The pannings made from the ore are said to be wonderful, as great rings of gold form around the pan with each test of washing. The prospectors are wild over the outlook for a great mining boom, and about 500 men are working night and day in search of veins. The new gold discoveries are on the same mineral belt as the rich telluride mines of Ballarat, Jamestown, Gold Hill, Sunshine and Magnolia. In each of these districts mineral has been uncovered at the grass roots." Miners do not believe such glowing statements in Colorado or anywhere else, but probably such reports are not intended for "home consumption."

## Notes on Gold Milling in California.

NUMBER IX.

By E. B PRESTON, M. E., Field Assistant State Mining Bureau.*

MILL ASSAYS.

*Amalgamation (Free Gold) Assay.*—Take two pounds (being exactly one thousandth part of a ton) of ore, crush in an iron mortar, and pass through a No. 60 sieve; remove the gold and other metallic substances left on the sieve, and place in a small porcelain dish containing a little dilute nitric acid, to remove any adhering crusts of oxide of iron, etc., which might prevent amalgamation; these residues are then carefully washed and thrown into the sifted ore, which is then placed in a wedgewood-ware mortar and mixed with enough warm water to make a stiff paste. To an ounce Troy (480 grains) of new, clean mercury, *free from gold*, add a piece of clean sodium about the size of a pea. The mercury thus highly charged with sodium is then thrown into the mortar containing the sample, and the mass ground constantly for an hour, when amalgamation should be quite complete. The mass is then transferred to a gold-pan and *carefully* washed over another pan or tub, in which the tailings are caught, and re-washed to save anything which may have escaped. The mercury is collected and transferred to a small dish; if it be much floured and refuse to run into globules, stir it with a small piece of sodium held in the end of a glass tube, which will cause it to run together. The mercury is then washed carefully in clear water and dried with blotting paper. It is then re-weighed, and if the loss exceeds 5% the assay must be rejected and a new one made. The mercury is next transferred to a small annealing-cup or crucible, which has been carefully black-leaded inside, covered with a porcelain or clay cover, and volatilized with a gentle heat. When all the mercury has been volatilized, about fifty grains of assay lead are thrown into the crucible and melted, giving it a rotary motion while in a molten state. It is then removed, cupelled, and the "button" weighed. It may be assumed without sensible error that the mercury lost in the operation carried the same proportion of gold as is contained in the mercury recovered; hence the gold contents of the ore will be found by multiplying the weight of the "button" obtained by the weight of the original quantity of mercury, and dividing the product by the difference between the weight of the mercury recovered and the "button." This figure multiplied by 1000, gives the weight, in grains, of the free gold and silver per ton of ore, which, for all practical purposes, may be assumed to be all gold. Should, however, greater accuracy be desired, hammer the "button" flat and thin, and dissolve the silver from it with nitric acid and weigh the gold. The difference in weight represents the silver.

*Panning Assay.*—Take two pounds of ore, crush, and pass through a No. 40 sieve; any gold in the residue left on the sieve being set aside. The sample is then carefully panned, and the tailings re-panned, to make sure nothing is lost. This operation will show at once whether the ore is rich in sulphurets or not, and the nature of them. The visible gold should be panned as free as possible from all the sulphurets, taking care that none is lost. The pan and its contents, together with the residue left on the sieve, are dried by holding over a fire; the contents are brushed into a cone of lead-foil, rolled up, melted, and cupelled. The "button" is weighed, and the free gold determined by multiplying its weight by 1,000.

The tailings produced in the panning operations should be panned over several times to collect all the sulphurets, which should then be dried, weighed, and their percentage in the ore determined.

Another method consists in not separating the free gold from the sulphurets, but in treating them both together by fire-assay, and determining the *total* value of the gold present in them. The operations, as far as described, are all that can be properly considered as coming under the term of battery amalgamation as practiced in California, if we except the use of the riffle and blanket sluices; these are placed below all the plates, and receive a very spasmodic attention in the majority of mills. Blankets are laid in strips, about sixteen inches wide and about six feet long, overlapping each other in double sets of sluices, set on a grade of about three-fourths of an inch to the foot, washed in a separate water-box. The material thus obtained, with the contents of the riffles, is deprived of its valuable contents by the aid of arrastras, pans, or Chili mills. But few blanket-sluices are found to-day in California mills.

On the practical development of the Plattner chlorination process, by Mr. Deetken, in the "sixties," it was demonstrated that many of the low-grade quartz veins carried enough gold in their sulphurets to make their working profitable, causing attention to be directed to the concentration of these ores by mechanical contrivances. From the constant and successful use of the gold-pan the mechanical application of a similar motion was sought, resulting in the use of the Hendy and similar concentrating machines.

The Hendy concentrator consists briefly of a shallow iron pan with an annular groove on the outer edge and a waste discharge in the center. It is supported on a central upright shaft passing through the center of the pan, on which revolves, above the pan, a central bowl to receive the pulp, having two tubular arms extending close to the outer edge of the pan; these uniformly discharge the pulp at right angles from their axis. At a point on its circumference the pan is attached to a crank-shaft, making about 220 revolutions per minute. The sulphurets and small balls of amalgam gather in the groove at the outer edge, from whence they are drawn through a gate, which is regulated to be automatic in its discharge. This gate is not opened until the groove is pretty well filled with sulphurets. Two of these machines, driven by one shaft, are required for a five-stamp battery. The machine needs constant attention; one man can attend to twelve machines on a shift. They have been mostly displaced by the endless-belt machines which have developed from the endless blanket and shaking-table.

In 1867 the first patents for the revolving belt were issued. This was the commencement of the belt concentrators, of which at present the Frue, Triumph, Woodbury, Tulloch, Embrey, and Johnston are representatives. To produce the best results on these machines, all the stuff should be *sized*.

*The Frue Vanner*, which has the largest representation in California gold mills, has been frequently described. It has a side shake of one inch, with from 180 to 200 strokes per minute, the belt traveling upward on an incline form three feet to twelve feet per minute. The belt is made in two sizes, four feet and six feet wide, and in the latest patterns as made at the Union Iron Works, San Francisco, has practical arrangement for easily changing the slope at the upper end. The frames of these modern styles are made of iron instead of wood. The pulp is discharged very evenly over the belt from a distributor near the upper end, just below the point where clear water is discharged in fine jets across the belt. In placing the machine, attention must be given to the solidity of the frame, and that a perfect level be obtained across the belt; further, the pulp and clear water must be distributed in an even depth of about one fourth of an inch; the grade and upper travel depend on the fineness of the pulp, and must be regulated accordingly.

The following guide for a proper condition of the work on the belt is given by Henry Louis, E. M., F. G. S.: "The working conditions should be so adjusted that a small triangular patch of sand should show at each of the lower corners of the belt. These sand-corners should not be too large, but must be well marked, and the two should be of equal size. Should they be unequal the fault will be found to be either in that the belt is not accurately level across, that the distributor is not doing its work properly, or that some of the working parts have not been properly tightened up, so that there are other motions than the normal ones communicated to the belts. Too large a corner of sand shows that the pulp is too thick, while absence of any corner indicates that it carries too much water.

Two of the four-foot belt vanners, or one of the six foot, handle the pulp from a five-stamp battery. The amount of clear water required to be added is about one-fifth of a cubic foot per minute; the vanner requires about one-half H. P."

*The Triumph* differs from the Frue, principally, in that it has an end shake of one inch and slightly quicker stroke (230 per minute), the belt making a forward movement of three feet to four feet per minute. It receives the pulp in a bowl containing quicksilver before reaching the distributor, which is all kept in agitation by revolving stirrers.

*The Woodbury* is similar to the Triumph in extent and number of motions, but divides the belt into seven longitudinal partitions; an increased output being claimed for this construction.

*The Tulloch* gives a rocking motion from a fulcrum on the floor, making 140 shakes of one and three-eighths inches per minute, using either canvas or rubber belt. This machine, it is claimed, saves a somewhat larger amount of the finer and richer grade of sulphurets as compared with the former types.

*The Embrey* is similar to the Frue, but with end shake.

*The Johnston*, with improvements, and the latest of the belt concentrator placed on the market, claims many points of advantage. It is suspended from four non-parallel hangers capable of adjustsment, by which the angle of oscillation can be changed as required, preventing the accumulation of sand at the edges, such as occurs with the horizontal side-shake machines, or the piling of the sands in the center of the belt, that occurs with the rocking motion. The motion imparted to this belt resembles more nearly that of the batea than that of any of the other concentrators. The belt is made of No. 6 duck, oiled and painted, but a rubber belt can be used at one-third the cost of those with molded edges, which are short-lived. Small, hollow, brass, side-rollers on the shaking-frame, form the raised edges by curving the flat belt slightly upwards. The pulp is delivered from five slots running parallel with the belt frames, one-fourth of an inch wide and sixteen inches long, leaving ten-inch spaces, into which the pulp is thrown when it strikes the belt. Here the separation at once takes place; the sulphurets settling on the belt are carried by it up to the clear water, while the sands are carried down the belt. In neither case are the sands or sulphurets obstructed by the falling of water and sands, as in other machines where the pulp is discharged across the belt. The clear water at the head of the table, instead of being discharged from a stationary box to the moving table, is discharged from a distributor, which is attached to and moves with the table, thus stripping the belt of the smallest possible portion of sulphurets. Two widths of belt, fifty-four inches and seventy-two inches, are used, which are given a grade of one-fifth of an inch to one-fourth of an inch to the foot, making about 118 side-shakes per minute. One machine handles the pulp from a five-stamp battery.

Another vanner, soon to be placed before the mining public, consists of the essential features of the vanner, but carries a rubber belt with depressions all over it, two inches in diameter and one-eighth of an inch deep, shaped after the batea, while the entire belt receives a motion corresponding to that given to a batea.

As the motion and grade given to any of these machines can only be correct for a certain size of grain in the pulp, it would be advisable to introduce some method of sizing the pulp previous to bringing it on the concentrator, and feeding the sized material to different machines. The finer the screen that has been used in the battery, however, the less does the lack of sizing affect the product from the concentrators. The concentrators should always, where possible, be attached to power independent from the stamps, and be placed on a floor below the aprons in a position to permit the attendant to pass all around and to conveniently transport the concentrated stuff to the covered drying floor, which should be made with a slight incline, perferably of concrete, and exposed to sunlight.

*Canvas Platforms or Tables.*—Investigation proving that the slimes passing off with the waste from the mill and concentrators still carried an appreciable amount of precious metal, millmen during the last few years have extended their operations, and re-treat the hitherto escaping slimes. This is done by conveying all the waste material from the mill, through sluices, to canvas platforms having the following general features.

A platform is built of clear, seasoned, and planed, one and one-quarter inch planking, on a solid, level foundation, and given a grade of about three-fourths of an inch to the foot, over which No. 6 canvas is stretched smooth, longitudinally, though sometimes crosswise, with a two-inch overlap. Particular attention must be paid that the canvas is stretched smoothly and evenly and that no crack opens between the planks constituting the platform. The length and width of the platform required depends on the amount of pulp to be handled; overcrowding must be avoided. The platform is divided longitudinally into sections corresponding to the width of the canvas, which is twenty-two inches; the partition is made of wooden strips, two inches wide and one-half of an inch high, covering one inch on the edge of two adjoining pieces of canvas. Running along the head of the platform are two sluices, one placed above the other; one containing clear water, the other pulp from the mill, both furnished with three-fourths of an inch to one inch plug-holes over each section. Below the lower edge of the platform are two sluices placed side by side, the inside one to convey the waste, the outer one for the concentrates (sweepings) from the platform. When ready for operation, the plugs are withdrawn, and both pulp and clear water commingled flow down in an even current and are discharged through the bottom waste sluice. After one hour or less, the plug is inserted in the pulp-box over the first section, and the clear water permitted to run for a few minutes longer, during which time quartz sand may be observed passing off the canvas, leaving a dark, partly metallic-appearing sediment on the canvas. A tray or board is then placed over the waste sluice, connecting the lower edge of the section with the outside sluices, and the sediment is removed from the canvas, either by sweeping or with the aid of a hose with a flattened nozzle, to be worked later by chlorination or cyanide process.

(*To be Continued.*)

* Bulletin No. 6, California State Mining Bureau.

## Ore Treatment—Cyanide and Chlorination.

The possibilities and probabilities of ore treatment are constant subjects of discussion. In all cases the process must be suited to the ore. On this subject W. P. Harvey, of Vancouver, B. C., says:

The ore found in the Cariboo, Fairview, Boundary, Osoyoos, Yale, Alberni, and some in Nelson, are not adapted, as a rule, to any smelting process, but rather to milling as applied to amalgamation, chlorination, and cyaniding. The Cariboo mines produce large quantities of refractory ore—by this is meant that containing as an impurity of the rock itself, sulphur and arsenic; in such cases a portion only of the gold exists uncoated, the balance being invisible as such. These ores are usually treated by amalgamation, when there is a considerable loss, as the coated gold will not give itself up to mercury, because its surface is not directly exposed to it. Of late years, instead of roasting to drive this impurity away, it has been found cheaper to treat the tailings by subjecting them to the action of a solution of cyanide of potassium, which attacks the coated gold of the tailings and dissolves it, when the solution containing the precious metal is passed over zinc shavings, which is the means of precipitating it in metallic form; this is collected and melted, the solution passing beyond the zinc being free from valuable products, but ready for another set of tailings. The Yale ores, however, are mostly free. At Fairview, 60 per cent of the gold contained only is free, and here the process named has been found to be equally as amenable as has been proved to be the case in the Cariboo. With Alberni ores some are too rich for any other treatment than free milling, but the majority can only be handled economically by the use of an accessory to the amalgamator. * * * * The chlorination process has been tried in this country, and found too expensive for commercial purposes.

On the other hand, J. E. Rothwell of Denver, Col., claims that in Colorado chlorination is of more advantage than the cyanide process. He says it is a well known fact that a solution of chlorine in water is a very efficient and rapid solvent of gold, much more so than cyanide and about the same as bromine. The relative dissolving powers of the different solutions as given by Rose in his "Metallurgy of Gold" is as follows:

Chlorine—Saturated solution in water (about a 1 per cent solution), 1½ hours, 4.49 per cent.

Bromine—1 per cent solution, 1½ hours, 6.46 per cent.

Cyanide—1 per cent solution, 1½ hours, 0.57 per cent.

In each case the temperature of the solutions was 60° Centigrade.

It has been said that 1 ton of chemicals as at present used in the chlorination process will treat only 20 tons of ore; while 1 ton of chemicals used in the cyanide process will treat 100 tons of ore. This is a mistake, as 1 ton of chemicals in the chlorination process has been proved to treat from 60 to 150 tons of ore, and even in some cases nearly 200 tons of ore; this when using chloride of lime and sulphuric acid, but when it is considered that of the chloride of lime used only 30 per cent of its weight is available as chlorine and acid has to be used to liberate it, it will be seen what the present reason is for having to handle a great amount of freight. Now, however, a great advance in the chemical industry has been made, and it is possible to get chlorine in a practically pure state, thus eliminating the freight on 75 per cent of the necessary chemical. And as equal quantities of chlorine or cyanide in a solution will treat the same ores, except that chlorine will be about eight times as fast as cyanide, and as the relative cost of the two chemicals is as 20 cents to 55 cents per pound, it can readily be seen where chlorine has the advantage, and the cost in one particular will be materially reduced. But this is not the case that shows the greatest possible advantage that the chlorination process has over the cyanide, as by recent improvements it has been proved possible to manufacture chlorine from salt direct, by electrolysis, at an expense of from 5 cents to 7 cents per pound; therefore, when a large chlorination mill is built that will make their own chlorine, it can readily be seen how much cheaper the treatment can be made.

Other advantages that chlorination has over cyanide is that it is not necessary to reduce the ores as fine for chlorination as for cyanide, and it is well known to mill men that where 80 tons of ore can be reduced to 10 or 12 mesh, sufficient for chlorination, only 30 tons can be reduced to 30 mesh, absolutely necessary, except in rare cases, as at the Mercur, for cyanide, thus reducing the amount of crushing plant necessary, and therefore the cost of crushing and wear and tear of machinery.

It has been claimed that the cyanide process does not require the ore to be roasted, and that chlorination does. This is not always true, as it has been demonstrated in several cases in America that certain ores will not yield their good contents to cyanide without roasting. It has also been demonstrated that certain low-grade silicious ores will yield a very high extraction by chlorination without any preliminary roasting, showing that even in this particular the advantage is not all with the cyanide process. In any case the roasting of ores is a comparatively cheap and simple matter, as manufacturers of roasting furnaces are ready to put in furnaces and guarantee that ore can be roasted for from 30 cents to 35 cents per ton.

As to the relative cost of the works to treat by either process, this is practically the same in each case.

A resume of what chlorination will cost on Cripple Creek ores as compared with cyanide would be about as follows:

| | *Chlorination.* | *Cyanide.* |
|---|---|---|
| Sampling, per ton | 0 30 | 0 30 |
| Crushing, per ton | 0 50 | 0 50 |
| Roasting, per ton | 0 35 | 0 00 |
| Chemicals, per ton | 0 60 | 1 00 |
| Labor, per ton | 0 75 | 0 75 |
| Amortization, per ton | 0 25 | 0 25 |
| Totals | $2 55 | $2 80 |

To cyanide the royalty must be added, amounting to from 50 cents to $1.50 per ton, according to the grade of ore treated and the good will of the managers of the process.

If the cheaper method of producing chlorine is added to the works the cost of chemicals will be reduced about one-half, and should any of the large mines put up their own works the labor and cost of sampling would be reduced, making the whole cost still less.

It is a well known fact to those familiar with the action of the two processes that the extraction on all grades of ore by the chlorination process is uniformly high, ranging from 92 per cent to 98 per cent, while that of cyanide is such that the cyanide mills do not care to accept any ore that runs over 0.6 to 0.75 ounces per ton, by reason of the lower extraction made and having to pay $19 an ounce for the gold in the ore.

At the Golden Reward Chlorination Works, the pioneer works in America, where they have treated upwards of 200,000 tons of ore since starting in 1890, the cost of treatment has been reduced to $3 per ton, and they are adding improvements that will still further reduce this figure.

As an instance of what chlorination can do on tailings, under similar conditions to cyanide, the following figures, to be found in Rose's "Metallurgy of Gold," taken from a report of the Fahlun Copper Works, Sweden, can be considered authentic. Tailings from 14,000 tons of ore were treated. Gold in tailings before treatment, 41.82 grains; value, $1.798 per ton; gold in tailings after treatment, 4.04 grains; value, $0.175 per ton; extraction, 90.34 per cent.

| *Cost per ton—* | | | |
|---|---|---|---|
| Chlorine of lime, 6 pounds | 5d | or | 0 10c |
| Sulphuric acid, 8.37 pounds | 1d | or | 0 02c |
| Acetate of lead | ¾d | or | 0 015c |
| Fuel for steam | 1¼d | or | 0 025c |
| Total cost | 8d | or | 0 16c |

If we reduce these figures to American prices, we find that the cost is about 55 cents per ton. It would have been impossible to have used cyanide at a profit on this grade of material.

The lowest grade of tailings being treated by the cyanide process in America is probably at the Harqua Hala, in Arizona, where the value is $4.10 per ton and an extraction of 76 per cent obtained, according to the manager's report to the company. This is about the same extraction as obtained in South Africa on tailings of from 4 to 6 pennyweights, and the cost of treatment of which, not including royalty, ranges from $1.25 to $2.50 per ton.

It is not hard to figure where the profit to a chlorination mill will come from out of a $5 treatment charge, when the actual cost of treatment will not exceed $2.55 per ton, and chlorine extracts from the ore the full value paid for, and in the higher grades from 2 to 5 per cent more.

In defense of the cyanide system a writer in the *Mining Industry and Review*, of Denver, says:

In the United States, abandoned deposits of gold and silver ores are being reopened by the use of the cyanide process with the certainty that these enterprizes can now be made highly profitable.

The known existence of low-grade gold and silver deposits similar in many respects to those found in South Africa is not alone sufficient, but, in combination with the cyanide method to recover the values successfully, should bring up the production of the precious metals in this country to a figure second to none in the world.

In substance, the MacArthur-Forrest invention consists not merely in discovering that a dilute solution of cyanide could be used to extract gold from its ore, but showing the public the best practical method of doing it by leaving baser metals behind, which had never occurred to any one before, and is the keystone to the whole cyanide process. The process consists in breaking the ore to a granular product and then subjecting it to a weak cyanide solution. When the gold in the ore is known to be dissolved, the cyanide of gold solution is allowed to trickle through a mass of bright zinc shavings, and trickles out gold—free. The porous mass of zinc forms a chemical filter, which at once precipitates and collects the precious metals. When the gold is deposited, the filliform mass of zinc with gold and silver powder adhering is vigorously shaken in water, when the precious metals fall off. The gold and silver is then collected and fused directly into bullion bars of almost pure gold and silver.

The cost of treating crude ores in the United States averages $3 per ton with extractions varying from 80 to 90 per cent of the precious metals. Tailings are treated at an average cost of $1 per ton with extractions of 70 to 80 per cent.

According to the report of the Witwatersrand Chamber of Mines of date of October, 1895, forty-three cyanide mills at Johannesburg run on tailings, all of them using the cyanide, or MacArthur-Forrest, process. In September over 200,000 tons of tailings were treated. The total product claimed to have been recovered by cyanide for the month of September is valued at $1,000,000.

In New Zealand the MacArthur-Forrest process has produced 99 per cent of the Upper Thames output and 80 per cent of the Kuaotunu output.

In the United States the process is at present in successful operation on low-grade ores and tailings in various mills in Colorado, New Mexico, Arizona, Utah, Idaho, Montana, South Dakota, Oregon, Nevada and California. Prior to its adoption these ores and tailings were yielding no revenue to their owners.

*Colorado.*—The Metallic Extraction Company, Mr. Eben Smith, president, have been operating a 100-ton MacArthur-Forrest plant for the past four months at Florence. The mill is now being increased to a capacity of 300 tons per diem. Mr. David H. Moffat, president of the First National Bank, Denver, is a large shareholder in this company. The Livingstone Gold Mining Company, Boulder county, have produced over $40,000 since being in operation. The Brodie mill, fifty tons per diem plant at Cripple Creek, has produced for the past six months over $54,000 worth of bullion.

*Utah.*—The well-known Mercur mine has used the cyanide process for the past three years, and has paid dividends to the amount of $350,000. The mill capacity is about 175 tons every twenty-four hours. When the Mercur Company first adopted cyanide it was deeply in debt. The Marion Company is treating over fifty tons per diem. The Sunshine Company has commenced operations with a plant of 150 tons daily capacity. The above mills are all in the Camp Floyd mining district. Several smaller plants are operating in other parts of Utah.

*South Dakota.*—The Black Hills Gold and Silver Extraction Company are operating a fifty-ton plant at Deadwood. Recently a fifteen days' run is said to have produced a bar of bullion valued at $30,000. The Custom M. & M. Co. own a twenty-five ton tailing plant.

*Nevada.*—The Union Mill Company, Tuscarora, have been operating a large heap of tailings. Two other plants have been treating tailings for some time past.

*New Mexico.*—For three years past the North Homestake tailings have been treated successfully.

*Arizona.*—Two fifty-ton tailing plants at Wickenburg, Maricopa county, have been operating successfully. The Congress Gold M. Co. and the Harqua Hala M. Co. are each treating over 100 tons per diem. The Grand Central mine dump is also being successfully treated by the cyanide process.

*Montana.*—The Revenue fifty-ton plant, in Madison county, and the Ammon-Stivers M. & M. Co. are using cyanide.

*California.*—The following mines are at present successfully operating with cyanide: The Bodie M. & M. Co., Mono county; the Fulton Foundry; the Standard Con. M. Co.; Messrs. Parr and Tyack and Judge Bicknel. Total tonnage per month, 10,000 tons.

*Oregon.*—The Eureka and Excelsior mines, Baker county; capacity, fifty tons per diem.

The completion of mills now in course of construction and for which licenses have been granted by the Gold and Silver Extraction Company of America, Ltd., controllers of the MacArthur-Forrest process for the United States, should increase the tonnage, within the next twelve months, of ores treated by cyanide to at least 50,000 tons per month and add largely to the production of gold in the United States.

The possibilities of the process are such that it is safe to predict cyanide will recover as much gold, if not more, in the United States than it is doing in Africa, where 40 per cent of the total value of gold produced is by the MacArthur-Forrest cyanide process.

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A NEW YORK professor, afflicted, or blessed, with a glass eye, has devised a striking mode of converting this little accessory to uses other than mere ornament. Hermetically sealed within the shell of the glass eye is a minute one-candle power electric glow lamp, of the kind used by surgeons. This ocular lamp is operated from a small storage battery, conveyed in the professor's pocket. The luminous eye acts like a dark lantern, whenever desired, simply by the natural closure of the eyelid over it. For reading in bed, or in the train, or conducting any physical research, it proves an admirable convenience. At first sight, to a casual observer, the luminous orb wears a fearsome, or at least startling, aspect. In fact, it would be ill-advised to mingle in general society with the eye in use.

## Mines and Mining In Nevada County.

NUMBER I.

By SAMUEL BUTLER.

Mining is the staple industry of this county. All other industries and pursuits revolve around it and are dependent on it. On its success depends the financial and commercial prosperity of our citizens and business men. When our mines are prosperous and productive, commerce is brisk and the people are correspondingly happy, and vice versa. It is the object of the writer, in conformity with an annual custom, to give the readers of the MINING AND SCIENTIFIC PRESS a resume of this important industry in our county from the standpoint of a practical miner. The aim of this article is retrospective and prospective. It is the intention here to calmly and dispassionately review the past and to offer some suggestions regarding the future of our mines. In this particular the assertions here made will be influenced only by the accomplishments of the past. Gross misrepresentations and garbled statements will be avoided and reliable data only will be used as a basis on which to found the following paragraphs.

Since its inception Nevada has borne the proud distinction of being the banner gold-producing county of the State. Although competition has been active and keen, and sometimes she has been very hard pressed in the race for supremacy, her competitors have never been able to wrest the wreath from her golden brow, with but one solitary exception, and at this writing there is strong reason for believing that the production of 1895-6 will again place her in the role of leading gold-producing county of the State. In saying this we do not wish to detract from the importance which should be attached to the splendid production of Calaveras county, which Mint Statistician Yale places at the head of the list of gold-producing counties for 1894. Nevada county is neither envious nor jealous of the laurel won by her sister county in the struggle for supremacy. We stand prepared to congratulate her on her splendid achievement, and express the wish that every mining county might be capable of duplicating her great production in the near future. For experience has taught us that success and prosperity in the gold mining industry is indicative of prosperity in commercial and financial circles. Therefore, with a feeling of patriotism characteristic of miners generally, we glory in the success of Calaveras county and a general prosperity throughout the State.

But at this juncture it may be well to point out a delinquency observant in many of our mining companies and which is not generally known by those conversant with the condition of our industry. I refer to the reticence of our superintendents when appealed to by the proper authorities in giving the annual production of the mines under their supervision. There is no tangible excuse for such action, as no harm can result from giving to the world the amount of gold produced in each mine every year. On the other hand, irreparable injury is inflicted on the county and its industries by withholding from the public, and capital especially, the figures which they anticipate and which are intended to impress them with the magnitude and importance of our mines. By what method is outside capital to become cognizant of our production if every mining company insists on refusing to publish the amount produced each year? It is this annual publication which attracts and interests capitalists other than those now engaged in the development of our mines and which parades before the world the wonderful resources at our command. But some of our prominent mining companies doggedly refuse to inform the public of their productions, with the result that no accurate estimate of our gold production can be obtained. After a careful study of the situation, I am prone to state that only about three-fourths of the gold production of this county is recorded per Mint request. This is very regrettable, in view of the great expense incurred by the Mint and State Mining Bureau in collecting these statistics annually for public information and distribution. It also retards the progress of the county, while other sections are laboring earnestly to collect statistics regarding the full production of their mines and for the purpose of impressing the general public with the greatness thereof.

To those acquainted with the mining industry in this county the decrease in production in 1894 is not surprising. It was the inevitable result of a series of misfortunes that were regrettable and unavoidable. The reason for this diminution in production I clearly pointed out in an article published in these columns a year ago. I then referred to the burning of the Maryland plant, which threw 200 men out of employment, the suspension of the Champion mine through injunction, which disemployed 150 men, and the cutting off of the rich North Star vein, which seriously affected 200 men employed at the time. These incidents, combined with other annoying and injurious reverses, caused the diminution of 1894 and placed Nevada third in the list of gold-producing counties. Whether the production of 1895 will regain the prestige lost in 1894 is still a matter of conjecture, but it is safe to say that the production of 1896 will again put her at the head of the processsion. Everything tends to sustain this assertion. The rehabilitation of hydraulic mining, under the Caminetti and Ford acts, which has not yet been evident in the way of increased production, will greatly augment our gold output in the near future. Preparations have been made in compliance with the supervision of the National and State Debris Commissioners for the resumption of some of our largest hydraulic mines. There has also been a reopening of several abandoned mines, notably the Massachusetts Hill, Bullion and Banner in Grass Valley, the Merrifield, Cadmus, Home and Gold Tunnel mines in Nevada City, which formerly were very productive properties and which it is hoped will again add greatly to our gold production.

*(To be Continued.)*

## Balance Sheet of a South African Mine.

The following is the official report of the directors of the Wemmer mine at Johannesburg, South Africa, for the month of October. The Wemmer is what is called a "main reef mine;" its capital is £55,000; its market value, £550,000; it is six years in existence; its present monthly profit is about £11,000. The figures below are of interest to the American miner:

EXPENDITURE AND REVENUE.

EXPENDITURE.

| | | Tons. | Cost per ton. | |
|---|---|---|---|---|
| Mining account | | | | £5,725 1 6 |
| Sorting account | £495 12 11 | | | |
| Less stone sold | 188 5 6 | | | |
| | | | | 307 7 5 |
| Water service from pan to mine | | | | 5 6 3 |
| | | 10,985 | 10 11.91 | 6,037 15 2 |
| Reduction expenses— | | | | |
| Crushing ore | 1,158 3 5 | | 3 3.42 | |
| Concentration | 230 10 6 | | 0 7.85 | |
| Tailings wheel | 14 4 11 | | 0 0.48 | |
| Electric lighting | 33 4 11 | | 0 1.13 | |
| Breaking rock at main shaft | 126 5 7 | | 0 4.29 | |
| Transportation of ore to mill | 217 10 9 | 7,052 | 0 7.40 | |
| | | | | 1,780 0 1 |
| General charges— | | | | |
| Licenses, medical expenses, directors' fees, sanitary expenses, accident and fire insurance, salaries and charges | | 7,052 | 1 2.07 | 413 12 0 |
| Development redemption | | 7,052 | 7 0 | 2,467 10 0 |
| | | | 24 2.55 | |
| Cyanide works—Treating | | 4,375 | 3 5.97 | 765 3 6 |
| | | | 27 8.52 | |
| | | | | 11,464 1 3 |
| Profit for month | | | | 11,057 12 10 |
| | | | | 22,521 14 1 |

REVENUE.

| | | |
|---|---|---|
| Gold account—4098.63 ounces bullion realized | | 14,954 6 1 |
| Cyanide works—1585.05 ounces bullion realized | | 5,433 11 4 |
| Concentrates estimated for October production | 2,499 0 0 | |
| Less deficit on September production | 365 3 4 | |
| | | 2,133 16 8 |
| | | 22,521 14 1 |
| Total amount spent on development, including 423 feet of driving and sinking | | 1,933 4 5 |

CAPITAL ACCOUNT.

| | |
|---|---|
| New incline main shaft | 375 15 6 |
| Buildings and general improvements | 1,062 1 0 |
| | 1,437 16 6 |

MILLING RESULT FOR OCTOBER.

| | |
|---|---|
| Stamps at work | 50 stamps. |
| Working time | 30 days. |
| Tons crushed | 7,052 tons. |
| Tons crushed per head per day | 4.70 tons. |
| Bar gold extracted | 4,098 63 ozs. |
| Yield per ton crushed | 11.62 dwts. |
| Tailings treated | 4,375 tons. |
| Bullion returned | 1,585.05 ozs. |
| Concentrates caught | 160 tons. |
| Assay value | 5 ozs. 6 dwts |

The total yield per ton, including extraction from tailings and concentrates, is 18.78 dwts. fine gold.

## Cedar River Gravity Water Supply for the City of Seattle, Washington.

At a special election held on December 10, 1895, by more than three-fifths majority of the voters, it was decided to extend the city water works by adding a gravity supply from Cedar river, at a cost not to exceed $1,250,000.

The present source of supply is Lake Washington, which lies immediately east of the city. Its elevation is about fifteen feet above mean high tide of Seattle harbor. From the principal pumping station at the lake the water is raised to a reservoir of four and one-quarter million gallons capacity, at an elevation of 305 feet. From this reservoir the principal section of the city is supplied, and two auxiliary pumping stations serve the higher residence districts to an elevation of about 480 feet. The distribution system includes more than one hundred miles of pipe lines, varying in size from two to thirty inches. The average daily consumption is somewhat in excess of five million gallons, the maximum being about seven million gallons during the summer months.

During five years of municipal ownership the receipts from the water works have not only been sufficient to pay all expenses of operation and maintenance but have created a large surplus revenue, available for general purposes. During the same time water rates have been reduced fully fifty per cent.

Before acquiring the present system the city secured the services of Mr. Benezette Williams, C. E., of Chicago, as consulting engineer, and under his direction an exhaustive series of surveys was made in 1889 and 1890. His report was submitted on February 21, 1890, and was followed with detail plans and estimates. The plan located the source of supply on Cedar river, about twenty-five miles southeast of the city. At this point the river has an elevation of 513 feet above tide and the flow varies from 115,000,000 gallons to 1,500,000,000 gallons per twenty-four hours, at the respective low and high-water stages, the river being a mountain stream from the Cascades and subject to great fluctuation of flow. It was proposed to build a timber and earthen dam across the narrow river valley to a height of twenty-one feet above low water, thus raising the water surface to 534 feet above tide. From this point, by means of a V-shaped flume, a flow of 50,000,000 gallons per day was to be diverted and carried to Swan lake, a distance of about eight miles. Swan lake is a clear, deep lake, with gravelly bottom and with generally steep banks and precipitous shores. Its water surface is about 600 acres and at an elevation of 468 feet above tide. The plan proposed a dam at the outlet of the lake, raising the water level to 485 feet above tide, thus increasing the water surface to 800 acres. The location of Swan lake is such that besides serving as an impounding reservoir it saves two and one-half miles of pipe line between Cedar river and the city. Mr. Williams proposed to draw the city supply from Swan lake through a tunnel about one mile long and a forty-two-inch pressure conduit of fourteen miles length to a city reservoir at 300 feet elevation, continuing two and one-half miles farther to a high-service reservoir at 425 feet elevation. By arranging for alternate discharges into these city reservoirs, nearly the entire city would be served by gravity from a supply system with a capacity of 25,000,000 gallons per day. The plan proposed a main supply pipe made of three-inch wood staves, securely banded with wrought-iron or steel bands, the outer surface of the staves and bands to be coated with asphaltum.

The estimated cost of the supply system as then proposed by Mr. Williams was $1,200,793.65, and of furnishing and laying distribution pipes in the city $535,052.86.

During 1890 the city purchased the plant of the private corporation which had heretofore furnished the water supply, and constructed most of the city distribution system as recommended by Mr. Williams, postponing construction of the Cedar river gravity supply system. The economy of the plant during the past five years has been such as to thoroughly convince the people as to the benefits of public ownership. Although the expense of operating, maintaining and renewing the pumping plant has been large in comparison to the economy of a gravity supply, it was not deemed advisable to increase the obligations of the city by adding the Cedar river supply until it became absolutely necessary.

Within the past year, however, it was very clearly indicated that an effort was being made to control and develop the ultimate city water supply for private profit. This condition of affairs stimulated action by the City Council towards immediate construction by the city, which action was duly ratified by the people at the special election on December 10th.

It is now proposed to construct the supply system substantially in accordance with the recommendations of Mr. Williams as to location, routes, etc., but with some modifications as to character of construction. Two reservoirs will be constructed in the city, of forty and twenty-five million gallons respectively. The cost of the proposed additions, including all lands, water rights, rights of way, engineering and incidental expenses, is limited to $1,250,000. Payment will be made in city warrants drawn upon a special Cedar River Water Supply Fund, created for this purpose. Under the plan proposed by the council and ratified by the people, the city binds itself to set aside into the above named special fund seventy-five per cent of the gross receipts of the entire city water works after the addition of the gravity supply. This fund is to be applied solely for the payment of interest and principal of the warrants issued in payment for the supply plant. The warrants will bear five per rent interest, payable semi-annually, commencing from the date of completion and acceptance of the work, and after payment of interest at every semi-annual period the balance in the special fund is to be applied to redemption of the principal. The city irrevocably binds itself not to reduce the rates or charges for water, so that the seventy-five per cent of the gross revenues to be set aside shall not amount to less than at present, until the construction obligations shall have been fully liquidated and discharged; also not to sell, lease, or in any manner dispose of the city water works without providing for these obligations.

The water receipts for the year 1895 amount to $111,698.05, based on ten months' collections up to November 1st. During 1894 the receipts were $121,666.31, but as a flat reduction of fifteen per cent in water rates was made on July 1st, 1894, and another reduction of five per cent on January 1st, 1895, it will be seen that there has been an actual increase of five per cent in the business of the department for 1895 as compared to 1894. This is a most encouraging proof of progress in the face of the general depression. Estimating on a continuation of five per cent annual increase of business at the present water rates, the percentage agreed to be set aside into the Cedar River Water Supply Fund will be sufficient to pay all interest and redeem the principal of the warrants issued in payment for the gravity supply within twelve years from the time of completion.

This plan of payment for the proposed additions is simply the application of the surplus revenues of the water works to the improvement and perpetuation of the supply. Under the operation of the gravity supply the twenty-five per cent of the revenues retained by the city will be ample for operation and maintenance expenses. The possession of this abundant and economical supply will make it possible for the city to foster manufacturing and commercial enterprises by offering such inducements as water and power service, either free or at nominal rates. The supply controlled by the city will afford opportunity of developing power to the extent of 5000 H. P., as required, and a municipal lighting and power plant will be a natural consequence of the proposed water works additions. The method of construction and payment which has been adopted involves no increase of the bonded debt of the city, the interest and principal of which are payable from general taxation upon all assessed property of the city. The application of the surplus revenues of the water works to this special fund, instead of for general municipal expenses, will be more than offset by the saving of pump renewals, maintenance and operation, together with costs of street lighting. Thus, while the municipality will acquire and develop a permanent water supply, it is confidently expected that it will not involve even a temporary additional burden, while the eventual benefits are assured beyond all question.

Detail specifications, plans, forms of proposal and contract are now being prepared by the City Engineer, and the formal call for bids will be made in the near future. Alternative bids will be requested, covering both riveted steel and wood stave pipe construction.

# Scientific Progress.

### Difficult Engineering Feat.

A difficult and costly piece of engineering has been undertaken by the United States Government in the projected establishment of a great lighthouse in the open ocean off Diamond shoal, seven miles from the present Hatteras light, and bearing almost due east. This is one of the most daring schemes that army officers have dealt with since General Casey, chief of engineers, successfully undermined the great Washington monument, and placed there a solid foundation expected to support that structure for ages to come. Surrounding this new plan, however, there is foreboding of failure, and it is predicted this early that $1,000,000 is to be sunk literally as well as metaphorically in the sea. If such a structure is placed there, and stands without damage the onslaught of the sea for five years, according to a leading army engineer, this Government will have accomplished its greatest triumph in this branch of science.

The height of the focal plane above water in the prospectus will be just 100 feet, and the structure is to stand in 33 feet of water, and to be supported on disk plates sunk to a depth of 30 feet in the sand. The diameter from center to center of vertical members of the foundation series is to be 60 feet, and the height of the floor of the house above water 47 feet. The main portion of the structure is to be constructed of forged steel members with principal joints and connections formed of steel castings.

A special feature of the design is to make all essential parts below the water line of massive dimensions, as well as all those parts above the water line which will be subject to the action of wind and waves. The use of bolts, keys, screws and other small sections or dimensions, which would be rapidly weakened by corrosion, will be avoided as far as possible. Joints and connections are to be made absolutely rigid to all possible strains, and to be as strong as the members themselves. This is to be effected by joining ends of members to steel-cast hubs by the use of massive steel rings shrunk in a manner approximating that followed in "built-up" gun construction.

In the foundation series, besides the massive members necessary for the strength of the tower when in place, there will be certain other tie rods of lighter section, which are added for greater security to stiffen the framework while it is floated, and while being placed and grounded on the shoal It is proposed by the board to construct the screw pile structure in the harbor and float it out by steel cylindrical caissons calculated to give a draft of 30 feet when at sea. This part of the light is then to be sunk probably 50 feet down in the bottom by hydraulics until a firm hold is secured. It is then proposed to build up from the skeleton arrangement until the lightkeeper's apartments have been completed, and the height secured for the great lens, which is to throw its light 25 miles in all directions. The work is to begin this winter, and it is proposed to complete the lighthouse in two or three years.

### Electricity Direct from Coal.

I do not think many people have thought about the possible effects of a successful direct conversion of the energy of fuel into electrical energy. Different industries will be affected in different ways and to different extents. Some will be harmed; will be practically done away with; others will suffer indirectly; others again will be benefited. It is one of the conditions of evolution that with every advance there is some corresponding suffering. It is a struggle in which we are raised on some one's shoulders, and for an advance which would be so radical there would be many victims.

Let us consider for a moment the generation of electricity for distribution from central stations. In looking over the expense account of a company supplying energy, say, for lighting, we are struck by the fact that the cost of fuel is a small part of the total running expenses, and at first sight it would seem that a process giving us fifty per cent of the energy of the fuel would be no such great improvement over the present method, which gives, say, ten per cent. We would use less fuel, to be sure, but the cost of the fuel, as stated, is comparatively small. If, however, we considered the total cost of the energy at the switchboard terminals of the station, we can see that a simple process of direct conversion would make more than a small percentage difference in the cost. The generator would take the place of the boilers, engines and dynamos now in use. If the efficiency of our present plant is ten per cent, we are handling five times as much fuel, and our boilers are five times as large as they would be if the total efficiency were fifty per cent. If our direct method is comparable, say, to the generation of steam by a boiler, then, using it in place of our present system, would amount to changing our present plant—boilers, engines and dynamos—for a set of boilers one-fifth as large. There would be no high temperature, no moving parts, no commutators to wear out.—Dr. Louis Duncan in Cassier's Magazine for January.

### Coalless Cities.

The conditions of the great problem of entirely excluding coal from a city may be treated as follows: Artificial illumination, motive power, heating, cooking, manufacturing and various domestic operations, now performed with the aid of coal, must be accomplished without bringing coal or any objectionable substitute into the city. But how can such a radical and stupendous scheme be accomplished? The first reply to this, as to all other apparently unanswerable questions, would almost certainly be, "By electricity, of course."

If a suitable water power be available within a reasonable distance, it would naturally be utilized for driving the dynamos to generate electrical current for supplying a city. In the case of nearly all other large cities, however, the power would almost necessarily have to be obtained from coal, which would be brought to one or more large stations, located on the outskirts of, or at a sufficient distance from, the city, so that the latter would be free from smoke and other disagreeable consequences of coal combustion.

The current generated by the dynamos would be carried by overhead or underground conductors to the limits of the city, where the pressure would be reduced by step-down transformers from, say, about 10,000 volts to about 2500 volts in one or more stations, located at convenient points. The distribution of the current would be accomplished by running underground conductors from these main transformer stations to transformer substations, where the potential would be brought down to 250 volts for feeding lamps, motors, etc., by the three-wire system.

These sub-stations should be quite numerous, so that the local distribution at low pressure shall necessitate only the minimum weight of copper for the conductors.

A transformer sub-station could be in each block of the city, to be supplied with current. Local circuits from the secondary of the transformers would be carried around the block. These circuits would not be dangerous, since they would be operated at only 250 volts, and they could be strung as aerial wires supported upon fixtures or brackets attached to the roofs or back walls of the buildings, or they might be run in troughs, laid on the tops of the houses. Strong objections would probably be raised against allowing wires to be put up in this manner, but it should be remembered that they would be entirely out of sight from the streets, and would save the constant and very serious nuisance of digging up the latter for making connections to the individual houses. With overhead wires this could be done with trifling expense and trouble. All reasonable objections to these conductors are really less weighty than digging up the streets a single time to make or repair a house connection for gas or electric lighting.

The sub-stations would occupy only a part of the cellar in some building in each block, and there would not be sufficient noise or vibration from stationary or even rotary transformers to be at all perceptible in the rest of the building. The only precaution necessary would be the locking up of the transformers in a room accessible only to a regular attendant, who could take care of ten or more stations, visiting each occasionally to examine the apparatus, and perhaps also to regulate the voltage or to connect in circuit more transformers during the hours of heavy load. These last two operations could be performed electrically from a central station or automatically by clockwork, if desired.—Prof. F. B. Crocker in Cassier's Magazine for January.

# Mechanical Progress.

### The Life of the Present Steel Rail.

Referring to steel rails, Mr. J. F. Wallace, writing in the *Engineering Magazine* for December, says: While it is true that there has been a steady and uniform decrease in the price of steel during the last quarter of a century, the average standard weight of rail for main lines has at the same time increased from 60 to 99 pounds per yard, and the quality has materially depreciated. As an example of the deterioration that has taken place in quality, he states that during the past year he has relieved from a main track on tangents rails that weighed 75 pounds to the yard which had been in the track only five years; whereas, on the same district and under precisely the same traffic conditions, there still remain in the track 60-pound rails that have been in service for over fifteen years, which it was not considered necessary to renew this season. While this may be an exceptional case, he considers the steel rail which was furnished by the manufacturers fifteen to twenty years ago about 50 per cent better than the rail now manufactured. This is not intended to apply to special high class rails, which may be furnished by a few rolling mills under superior specifications, but to the ordinary rail supplied to and purchased by the majority of the railroads in the United States to-day.

### To Bore Glass.

Strong glass plates are bored through by means of rotating brass tubes of the necessary diameter, which are filled with water during boring. To the water there is added finely pulverized emery. The boring cylinder is put into motion by means of a drill or bow-drill. Weaker glass can be provided with holes in an easier manner by pressing a disk of wet clay upon the glass and making a hole through the clay of the width desired, so that the glass is laid bare here. Then molten lead is poured into the hole and lead and glass drop down at once. This method is based upon the quick, local heating of the glass, whereby it obtains a circular crack, the outline of which corresponds to the outline of the hole made in the clay. The cutting of glass tubes, cylinders, etc., in the factories is based upon the same principle.

### Machine vs. Intelligence.

The machine has run ahead of the human intelligence which operates it. A Western paper company, which has recently rebuilt a mill which was burned some months ago, has set up therein two Fourdrinier machines which, according to the contract entered into by the builder, are to run at the speed of 400 feet per minute. One of them was started up last week at a speed something less than that which the contract called for. The machine worked all right, but the attendants were not accustomed to such fast running, and it embarrassed them. It became necessary to slow down the machine, in order to allow the tenders to get acquainted with it. The 400-feet-a-minute machine has come to stay. And it is only two years since unbelieving foreigners were sure we were drawing the long bow, when we told them of machines in America that were running at the rate of 300 feet a minute.—The Paper Mill.

### Aluminum Solder.

The question is often asked, "Can aluminum be soldered?" The reply is that it can be soldered; but it is difficult to do, the principal reason for this being that it is with difficulty that solder can be made to adhere to aluminum, since the heat conductivity of aluminum is so great that as soon as the solder comes in contact with the metal the heat is conducted away from it so rapidly that the solder is chilled, and will thus not be allowed to flow freely on the surface of the aluminum. This can be overcome to a certain extent by keeping the sheet heated with an alcohol lamp or a gasoline torch while the soldering process is being carried on.

There are two general methods of soldering. One is to prepare the surface of the sheet chemically, so that the solder will form a chemical combination with the surface so prepared and adhere; and the second method is to plate with copper or some other metal the surface to be soldered, and then solder together these two surfaces.

The difficulty in this latter method is that, unless the plating is carried on with unusual care and skill, the plating itself will not adhere to the surfaces of the aluminum after a period of six or eight months, and the surfaces will drop apart, not from the fault of the solder, but from the fault of the plating.—J. C. McGuire before the N. A. M. E. Society.

### Edison's Experiments.

It is not the electric lights, nor the phonographs, nor any of the other things with which Mr. Edison's name is connected, that strikes the visitor to his workshops as the greatest part of his work. It is the invention of the innumerable machines with which these things are made. The idea of the electric light would have been of no use to the world without machines for making the lamps and the other parts. All of these machines had to be invented and made by the electrician, and there are thousands of them, some no bigger than a toy engine, some as large, nearly, as a house. Many of them are so delicate that they are operated with a belt no greater than a shoestring. One of them is used in polishing jewels for use in the phonograph. Without being touched by anybody it holds the tiny jewel in every possible position, shifting it, turning it, absolutely feeling it, to learn whether it is smooth, and all the while its delicate fingers are at work rubbing the jewel, which is no bigger than the head of a large pin. No boy could move his fingers more dexterously than this machine moves its parts in turning the jewel around.

THE latest invention in labor-saving machinery is the electric stevedore. This is a movable conveyor for loading a ship with flour or grain from an ordinary wharf. Its length is forty feet, two wheels in the center allowing it to be moved at will. The actuating power is electricity. The revolving belt on which the sacks are placed is of rubber, and passes over twelve rollers. It revolves at such speed as to carry all the weight in flour or grain that can be placed upon it. This apparatus recently loaded a steamer with 3000 tons of flour at the rate of seventy-five tons per hour.

# Electrical Progress.

### Why the Arc Light Hisses.

Prof. Sylvanus Thompson has been answering a question which has often puzzled the public. The arc light proceeds from the points of two little carbon rods as large as one's little finger. Prof. Thompson explains what is the state of the carbon when the lamp is throwing out its light. He says that the carbon is sometimes actually melting—a thing that was until recently thought impossible. Moreover, he says that when the light hisses the liquid carbon is really boiling. In ordinary combustion the state of the arc crater is such that the solid carbon below is covered with a layer or film of liquid carbon just boiling or evaporating off. When hissing takes place, a new state of things is set up. He says: "If you watch a short, hissing arc, you will see a column of light concentrating itself on a narrow spot, and the spot keeps moving about, and is very unstable in position, as well as in the amount of light it gives out. The crater surface, after the arc has been hissing, is found to be literally honeycombed. When the arc is hissing, you can see little bits erupted out and the hissing seems to be comparable to the hissing which takes place in boiling water."

### New Electrical Fields.

The power of electricity to do heating under every variety of conditions, to handle all varieties of the atoms of matter, and to operate as a chemical and physical agent directly in and through all parts of the living system, necessarily gives it an almost unlimited field. Not only can it supply light by heating to brilliant incandescence either carbon or platinum, but it can no less readily fill any demand for heating, or for cooking by means of heating. It, with great sureness and refinement of action, executes plating and electrotyping. Its immense and irresistible energy attacks with complete success the difficulties of smelting and of the reduction of refractory ores. It also comes to the help of the surgeon and the physician, on lines of medical efficiency almost coincident with those of creative energy.

In a recent suit brought against the city of Baltimore, Md., by the Safety Insulated Wire and Cable Company of New York city, it became of the greatest importance to have the wire company's charter in court. This phase of the case came up late one afternoon. Mr. Leonard F. Requa, general manager of the Safety Company, was in court. He knew that the company's original charter was in the president's safe-deposit box in New York and that the president was out of town. So there was no hope of securing the original in time to be of any service. After a few minutes' reflection, Mr. Requa went to a long-distance telephone and called up the Secretary of State at Albany, N. Y., to whom he explained the importance of the situation. The Secretary of State agreed to mail to Baltimore as soon as possible a copy of the Safety Company's charter. When Mr. Requa went down to breakfast in the hotel at Baltimore, the following morning he found a copy of his company's charter in his mail. This incident simply goes to show that when there is quick work on hand, a ready appreciation of the value of the telephone is a good thing to have with you.—Electrical Review.

Street cars are still rather expensive. The best cars, 35 to 42 feet in length, with modern fittings, cost from $2000 to $3000 in lots of ten to fifty. Single-truck electric cars, with electric equipment, from $1500 to $2500. Trailers for motor cars or for cable grips range in extremes from $750 to $1500. Cable grip cars, with gripping device, $450 to $1000. The electrical apparatus, which consists of two 30-horse power motors, the controllers on the platforms and the wiring of the car; also lightning arrester, switches, fuse box, etc., cost $900. A few months ago the price was $825. The same outfit, but less efficient, six or seven years ago cost $3500. A car wheel costs from $6 to $10, according to size and weight. Car axles, $4 to $5; window curtains from 75c to $3 each. Fare registers from $15 to $35 each; gongs from 75c to $2 each; trolley wheels 50c to 75c; trolley pole $1.50 to $3; hand brakes $5 to $50; air brakes $100 to $500; electric brake $25 to $150; head lights $4 to $12; car-heating stoves $5 to $25; electric heaters $4 to $10. The cable in the conduit, which pulls the cable cars, costs from 9c to 12c per foot. At present an electric track complete, with overhead work and feed lines and rails of 74 pounds to the yard, ranges from $3 to $3.30 per foot of single track.

It is believed, says *Electricity*, that the first electric light installed in an American theater was a Jablochkoff candle used as a focussing lamp in the old California Theater, on Bush street, San Francisco, in 1878. The managers of the theater at that time were Messrs. Barton Hill, General Barton and Frank Lawler. The play was "Antony and Cleopatra," Rose Eytinge and Cyril Searle taking the leading parts. Mr. A. H. Reese was the engineer in charge of the work. Seventeen years have worked a complete revolution in theatrical lighting, and to-day there is not a theater in the United States which could dispense with the electric light.

The metal glucinum is emerging from its position as a chemical rarity, and is coming to the front much as aluminum did some few years ago. It is even lighter than aluminum, which is remarkable, but its chief value consists in the fact that its electrical conductivity is as high as that of silver, and consequently higher than that of copper. It is less extensible than iron, and more durable. At present its value is 71s 4d per pound, which is prohibitive for large quantities; but this is only one-tenth of the price of platinum, weight for weight, and one one-hundred-and-sixtieth of the price of platinum, volume for volume.

To measure and record the time during which conversation goes on over a telephone wire between two people, an instrument has been invented called the calculagraph. It also registers the hour at which central is rung up, and any interruption in the conversation. The device consists essentially of a clock and printing apparatus, and will compute the charge at whatever rate it is adjusted for.

Elaborate and prolonged as were Edison's experiments with various forms of carbon for a lamp filament fifteen years ago, this line of research is still being followed up. Some recent German investigations suggest that an improvement on other materials may possibly be found in calcium carbide, the newly discovered compound from which acetylene gas is obtained.

It is customary, where a higher voltage than 2000 or 3000 is desired, to generate the current at about that potential, and then transform it by means of additional appliances. An alternating current dynamo has been built by Ferranti, in London, for the Deptford lighting station, which generates 12,500 volts. This is said to be without a precedent.

According to *Electric Power*, the microphone, telephone and phonograph are used by medical experts to collect and reproduce for students the different sounds produced by various human organs in a state of health and a state of disease. By means of a funnel these sounds can be magnified.

A German publication describes an electric system whereby iron furnaces in foundries can be charged, or filled, by cars operated from a distance, so that the men need not expose themselves to intense heat. Another advantage is that the work can be done in one-tenth the time.

The Cripple Creek Power and Mining Company has been organized for the purpose of generating and transmitting electric power. The generating plant is to be located at Florence and the power transmitted to the top of Gold hill.

The first of the great electric switch engines for the Baltimore tunnel was described in these columns last fall. The second one has been delivered, and is doing equally good work. The third is now ready.

# Practical Information.

### Burnt Steel—An Application of a Theory.

It is not always easy to make practical application of fine-spun theories, but that theory which is insusceptible of practical application cannot well be defended from the aspersion of fallacy.

Can we adapt and make familiar the theory that heat is a mode of motion and apply it to the known effects of overheating steel? Can we realize from our own personal experiences of burns and their physical effects upon our own systems that the exquisitely painful sensations produced are due to vibrations? When a hot coal sizzles on the flesh it is no time to philosophize; it is time to act, and when a piece of steel has become too hot, something has to be done with it immediately.

Heat is a mode of motion. Heat is motion. The property of attraction normally attaches to each atom of matter; it is not so necessary a part of it as to become essential to its existence as a primary atom, for it can be separated from it. In order to detach attraction from matter, sufficient motion must be set up. The condition of motion detaches attraction and the atoms separate. This motion in the case of burnt steel is set up by heat.

Attraction is rest. It is the tendency of particles to come together and rest upon each other. A body with its attractions satisfied is in equilibrium. Its forces balance. It is at rest. But heat is unrest. Heat gets among the particles of solid materials of steel, for instance—and they begin to repel each other. They have a greater fondness for going on an excursion than they have to nestle. When their motions acquire velocity enough they break their bonds, and the steel is no longer solid. It melts and is fluid. As the heat is excessively increased the particles of different elements of which it is composed make the discovery that they are free to separate. The carbon forsakes the iron, the impurities get away, finally the particles of iron themselves fly apart. It is not necessary to present to the solid steel any new substance for its constituents to unite with in order to dissolve the firm union of particles which gives it its characteristic solidarity, hardness and strength. It will just as well become fluid in a covered crucible if we can give its particles the vibrations due to temperature with equal facility. Get the heat to motion and the iron will go from a liquid to a gaseous state and to dissociation under the same conditions. This is no attenuated theory; it is a sad fact, as blacksmiths too often realize when they are unfortunately called away and leave their steel in the fire. At the slightest inception of heat the particles initiate movement. Take a close fitting plug-gauge in the hand, and the warmth imparted to it will set its particles into such motion that it expands and will no longer go into the ring-gauge which it perfectly fits when both are in equable temperature.

Put steel in the fire, and its particles at once in motion, unrest; at first their individual movements are fettered by the hardness of the steel, but the steel softens as they gain greater freedom, and by gradual increase their excursions become boundless, limitless, if the process is carried to the extreme and the steel is burned to gas.

Leaving this confinement to the forge, we may inject the remark that nowhere but in absolute zero of temperature can motion cease and stillness exist and rest endure. It is possible that in interstellar space, far, far away beyond any distance we can think, there may be such a region of rest, but that belongs to the category of things Huxley terms "unknowable." Singular as it appears to man, who has concluded that perpetual motion is unattainable, there is no space cognizable to man where all things are not in perpetual motion. At every point of space known to man perpetual motion exists. We know of no place impermeable to the influence of the sun.

Motion being heat, it is natural to trace it back in familiar paths to the sun, and thus find, at their headquarters, the elements of motion. This investigation might lead us to a more or less satisfactory conception of motion within the boundaries of our solar system. We may understand that motion is concentrated in coal, and comprehend Tyndall's saying: "Suns may revolve themselves into flora and fauna; and flora and fauna melt in air; the flux of power is still the same."

We return to the forge, and find that when flora and fauna are melted in air, we have a good, bright coal fire. You insert a piece of steel into its glowing heart, and it receives heat. The flux of power moves its particles and separates them. When it is quite hot, remove it from the fire, and if left to its natural conduct, when the heat is going away—or what is the same thing—when the heat motions are gradually ceasing, the separated particles will be left at the extreme boundaries of their excursions. As congellation progresses, they are fixed there, and are left so far apart that, when they get cold, they are only slightly within the sphere of cohesive attraction. That means that the steel is robbed of its strength. It will break like a pipe stem. It is burnt.

For this least injured form of burnt steel there is a perfect remedy, if its density can be restored. It may be treated in any manner which will bring to bear sufficient force of compression to compel the particles to come close together. This may be by hammering, by steady pressure, or by the contraction caused by shrinking the surfaces by rapid cooling, as by immersing it when hot in cold water. A worse form of burnt steel can only be remedied, or, as it is called, "restored," by chemical treatment. This is that form which has been exposed to the action of the air while its particles were widely separated by heat, inviting the embrace of the ever-grasping oxygen. A new element has come in; it will be found the piece is larger; every particle is enveloped with an oxide film. This film must be dissolved and removed before the particles of carbon alloyed iron can approach each other near enough to unite with the force of attraction which can only be exerted when they are in immediate contact.

I do not recommend anything for this. A treatment of cyanide of potassium, patiently continued, may, under certain conditions, produce some good results. A few immersions and coolings in rosin may produce on thin pieces a beneficial effect which puzzles the best steel workers. There are patented compounds which give good results.

It is of far greater importance to avoid than to remedy this error. One would hardly trust a barber who got ready to put a tourniquet around his neck if he should happen to cut his throat; so those who fix themselves with great care to "restore" burnt steel are hardly to be trusted to heat it. It looks like premeditated carelessness.

If by unavoidable accident a piece of steel gets too hot let the workman keep it out of the air, or else close up the grain by immersing it in cold water. Dip in and out, in such a manner

as to cool it as rapidly as possible without hardening it, or submitting it to a tension liable to create checks or promote cracks. Do not trust to immersion in soapsuds until the steel is below a red heat, for its effects are uncertain; it is apt to take hold in spots, cool unevenly and start cracks.

In any treatment of steel, where the temperature exceeds a hardening heat, let not the benign influence of borax be neglected. It is possible that the reason why no other substance has superseded borax as a flux for welding, is because borax is in every way so satisfactory that inquiry for a substitute lacks the motive power. It is good enough, and when steel is too hot there is nothing better to put upon it to render it impervious to the air and save it from the injury which might befall it if left exposed in its raw, bare and unprotected state. A flux of borax will varnish the surface of the too-highly heated metal and afford it adequate protection from the accumulation of further ills. It will also, to a considerable extent, prevent the formation of cold shuts and cracks in hammering for refining. It may be applied in powder either of (1) the raw borax; (2) borax roasted until it has parted with its water of crystallization, about forty-seven per cent of its weight; or (3) when it is burned to a glass. For the purpose of restoring burnt steel the powdered raw borax is probably the most efficient.

It is recently announced that a series of careful experiments has determined that if a trifle over one-half of one per cent of borax which is the metallic base of boracic acid is used as an alloy in steel, the tensile strength of the resulting metal will be greatly augmented without a proportionate increase in hardness and brittleness, sensitive to shock, when it is subjected to the operations of heating and rapid cooling as in hardening. It is said that the alloy can be filed, while common steel which acquired equal tenacity by hardening could not be filed. A skillful steel worker might, however, be able to perform these operations and produce opposite effects. Very much of the treatment of steel and its results depends upon the intention of them and who actually holds it in hand.—B. F. Spalding, in the Age of Steel.

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DISCUSSION has again begun as to when the twentieth century will begin. Those who claim that it begins Jan. 1st, 1900, would probably decline to accept a payment of 1899 dollars from a wealthy debtor who owed them $1900. On Dec. 31st, 1900, the full term of 100 years comprising the century will have elapsed, and at midnight on that date begins another century—the twentieth, according to our little record. It would be interesting to know just how long man has been keeping an account of time. Several times since the world became inhabited an effort has been made to keep some sort of tally of the years, and after consecutive counting of the years for a few thousand of the earth's annual journeys round the sun the count has been broken, some great war or famine or catastrophe sweeping away all vestige of the record. Time and again the effort has been made. Of all chronologies the Chinese seems most definite and consecutive. They have an unbroken count of years amounting now to over 5000. About 1901 years ago a general understanding was had in Europe to date from the birth of Christ, and according to that nearly all those influenced by Western civilization count by that system, calling this year 1896, A. D., though, in comparison with older systems, 1896 looks very meager. Along in the coming centuries will doubtless ensue some cataclysm that will upset all the present chronology, and then in 2300, or 2700, or whatever it may happen to be, this A. D. system will be dropped and men will begin at 1 again, as they have so often done before in the circling cycles of Time's changing course.

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ALUMINUM has been utilized for obtaining a flashlight as a substitute for magnesium. It is used as silver bronze.

## It Has Been Recently Held

A court of equity will not reform a written agreement when, by so doing, it would impose on one of the parties obligations which he never intended nor agreed to assume.

When an agent acts without or beyond the line of his authority, and the principal incurs thereby an injury, the agent may be held liable.

A promise by one party to do a given act, nothing having been done or paid in consideration therefor, cannot be enforced unless the opposite party either expressly or by necessary implication promises to do something in return.

The settlement of an action either begun or threatened, unless it be founded on a fraudulent or fictitious claim, is a valid consideration for promises by a third party to pay the claim.

It is the duty of a party to protect himself from the injurious consequences of the wrongful act of another, if he can do so by ordinary care and effort, and at moderate and reasonable expense; and for such reasonable exertion and expense in that behalf the wrongdoer is liable.

An employer is not bound to abandon the use of a particular machine or appliance, which is in common use, and in a proper state of repair, merely because there are other machines or appliances in use that are better adapted for doing the work, or that may be handled with greater safety.

In case the officers of a corporation authorized to issue share certificates fraudulently issue certificates for shares in excess of the number of shares the corporation is authorized to issue, the corporation is liable in damages for such overissue to an innocent holder for value of the overissued shares.

Where a party, having contracted to do a thing upon a given day, before the day of performance arrives repudiates his contract, or voluntarily puts it out of his power to perform, the other party to the contract may treat it as rescinded, and bring his action for the breach immediately and without awaiting the stipulated day.

## Colorado Miners' Wages.

The average daily wages of miners at the present time in the principal mining district of the State are as follows:

| *Counties.* | *Wage.* | *Hours.* |
|---|---|---|
| Clear Creek | $2 50 | 9 to 10 |
| Lake | 2 50-3 00 | 9 |
| Pitkin | 2 50 | 8 |
| Ouray | 2 50 | 10 |
| Hinsdale | 3 50 | 10 |
| El Paso | 3 00 | 8 |
| Boulder | 2 50 | 9 |
| San Miguel | 3 00 | 9 |
| Gilpin | 2 50 | 9 |
| Ward District, Boulder | 3 00 | 9 |

—Cripple Creek Mail.

## Gold and Silver Product of the United States in 1895.

Director of the Mint Preston has received approximate estimates of the gold and silver product of the United States in 1895 from the Mint officers and other agents employed to collect these statistics. The value of the gold and the number of fine ounces of silver produced by the several States and Territories is estimated to have been as follows:

| | *Gold, value.* | *Silver, fine ounces.* |
|---|---|---|
| Alaska | $ 1,500,000 | ..... |
| Arizona | 2,067,100 | 1,000,000 |
| California | 15,000,000 | 154,700 |
| Colorado | 15,000,000 | 22,000,000 |
| Idaho | 2,700,700 | 4,000,000 |
| Michigan | 40,000 | 35,000 |
| Montana | 4,332,700 | 14,700,000 |
| Nevada | 1,700,000 | 622,600 |
| New Mexico | 1,075,000 | 154,700 |
| Oregon | 2,300,000 | 7,700 |
| South Appalachian States | 316,300 | 1,200 |
| South Dakota | 4,255,000 | 82,200 |
| Texas | ..... | 206,000 |
| Utah | 1,352,300 | 8,223,000 |
| Washington | 300,000 | 11,600 |
| All others | 25,000 | 300 |
| Totals | $52,614,000 | 51,000,000 |

Director Preston thinks that the estimate for the gold product of Oregon is $600,000 too high; of Montana $250,000 too high; of South Dakota $400,000 too high; and that when the final figures are compiled, the production of gold by the mines of the United States in 1895 will be found to have been from $46,000,000 to $47,000,000 and the silver product about 47,000,000 fine ounces.

The product last year was $39,500,000 in gold and 49,500,000 fine ounces of silver.


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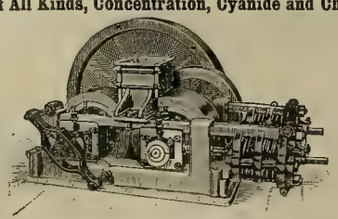
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For the half year ending December 31, 1895, a dividend has been declared at the rate of four and twenty-six hundredths (4 26-100) per cent per annum on Term deposits, and three and fifty-five hundredths (3 55-100) per cent per annum on Ordinary deposits, free of taxes, payable on and after THURSDAY, January 2, 1896.

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# Mining Summary.

There are two ways to prospect and make money—one is to find a new camp of value, the other is to select a mineral district or belt whose worth has been proven, but whose area has not been thoroughly prospected, learn all its peculiarities and proceed to prospect it thoroughly. The ones who do the latter are the ones who, as a class, are the most successful. In the first place, anything that they discover is available, therefore finds a ready market. In the next place, they are not only nearer their base of supplies, but work, when they need work, is handier, and so they do not drift around so much and can easier stay by a prospect until its degree of value is learned. This drifting aimlessly around from place to place does not pay. It is usually a sign of incapacity and lack of application. Such a prospector will work a little while first rate, where it is soft, but just as soon as blasting ground is struck, he thinks of some prospect requiring his immediate attention in a distant part of the country, and departs accordingly. Nor does a prospector want to stay too long with a prospect. It often requires more moral courage to leave a prospect than it does to stay with it. Too many prospectors practically marry a worthless prospect and think more of it and slave more for it than they would of and for a wife. Their imaginations clothe it with a fictitious value and they excuse its bad conduct, if it is a ledge, by saying that the ore shoot is either a little below or else to the right or left; if it is gravel, by saying that the "bedrock is pitchin'." They give the same excuse year after year, and soon pass into the has-been state of existence. Talk about faith moving mountains! A prospector's faith, with a little giant, will blow up whole ranges. For usually, after he has worked a claim a while, his faith is as firm and unwavering as a martyr's.

## CALIFORNIA.

### Amador.

*Record:* At the Doyle mine they are putting up a water-power hoist, capable of going down over 500 feet, when sinking will be resumed. A crosscut has been run in another portion of the mine, which has encountered another ore body of a promising character.

At the Jackson Gate mine the shaft is down over 170 feet, in quartz all the way. The quartz is low grade—too low so far to justify working. The present shaft is for prospecting purposes, and will be carried down at least 400 feet. If the outlook then warrants, a permanent working shaft will be started at a point west of the present works. Nothing more than a low-grade proposition is looked for, being on the east or hanging-wall side of the mother lode. This vein, while lower in gold-bearing qualities than its western neighbor, is vastly larger and the precious metal is more evenly distributed through the quartz. The development of a paying mine here, therefore, promises a big labor employer for half a century to come.

B. Ross is making a new survey of the Bell Wether mine, belonging to S. W. Bright, which he lately bonded to G. W. Brown, who has interested capitalists of San Francisco to take hold of the property. The resurvey is made at the request of the new company, which assumed charge of the mine the first of the month according to agreement. Not much in the way of mining operations is looked for before the opening of spring.

### Calaveras.

A seven-foot lead of good ore has been struck in the 1000-foot level of the Gwin mine. The work of sinking the main shaft is now being driven steadily ahead.

The Birney mine, recently bonded to the Birney Mining Co., composed of J. F. Sheehan and other San Franciscans, has been reopened. There is about forty feet of water in the shaft, which will be removed by the skip. The work of sinking will be by contract. About eighty feet of drifts have already been run.

### El Dorado.

A ten-stamp is being moved by Supt. Beardsley from Plymouth, Amador county, to the Lady Emma mine, near Kelsey.

The Gold and Silver mine, south of Kelsey, has resumed operations, after a lapse of about sixteen years, under the direction of Supt. Knox.

Work at the Big Sandy is being pushed ahead. Grading for the new hoisting works is about completed.

(Special correspondence).—The Two Channel Mining Company started its ten-stamp mill January 2nd. It is ready to start its two hydraulic plants as soon as the ditch company can furnish water. These plants are on the Georgetown divide, and are owned by Pickett & Marmon of Indianapolis. Mr. Pickett is also manager and part owner of the Grand Victory, which is rapidly making a record as a regular bullion producer. A few more men like Mr. Pickett and the gentlemen whom he has induced to invest capital in El Dorado county, and who are associated with him—particularly Messrs. Wright and Marmon of Indianapolis—would soon show what great possibilities are in store for El Dorado county, when properly investigated.

Jas. Van Winkelen is developing the east extension of the Indian mine at Clarksville. His shaft has attained a depth of seventy-five feet. The ledge is exposed for 300 feet. The ore mills $8 per ton.

Development work on the Blue Gouge is progressing rapidly. The new tunnel is in sixty-five feet. It is rumored that Mackay and Head are interested in this work.

Additional machinery is being placed on the Gignac mine, which already operates a ten-stamp mill. This is a gravel mine, situated two miles east of here.

Jas. Patton is sinking a shaft on his ranch, six miles west of town. The ledge is five feet wide, and the ore prospects richly in free gold and sulphurets.

F. W. Beardslee is adding a ten-stamp mill to the Lady Emma plant. This mine is sufficiently developed to warrant the prediction that it is a permanent and paying property. It is located near Kelsey.

J. M. Vandegrift has completed a five-stamp mill on his property, ten miles south of here. The shaft is down 100 feet. The ore is rich in free gold.

Jos. Zimmerman, three miles north of Clarksville, is sinking a shaft and has reached a depth of ninety feet. The ore vein is growing, and mills $10 per ton.

### Inyo.

AT DEATH VALLEY.—Both mills, the Johnnie and Chispa, are running steadily, operated by a Salt Lake company, John Q. Cannon being its president. They are also operating the Confidence mine, which is situated on the western slope of the Funeral mountains in Death valley. These seem to be the most difficult and expensive mines to work in the country, owing to the scarcity of fuel and water principally, but freighting from Daggett is equally as arduous a task. A mill is now upon the ground and will be hastily constructed, and run by gasoline, the same as at Montgomery. There are no accommodations to be had; everybody is camped in the open air, as it seldom rains. In that isolated spot men are camped at springs awaiting a chance to get employment.

### Kern.

AMALIE MINING DISTRICT.—(Special correspondence). One year ago there was but one prospect on which work was being rapidly pushed, that being the Amalie, which had been opened up to a depth of 100 feet, at which point ruby silver had been struck. During the past year this property has produced some of the richest ore of southern California, and is to-day the only ruby silver producing mine in this State. Work has been pushed forward till at present the mine is opened up to the 300-foot level, with drifts run every 50 feet. A good hoist has been erected and perfect ventilation secured by a system of winzes and air courses, and the mine is now in the best possible condition for further development, the ore having increased in richness from the grass roots.

The company has also erected a new boarding house, with a large cellar; a good store, with a large stone cellar; an ore house; a blacksmith shop; barn, and several dwellings for the use of employees; added two Frue concentrators to its mill and otherwise improved their facilities for general operation, and to-day have one of the best properties of its kind on the coast.

The Occidental company, which began its work here about a year ago, has done about 900 feet of sinking, drifting and tunneling and have now in sight some good ore and has both worked and shipped ore which proved very satisfactory.

Within the past year the Amalie mining district was formed with laws for the regulation of assessment and location work which require ten feet of work, with all monuments up before the notices can be recorded, and one hundred dollars' worth of work on each and every claim for each year, an affidavit of which must be filed with the District Recorder. The district was formed April 13. Since that time there have been recorded 22 locations on which the required amount of work was done, prominent among these was the Picnic, from which was taken $400 in the first 40 feet, it being practically free-milling gold ore. The slate wall, from which there has never been a mill test made but shows considerable free gold, carries sulphurets heavily. Messrs. Young, Sauser & Co. have also discovered and located some mines on the Piute and are showing some handsome gold specimens which they have taken out, their lead being from 12 to 16 inches in width.

One year ago we had no mail service. To-day we have a postoffice and a stage line running through camp to Piute, making three round trips each week.

Our district is well watered and wooded; is 15 miles from the railroad by the county road; has an elevation of 3000 feet, and a climate almost perfect. All in all, we consider the past year a very prosperous one for this section, and it is to be hoped that its progress will be unabating in years to come.

### Nevada.

THE CHAMPION'S NEW MILL.—*Transcript:* The balance of the machinery for the Champion Mining Company's new forty-stamp mill has arrived and is now being hauled to the site of the mill. As yet the framework of the mill building is only partly up, but the timbers are all framed and the millwrights are hurrying the work of getting them up in place. The work of placing the machinery will begin soon. When the mill is completed it will be one of the best in the State and, with the thirty stamps that are now dropping, will give a large crushing capacity.

THE PLUMBAGO MINE. — *Transcript:* The main tunnel at the Plumbago mine, near Moore's Flat, is now in 600 feet, and an upraise of 350 feet has been made to the surface. The last hundred feet in the tunnel has cut a new ore shoot not seen on the surface or known of before. The ledge is seven feet wide, of good ore, which mills, exclusive of the sulphurets, $5 per ton. Supt. Taylor is well pleased with the outlook. The tunnel will reach the old shoot that was worked years ago, the quartz from which paid as high as $80 per ton.

TO WORK GRAVEL MINES.—A well posted mining man suggests to the *Transcript* that many gravel claims in Nevada county that in years past were worked by the hydraulic process, could by made to pay well by drifting and having a mill to crush the gravel. At the Harmony drift mine, near Nevada, a ten-stamp mill is kept in operation steadily and crushes 120 tons of gravel per day, at a total cost of less than $3000 per month, which includes wear and tear of mill, water power, screens, quicksilver and labor. It actually costs only thirteen cents per ton to work the gravel, a No. 12 screen being used in the battery. With a twenty-stamp mill it would cost, to work 240 tons, less than nine cents a ton. This is cheaper and better, it is claimed, than hydraulic mining, and would suggest the opening up and working in this manner of more gravel mines throughout the county, which are so situated that the building of impounding dams for hydraulicking would be hardly practicable.

STILL CONTINUES RICH.—*Union:* The big strike made at the Neversweat mine, in Willow valley, Monday, still continues. Another large amount was taken out Tuesday, and from the character of the quartz it looks as though there is a big mine out there. A piece of ore weighing 300 pounds and covered with gold was taken out Tuesday.

### San Diego.

AT JULIAN.—The Elevada mine has 120 tons of ore at the mill. The mine is worked by an incline shaft, which is now down 101 feet.

### Shasta.

ILER BROTHERS' MINES. — *Free Press:* Iler brothers, on the Iron Mountain range near Slick Rock, own Mountain View Consolidated, Bunker Hill, Jupiter, Mountain View No. 2, Comet and Yellow Jacket. They have opened up during the past five years a large body of ore that will yield at least $8 per ton. Their first tunnel was commenced on the Bunker Hill, and run in on the Mountain View, and is now 495 feet in length, showing a four foot and a half ledge which is tapped 380 feet from the surface or apex of the mountain. It is estimated that 30,000 tons of ore are ready to be stoped. Their second tunnel or level is on the Bunker Hill claim and was started directly under tunnel No. 1 and 200 feet below. It is in the mountain side almost 500 feet and taps the ledge 600 feet deep. This tunnel goes through an ore body forty feet thick, and the ledge in the breast of the tunnel is six feet wide. The ledge seems to widen out and the ore get richer as depth is attained, and contains more free gold.

AT SUNNY HILL.—The mining industry of Sunny Hill is not in a condition of activity. The causes for this are the same as those from which many mining camps on this coast (and indeed in all mining countries) have lain idle for a long period and then become inactive. As to mineral and ledges, there are an abundance. But mining here has been done in a small and cheap way. Numerous little arrastras have been erected, the surface scratched through, the surface pockets taken out and the property then abandoned. Only one or two mines have been mined with any system by miners, and, although work done on them has been only surface mining, they have paid well. No ledge in this district has been tapped by a tunnel at any depth, and no shafts of any consequence have ever been sunk. To add to the difficulties of the "little" miner, only a small proportion of the gold carried by this ore is free.

In addition to the vast quantities of ore in this immediate vicinity, there are ledges and ledges almost without number, all the way up to Bully Choop, and the ore composing them is of all degrees of promise and richness.

We have ore in almost inexhaustible quantities, property at low prices, climate that permits of work twelve months in the year, and water and wood in plenty for any kind of reduction works the year round.

What we stand most in need of is reduction works to reduce the ore of a lower grade than the heavy cost will warrant shipping to the bay. With such a plant work would begin on almost every ledge from Bully Choop to Ono, and this would instantly become one of the busiest, bustling mining camps in California.

AT IGO.—The mines in and around Igo are looking up well, and the mining outlook of this camp for the coming year is exceedingly promising.

Our mine owners are now working their yearly assessment on their mines.

A good many men are at work on the old Hardscrabble mine drifting.

E. L. Ballou has been running his mill on ore from some of his mines at South Fork.

Many miners are anxiously waiting for the rain to come so as to start up their mines, which are all in readiness to be worked.

THE NEW WORKS AT KESWICK.—In a descriptive article on the Mountain Mines Co. at Keswick the *Free Press* says the power house contains a large steam boiler and engine and the dynamos for arc and incandescent electric lights, and for the generating of power for the machine shops, rock breakers and smelter. Electricity will be the only motive power used. A spur three-rail track runs down past the power house, and across this track from the house are the two rock breakers, each one in its own house. Up the track a distance of eighty yards is situated two large two-story buildings, which are about completed. They are on the left of the track. The first one reached is being fitted for a store on the ground floor. The upper story will be occupied as an assay office. A platform connects this building with the second one, the ground floor of which is used as a warehouse. The upper floor will be used for the offices of the company.

Across the track from the warehouse is the high trestle for the spur track, which will carry the cars loaded with ore to the smelter.

Beyond this track is a large frame building occupied as a machine shop. Across the creek is the main line of the Iron Mountain Railway, which runs from Keswick station on the Southern Pacific Railroad to Iron Mountain. At the end of the high trestle heretofore mentioned, and directly opposite the power house, is situated the smelter. One brick furnace is completed and one iron retort is in place. The furnace and retort are under a roof of iron, which is surmounted by ventilators and from which extends the large iron smokestack.

The fire was started in the furnace last week. The grading of the railroad is almost completed.

The last camp, No. 3, was abandoned last week and the company now starts to haul ore from Iron Mountain to Keswick over their own railroad.

### Siskiyou.

MINING NOTES. — *Journal:* The Success mine, which for some time past has been worked by the Scheld Bros. under a lease from Sophia Lee, has been closed down for more than a week. The Scheld Bros. assigned the license to Henshaw Bros., who advertised for new machinery and stated they intended to develop the mine on an extensive scale. After working a few weeks the managers became involved in a misunderstanding with the men working for them, as the wages were not paid as agreed upon. The lease was taken again by Scheld and the mine will now be worked under the management of John Burgess, and it is expected that it will do well, as it has proved by past results that it is a good property.

The Blue Gravel mine, at Greenhorn, was compelled to close down last Friday owing to the water supply having become exhausted. The tracks in the mine have all been relaid and the mine put in first-class shape. Work will be resumed as soon as there is sufficient water.

The Chinese employed in the Benz Bar claim, near Honolulu, are still working steadily day and night, notwithstanding the cold weather, which has caused temporary stoppages by freezing up the water in the flumes, and rendering the current wheels so heavy with icicles as to be difficult for turning, especially during the nights. The company has felt so elated over the success of digging out $1800 from a small crevice a few days ago, that it is anxious to keep things moving as long as possible before winter freshets come, when a heavy thaw or rain storm occurs.

The Chinese Company, above the mouth of Humbug creek, on Klamath river, has shut down on account of the cold weather, and nearly all the other claims, from Cottonwood to Scott river and Hamburg Bar, have also been shut down for the season.

The Steamboat mine on McAdams has been compelled to close down for a short time owing to the impossibility of getting dry wood to keep the pumps in operation. The engineer says they have used all the dry wood within six miles of the mine and kept the pumps going for a while by using green wood. Brokaw & Bennet will commence work again early in the spring. Great progress has been made towards developing this property since it came under the present management and since the new machinery was introduced last summer.

Work on the Espey, Hunter & Co. mine at Hawkinsville was resumed last Friday after having been suspended for over two weeks, owing to a break in the pumping machinery at Shasta river. The pump has been temporarily repaired to await a casting from Pittsburg, where the pumps were built, to repair the broken part.

*Journal:* The Seattle Placer Mining Company, which recently purchased the Shinar mine on Thompson creek, is making extensive improvements.

Around Scott Bar the Columbia and Gum Boot mines will both be worked this spring.

The old Bunker Hill mine near Happy Camp will be developed by Hughes & Hilbert, the new owners, who recently purchased it for $10,000, upon a more extensive scale.

The Steamboat mine on McAdams creek is being worked on a very extensive scale.

The mines on Salmon river are all very rich, and the new and extensive plant put in by the American Mine Association and Gold Ball Mining Company will enable the owners of the Gold Ball mine to work that property to great advantage.

The Espey, Hunter & Co. mine at Shasta river, the Blue Gravel and Success mines at Greenhorn and a number in Long gulch are expected to make a good showing next summer and make Yreka lively.

Scheld & Steele are busy at their mine on Long gulch, and will start their new arrastra up in a few days, crushing ore. The arrastra will be run by horse power at present, but the owners expect it will be necessary to put in an engine in a short time.

Very few of the small mines have been able to do much yet, owing to the scarcity of water; but now that the snow has begun to thaw, a plentiful supply of water will be obtainable.

The mines owned by Billups, Quigley and Humphreys, on Barkhouse creek, have been closed down for this season, but will be started up early in the spring.

The force at the Blue Gravel mine is at work still, but is not able to do much until it gets a better supply of water.

The Espey, Hunter & Co. mine at Hawkinsville is still shut down, the break in the large pumps at Shasta river not having been repaired yet. It will be some time before the casting will arrive to replace the broken part.

The Success mine, which the Henshaw Bros. have been working under a lease, has been closed down for several days past. Henshaw Bros. have given up the lease, and the mine will now be worked as before, under the management of John Burgess.

### Trinity.

*Journal:* As yet the output of bullion is greater from the placers than from quartz, but the ratio of difference in production is lessening yearly. The chief placer mines are situated at Junction City, Trinity Center, Coffee Creek, Weaverville, Minersville and along the Trinity river. During the past three years about $1,000,000 of French capital has been invested in the placers of the county. The La Grange Hydraulic Gold Mining Company, the Cie Fse Placers Hydraulique de

Junction City, the Minersville Hydraulic Gold Mining Company and Francis Heurtevant have purchased valuable gravel mines and equipped them with the latest and most improved appliances, giving employment to a large number of men. They are working these properties on a larger scale than before attempted here. The other developed gravel mines are regular in their production of bullion, and many age rich, yielding from $7000 to $25,000 to the acre.

There are also vast banks of gold-bearing gravel as yet unworked, owing to their situation and the expense of bringing water to them. It is only a question of time when these will be made productive. Another method of mining placer deposits is now being tried which, if successful, will revolutionize the industry. An elevating machine has been placed on the Trinity river this fall and is now being prepared for working. The machine works on the principle of a dredger and, it is claimed, will lift 3000 cubic yards of gravel a day to tram cars, which carry it to sluices for washing.

It is only since about 1880 that quartz mining has been carried on successfully in this county, but it has advanced rapidly. The principal quartz camps are Deadwood (in which is situated the famous Brown Bear mine that has produced millions), Trinity Center, Bullychoop, Canyon Creek, East Fork, New River and Minersville. The county contains besides a vast unexplored mineral belt ribbed with precious gold-bearing ledges.

One of the most valuable quicksilver deposits in the United States is located at Cinnabar. One mine, the Altoona, employs over 100 men and yields on an average 700 flasks of quicksilver a month.

In addition to these valuable metals there are large deposits of marble, granite, asbestos, soapstone and hydraulic lime, only requiring cheaper transportation to become valuable.

### Tuolumne.

MINING NOTES.—"Argus" in *Independent*: The Golden Rule, Jumper and Rawhide mines are taking out rich ore.

The Belleview cleaned up their ten-stamp mill, this week, after a successful run on good ore.

The Seminole have started up their mill and expect to keep it continuously running.

The Keltz mill has been cleaned up after a good run.

The main shaft of the App is being straightened and faulty surveys are being corrected. These mistakes have retarded operating this property considerably.

The mills of the Jumper and Golden Rule are running steadily. We were shown a very handsome and valuable specimen of gold in dyke formation from the Golden Rule.

A little mine on the east side of the North Fork of the Tuolumne is being prospected with very favorable results. It is a large vein and almost a high-grade proposition. Arrastras are being built to more thoroughly test the ore. It is well situated for extensive mining.

The Star mine is taking out fine ore. They sent the base and sulphuretted ore, worth several hundred dollars per ton, to San Francisco, for special treatment, while the free-milling ore, worth about $25 per ton, is crushed in the ten-stamp mill on the ground.

The old shaft and drifts of the Louisiana are all cleaned out and prospects look well for a rich paying mine.

The Spring Gulch mine, belonging to Marshall, is bonded to Essenberger & Andrews, of Salt Lake City, who propose to equip it and develop it right away.

The Crystalline group of mines, on the mother lode, are busily engaged in putting up a new hoist on the large vein, which shows free gold to the eye.

*Banner*: At the Teeters mine, on the north fork of the Tuolumne, five miles east of the Confidence, there has been little or no prospect work done on the claim, yet the natural development shows a vein that averages twelve feet and the assay gives from $5 to $7 in free gold and from $50 upward in sulphurets. All that is necessary to make a paying property out of the mine is capital. Sufficient free water can be obtained the year round to run a forty-stamp mill.

The Reno *Gazette* hears on good authority that the sale of the Silver Star mines is made. James Yerington, who has the deal in charge, has received a telegram from an English company, some of the members of which are in San Francisco, telling him to come to this city. The telegram said the company would accept the mines on the approval of ex-Governor Colcord. As to the approval of Mr. Colcord, that gentleman has already given it as his opinion that the mines are a valuable property and all they lack is capital to open them up. The mines included in the deal are the same lot that were in the Wolcott sale, with the exception of the Brown mine.

### STOREY COUNTY.

The plant of the Kinkead Mining, Milling and Manufacturing Co., at the foot of the C. &. C dump, has started up. The mill is to work over the waste from the C. & C. mine. Most of the machinery is the invention of J. H. Kinkead, the president of the company.

## OREGON.

### JACKSON COUNTY.

M. A. Graham of San Francisco has bonded the entire Golden Fleece mining property, with the exception of the Edna quartz mine, which Messrs. Moody, Saltmarsh and Boland will continue to work. The property bonded by Mr. Graham comprises 269 acres. He will begin extensive operations at once and intends to erect thereon a milling plant which will work from 100 to 300 tons of rock every twenty-four hours.

At the Ruble placer mines, on Coyote creek, three giants are at work. Some sliding has interfered with the working of the ditch.

Chas. Hocom reports having struck a nineteen-inch vein of good paying quartz, carrying free gold, on Neil creek, about two miles south of the railroad.

### JOSEPHINE COUNTY.

The Gold Basin project will employ some 200 men next season. A ditch twenty miles long is projected, tapping the headwaters of Chetco. The present ditch, three miles in length, will bring a good deal of rich dirt under the monitors without the aid of pumping works.

### BAKER COUNTY.

During '95, in the Virtue district, several new discoveries have been made of free-gold quartz lodes. The Virtue mine has eighty men, and has yielded $17,000 per month. The last strike of two small pockets turned out $44,000. The shaft is being sunk for the opening of levels deeper on the vein. At Cracker creek the Longmaids, experienced mining men, have the "E. & E." mine and mill under lease and bond, and are concentrating the ores of that property for shipment to the Tacoma smelter. Their shipments the past year have averaged about two carloads of concentrates per week, of the approximate value of $135 per ton. They employ thirty-five to forty men in the mill and mine. Preparations are being made to double the capacity of the mill by adding twenty more stamps. At Cable Cove a Utah company is developing a group of claims under lease and bond, and on June 1st are to determine whether they will go on and put up a thirty-ton capacity concentrating mill or not.

Eastern Oregon miners are specially favored by the O. R. & N. Co. in a $5.50 rate on ore.

## WASHINGTON.

The Yakima *Times* reports the discovery of a large body of tripolite near Roza, about twelve miles from Yakima. The discoverer says the deposit is about 200 feet in thickness. A sample of about 150 pounds was brought down.

### OKANOGAN COUNTY.

E. P. Wheeler, of the Bridgeport Mining and Milling Company, tells the Spokane *Spokesman-Review* matters of interest in Okanogan county.

Their properties on Mineral hill are fully equipped with machinery, and everything is on the ground to go ahead with work early in the spring. "On one of the properties comprising the group, we have sunk a shaft 130 feet deep and have drifted 400 feet south on the vein. Our preparations are now complete to run a crosscut tunnel from the bottom of the shaft 1000 feet into Mineral hill. When completed it will give a vertical depth of 750 feet on the vein. The ledge is 80 feet wide on the surface, carrying silver, with a trace of gold. At depth the character of the ore is changing and the ore now carries $16 to $32 in gold. It resembles telluride ore. To get the product out costs $40 for freight and treatment."

The Bridgeport Mining and Milling Company in Okanogan county has let a contract for the cutting of 5000 cords of wood and burning 1000 bushels of coal. The company recently suspended operations but with the intention of resuming again next spring.

### MONTE CRISTO.

Development work in the Seventy-Five mine, in the Monte Cristo district, has been suspended for the winter, owing to the failure of the water supply with which the air machine was to be run. The Pelton waterwheel and ventilating fan have been set up and a box flume built to convey the air from high up on "76" peak, but the water had frozen up, so work had to be stopped.

The work of stringing the 5000 feet of heavy insulated copper, aerial cable, which will connect the big electrical generator at the Union Concentration Company's concentrator and the Burleigh rock drills in the Pride of the Mountain mine, in Monte Cristo, is nearly completed. When the electric drills are started up the output of the mine will be greatly increased.

### EVERETT.

The iron ore tests made at the Everett smelter last week have proved very satisfactory. The ore was from the mines near Hamilton, where a number of men are now at work getting out ore and opening up the vein. It is said that shipments at the rate of ten carloads per day will soon begin from this mine to the Puget sound reduction works at Everett.

Mackintosh Brothers, who are largely interested in the Goat lake district have shipped a car of ore from one of their promising properties near Monte Cristo. The ore was shipped to Chicago to test a new cyanide process of reduction. If it proves satisfactory they will erect a plant there.

## BRITISH COLUMBIA.

THE HORSEFLY COMPANY.—One hundred thousand pounds of Ward pipe is now on its way to the 150. The riveters will be in about February 1st, and the work on the Horsefly company's ground will be pushed, and the hydraulic elevator put in under the direction of its inventor and patentee, R. C. Campbell, at as early a date as possible.

THE MONTREAL COMPANY.—At the Montreal claims on Quesnelle river, near Beaver, Superintendent Drummond has the cross-drift in to rim rock. 1700 feet in the upper benches; good gravel was found all the way. Shafts have been sunk at various places in the course of the drift. Some rich ground has been found, and the company as a whole are well satisfied. It is expected that a large force of men will be put on early in the spring and work in earnest commenced in the way of building dam, ditch, etc. The dam will be either made of cement or of logs and gravel. It will be 50 feet in height and the ditch line will be about 14 miles long. An immense ditch will have to be constructed to supply water enough, as the company calculates on running half a dozen monitors. The cost of opening up this property will be a quarter of a million dollars.

## ALASKA.

THE BOUNDARY QUESTION.—General Duffield, chief coast and geodetic survey, has presented to the Secretary of State the joint report on the Alaskan boundary recently agreed upon by him and the Canadian representative, Mr. King. The report will probably not be made public until it is transmitted to Congress, but it shows a practical agreement between the surveys of the two Governments, and may have the effect of partially quieting the apprehension of trouble over the boundary. The greatest difference between the lines run by the engineers of the two Governments is but six feet seven inches, or fifteen seconds of longitude. In the view of the two surveys, General Duffield does not hesitate to express the opinion that there can be no difficulty between the United States and Canada over the boundary. He said: "The line is as clear in the treaty as though it had been recorded by deed and map." General Duffield is confident that the British can find no grounds upon which to base a claim to the gold fields of the Yukon river, since a British engineer, Oglesby, in 1893, after a very careful observation, marked the banks of the Yukon and Forty Mile creek, where these streams are crossed by the 141st meridian, and his marks were verified by the United States survey. The only possible ground for contention which General Duffield foresees is furnished by that phrase of the Russian-British treaty that at no point shall the boundary be more than ten marine leagues from the shore. The United States Government interprets this to mean continental leagues, while England might contend that ten leagues from the island shore was contemplated, a construction which would deprive the United States of a valuable strip of territory, if sustained.

EBNER GOLD MINING CO.—The Ebner Gold Mining Co., incorporated under the laws of the State of Oregon, has filed articles of incorporation in Sitka; capital stock, $500,000; W. E. Ebner being president, C. W. Young vice-president, B. M. Behrends secretary and treasurer. Its term of existence is placed at ninety-nine years and the principal place of business at Juneau. The company has acquired by purchase the Takou group of mines, mill, trams, etc., recently sold to Mr. Ebler by W. Thorp. The new company will begin operations next spring.

## IDAHO.

A FLOATING GOLD MINE CAMP.—E. H. Lewis is about to launch a boat on Snake river that will be a veritable floating mining camp. There is a stationary engine and boiler which weigh 24,000 pounds, dredges, cranes and pumps of all sizes and descriptions. On the boat is a good boarding and lodging house intended to accommodate 50 miners. This mechanical battery will move up and down Snake river, working the channel and banks for gold. The scheme was tried on a small scale before and proved successful. The launching takes place at Froman's Ferry, about fifteen miles from Caldwell.

THE FORTUNA.—*Statesman*: The Fortuna Mining Company has designated T. H. Parsons of Hailey as its local agent. The company was recently incorporated under the laws of New Jersey and has purchased the Camas No. 2, near Hailey, for $250,000, and has begun active operations on the property.

THE POORMAN.—A. Grothe, manager of the Poorman mine at Silver City, has returned from London and will start up work on the property. Some weeks ago the workmen unexpectedly came upon old stopes and in a rush of water a man was killed. This was a serious matter, but in a business sense it was also serious, for it showed that the great ore chute that made the mine famous had been worked down to or near level of the new tunnel recently run.

The maps of the old workings showed 200 feet of virgin ground above the tunnel level and the company had relied upon their accuracy. The question that next arose was that whether the company desired to face the expense of development below the tunnel level. Mr. Grothe went to London and he comes back with authority to proceed. The mine will be furnished with an electric pump and hoist.

IN THE COEUR D'ALENES.—*Spokesman-Review*: The product of the Last Chance mine has for the past four months been averaging about 400 tons a month. It is hoped by the manager that the mine will be able to put out 1000 tons a month during the next six months; this in crude ore and concentrates. Improvements are being made to the mill which will double in capacity. One hundred men are now employed and when the improvements are finished more men will be employed. The mine is looking well and barring accidents work will go right on.

The Bunker Hill and Sullivan are working right along with about 350 men and are turning out seventy-five to eighty tons of concentrates daily.

The other mines in the district are all working and the product for the coming year will exceed the output of all previous years.

## MONTANA.

The gold excitement at Moose lake, sixteen miles from Philipsburg, Mont., has a good foundation. The vein discovered there has the merit, it is said, of not only being rich, but of great proportions. Twenty-eight miles west of Philipsburg, and fourteen miles from Bonita station, on the Northern Pacific, is located the Golden Scepter Mining Company on Harvey creek. This company is working in an extensive body of ore that averages $8.70 to the ton.

THE SNOWSHOE.—At the Snowshoe, seventeen miles from Libby, fifty men are at work on the concentrator and in the mine. The concentrator will be completed by January 15th and will have a capacity of 125 tons. The concentrates will be hauled by wagon to the railroad. The Snowshoe group is 160 miles from Spokane, Wash., and seventeen miles from the line of the Great Northern railway at Libby, Flathead county, Mont. About a year ago the Chicago & Montana Mining Company bought it, and since May '95 have made many improvements and spent $50,000.

CLAIM JUMPERS AT CAMP CREEK.—The claim jumpers had a merry time around Camp Creek as well as in Butte Tuesday night and the bleak hills from Soap Gulch to the Clipper saw more excitement that night than it has seen for some years. Several parties from Butte went out and among them a married lady who followed the lead of a couple of sturdy miners. A visitor from that section to-day says that every mining claim in the district is plastered with location notices, as many as four different declaratory statements being stuck up on the same claim.

BUTTE MEN JUBILANT.—*Inter-Mountain*: Butte stockholders in the Poorman in the Coeur d'Alenes and the War Eagle at Trail Creek are feeling good this week over the favorable reports from both those properties. Since the consolidation of the Tiger and Poorman properties and consequent reduction of expenses, things are looking favorable for the stockholders. Extensive and important improvements and changes in the mills and hoists are nearly completed after which it is expected that the mills will have a capacity of turning out from 1,700 to 2,000 tons of concentrates per month. With this output the owners expect to net about $25,000 monthly at the present metal quotations. They have cut the vein at the eleventh or 920-foot level, which shows a seven-foot body of ore, three feet of which is first class and showing a slight improvement in the ratio of silver to the unit of lead which will tend to increase the value of the concentrates without increasing the expenses of production. The property is looking as well as any of the stockholders could wish and the prospects are bright for the payment of dividends in the near future.

The new air compressor at the War Eagle in on the ground and will be running by Feb. 20. In tunnel No. 1, which is 250 feet from the surface the "big bonanza," as the rich chute of ore is called, from which about $250,000 has been taken—was struck some days ago. Tunnel No. 3 has been started 500 feet from the surface and in this another rich vein about three feet wide has been encountered, which gives a higher percentage of copper than the other lead and assays about the same in gold. This tunnel will be rut in about 1800 feet to get under the big ore body in tunnel No. 2.

## WYOMING.

There are no smelters in Wyoming; deposits of gold dust in the United States mint from this State are not reported to others than the depositors. The past year has been marked in all parts of the State by a renewal of interest in gold mining. Prospecting done during the earlier part of last year resulted in the investment of considerable capital in at least three important districts in the State. In one of these districts, known as the Four Mile mining district, and situated partly in Colorado and partly in Wyoming along the State line south of Rawlins, the West Side Placer Mining Company of Providence, Rhode Island, invested upwards of $100,000 in the work of putting in canals, hydraulic mining machinery and gold-saving apparatus. This work is just being completed, and the company is now in shape to commence washing.

Similar enterprise is to be found in the Douglas Creek mining district, south and west of Laramie. Several companies of comparatively large means have built canals and put in hydraulic machinery, and are prepared to commence work early this year washing for gold. The past year has been spent mainly in prospecting and in preparing for the work of 1896, but with this there has been considerable gold taken out, enough, it is thought, to cover all the expenses of prospecting and of dead work.

Operations have also been active in the Bald Mountain district, which is tributary to Sheridan. The milling capacity of this district has been doubled.

The hopes of Wyoming mining men are centered upon the improved methods which are being discovered, of saving fine gold from placer washings and of methods of cheaply treating low-grade gold ores.

The suits brought against the Rocky Mountain Coal Company of Uinta county, by the heirs of the sixty miners killed at the Red Canyon disaster of last spring have been compromised. The coal company agrees to pay each of the sixty plaintiffs $1000. The suits against the company which were to have been tried in the Cheyenne court January 13th have been dismissed.

## SOUTH DAKOTA.

*Pioneer*: Thomas Tracy, who owns a two-thirds interest in the Cutty Sark mine, says the Kidd concentrators in the Cutty Sark mill are proving insufficient, and the management is going to supplant them with a Frue vanner. Tests made upon the tailings showed that $3.60 was escaping for every ton, and it was decided to remedy this at once.

WORK AND NEW DISCOVERIES.—At Terry's peak, in the Bald mountain section, a body of ore was recently found that gives returns of from $900 to $1100 a ton; the Homestake Mining Company, while running a shaft into one of its mines, struck a sixteen-inch vein of ore that assays several thousand dollars to the ton.

There are now over 4000 tons of gold-bearing ore brought into Lead and Deadwood daily, and it is being reduced by the mills, smelters and chlorination plants at these places. The Kildonan Mining Company, whose plant is situated at Pluma, a small place two miles south of Deadwood, and the Champion Mining Company's plant at Deadwood, are new concerns and so far have given satisfactory re-

sults to their owners. On November 1st the former mill started up and is now reducing 150 tons of ore daily. In a short time the operators expect to be able to reduce 300 tons a day. At the first cleanup at this mill recently, three gold bricks, valued at something over $32,000, were moulded

The Champion Mining Company has so far been unfortunate in getting its plant into working order. Several years ago a mill was erected in Spruce gulch, a little over a mile from Deadwood, but after being operated for a short time it was abandoned. A company organized in Chicago by W. R. Westfall, one of the original owners, purchased this mill and bought new machinery, consisting of immense ball pulverizers, the first ever used in the Hills, which were shipped in and put in place in the old mill. Two starts have been made, but a break in the machinery each time stopped work. The manager expects to have everything in readiness to start again in a few days, and will then be able to handle 100 tons of ore daily. The company has its own mine within 2000 feet of the mill, and therefore will be able to give satisfactory results to its owners when once in operation.

In addition to these two plants, the Deadwood and Delaware smelter, the Golden Reward reduction works, and the Black Hills cyanide works are running daily and handling all the ore they can work.

The smelter and the Black Hills cyanide works are the only concerns handling custom ore to any extent, the others mostly working ore from their own mines. The average price charged for treating the ore is about $8 a ton. There are a great many mines in this section the ore of which assays $15 and under a ton, that cannot be worked on account of the high price charged for treatment and the cost of hauling to the mill; but with a smelter or other reduction plant that could reduce the ore more cheaply and, at the same time, give both the reduction people and the mine owner a good profit, several hundred tons of ore daily would be shipped to Deadwood for treatment that is now lying in the mines.

### UTAH.

SULPHUR.—At Sulphurdale, Beaver county, formerly known as Cove creek, is one of the largest deposits of sulphur in the United States. It is thirty miles from the railway. Large works have been put in for refining and turning out the various grades. During 1895 the company shipped 3,000,000 pounds of refined sulphur to points in Utah, Idaho, Montana, Wyoming and Colorado.

CALIFORNIA BAR'S GOLD.—*Tribune*: Manager Mitchell, of the California Bar on the Colorado river, is in Salt Lake, bringing with him nine pounds of gold, about 960 fine, and of the value of about $1800, the result of about eight days' run with the employment of seven men. The bar embraces about 90 acres, five miles south of Dandy crossing, with its gravel rising from 10 to 30 feet above bedrock, and shows an average value of $1 per cubic yard. At present the handling of the gravel is being conducted with plow and scrapers, the gravel being shot down to the stream, where it is put through a Kent washer, with improvements made on the original by the owners of the bar, Messrs. Mitchell & Ryan.

### COLORADO.

GOLD OUTPUT FOR '95.—*Record*: One year ago the *Record*, and all other Colorado papers, predicted a wonderful increase in the gold output of Colorado, but we doubt if any placed it near the present showing. The product of all ores for '95 shows:

| | |
|---|---|
| Gold | $16,995,919 51 |
| Silver | 12,353,074 66 |
| Lead | 3,046,514 27 |
| Copper | 928,849 68 |
| Total | $33,324,358 12 |

And for the year '94:

| | |
|---|---|
| Gold | $10,616,463 00 |
| Silver | 14,931 240 00 |
| Lead | 3,223,615 00 |
| Copper | 767,420 00 |
| Total | $29,537,738 00 |
| Net increase for '95 | 3,786,620 12 |
| Increase of gold output | 6,379,456 51 |

To the credit of '95 should be added considerable gold bullion that was shipped East for speculative purposes, and not reported in Colorado. The amount is estimated at nearly half a million dollars. While first credit is due to the Cripple Creek output for this remarkable increase, sight must not be lost of Leadville, Gilpin and the San Juan regions, that have been steady and liberal producers.

A PERMANENT CAMP.—*Mail*: W. W. Allen, manager of the Pueblo Smelting and Refining Co., when asked his opinion of Cripple Creek, said: "Cripple Creek is undoubtedly a permanent camp, and one that will supply the smelters with a great tonnage for years to come. From the twelve mines regularly shipping to our works I find the ore averages over $100 a ton. Ore carrying an ounce in gold to the ton will barely pay all expenses of mining, transportation and treatment. Anything above that means a profit. The known mineral area is now so large that the most sanguine of the Cripple Creek mining men are justified in their statements as to the probabilities and possibilities of the district. I do not think we shall understand the formation of the camp for years to come yet. The district must be turned over and mined to a great depth and over a wide area before the situation can be scientifically demonstrated. The gold belt, in my opinion, extends from Palmer Lake to Creede, not mineralized all the way, but in many portions of that great extent and range large camps will be established in the future."

CUSTER COUNTY.

The Geyser, Bassick and Bull-Domingo are the three leading mines in Custer county. The Bassick, near Rosita, has shipped large quantities of rich mineral in the past, some of which was tellurium worth $4 and $5 a pound. It is still idle owing to litigation. The Bull-Domingo, near Silver Cliff, producing principally galena ores, has been worked some under lease.

The Geyser, on the porphyry belt adjoining the town of Silver Cliff, has shown the most development during '95. The main shaft is now 2100 feet deep and produces good ore. The company has placed a plant which will enable them to sink 4000 feet. Horn silver and chlorides were mined from the surface where this shaft has been sunk, but the company has not attempted to ship much ore. It has been sinking and developing.

There has been some leasing of mines in the vicinity of Rosita, but the need of a railroad, since the Denver and Rio Grande branch was washed out in Grape creek canyon about six years ago, has retarded the development of the mining interests. One of the proposed new lines is from Cotopaxi. Another new and practical route is the Florence and Southern, which, it is claimed by competent experts, can be built for $690,000. This line will be thirty-eight miles in length and the heaviest grade is only three and one-half per cent. The surveys and the plans and specifications have been made.

### NEW MEXICO.

CARLISLE DISTRICT.—Regarding the sale of Carlisle properties to the English and French syndicate, several properties not included in the first sale are now under consideration. Papers have been made out and forwarded to San Francisco for action, and it is confidently asserted that the sale is sure to go. The money will be paid through Wells, Fargo & Co. The Gladstone and three other properties are included in the sale. The amount to be paid is said to be $40,000.

### ARIZONA.

Two mines near Prescott are bought by J. Mackin and J. J. Philbin of Chicago. They are in the Groom Creek group, sixteen miles from Prescott. Four mines compose the group—the Gold Flake, Gold Bug, Grandee and J. W. Two tunnels already driven into the property show a three-foot vein. Mr. Philbin places an estimate of $20,000 a month on the yield.

### MICHIGAN.

DEEP SHAFT SINKING.—The copper-bearing conglomerate beds of the Calumet and Hecla Mining Company's property have up to within a few years been worked by inclined shafts. A few years ago the Tamarack Mining Company developed its property on the dip of a portion of the Calumet and Hecla ground by vertical shafts, which were sunk some 2000 feet before intersecting the copper-bearing beds. Since then both the Tamarack and the Calumet and Hecla have started a number of still deeper shafts, several being planned for a depth of 5000 feet. The following notes refer to one of these latter shafts: The dimensions are 13 feet 6 inches by 23 feet inside timbers, or 15 feet 6 inches by 25 feet outside timbers. The shaft is divided into six hoisting compartments, each 6 feet 3 inches by 7 feet in the clear, with timbers of southern yellow pine all 12x12 inches, the sets were placed 5 feet apart, center to center, with 12x12 inches distance pieces between them. Outside of these sets a lagging of 3-inch pine planks; with bearers let into the rock, every three or four sets depending on the character of the rock. The ground sunk through was mostly hard trap, and four Rand rock drills, 3⅛ inch, driven by compressed air at sixty pounds pressure, were used. The explosive was Hercules powder. Sinking buckets, sinking crosshead and dump trucks were also used. Two shifts per day, each consisting of twelve miners, seven fillers, six timber men, and one bell man were employed. 1000 feet was sunk the first year, and 1197 feet in another year; the rate of sinking during one month reaching 126 feet. The depth on July 1, 1895, was 4426 feet, and the present rate of sinking is about 70 feet per month. The monthly rate of driving crosscuts with dimensions of about 6x7 feet from this shaft during March, April, May, June, 1895, was as follows:—137 feet, 144 feet, 146 feet, 136 feet respectively.

## New Mining Companies Organized This Week.

Polar Star Mining Co., San Francisco; directors, M. F. Tarpey, W. B. Carr, W. W. Foote, W. W. Byrne and A. Byrne; capital stock, $10,000,000, of which $500 has been subscribed.

Gold Flat Consolidated Quartz Mining Co.; principal place of business, Grass Valley; capital stock, $1,000,000; directors, Jacob Weissbein, J. Weissbein, C. W. Kitts, E. D. Kitts and B. G. Weissbein of Grass Valley.

Murray Creek Mining Co. (reorganized); principal place of business, Oakland; capital stock, $100,000; directors, D. Husing, H. Gloy, H. Harfst, W. Miller and F. Franz of Oakland.

Caledonian & Ward Gold Mining Co.; principal place of business, San Francisco; capital stock, $1,000,000; directors, C. M. Ward of Grub Gulch, Madera county; D. M. Tomblin of Oakland, M. F. Cale, W. H. H. Hart and A. W. Livingstone of San Francisco.

Genevieve Mining and Milling Co., San Francisco; capital stock, $200,000, of which $120,000 has been subscribed; directors, J. M. Taylor, J. A. Votaw, N. B. Schilling, H. G. Comstock and F. M. Johnson.

The Winona Gold Mining Co., incorporated in this city; capital stock, $250,000, of which $10,030 has been subscribed; directors, A. N. Butte, J. J. Meyers, T. J. Solinsky, J. T. Wall and F. A. Moore.

The Bailey Triple Ledge Gold Mining Co. has incorporated in San Diego; capital stock, $100,000; directors, L. N. Bailey, Banner; A. C. Nason, O. C. Dranga, San Diego; E. A. Stanley, Julian; and J. A. Jasper, Ramona.

The Greenwood Gold Mining Co. has incorporated in this city; capital stock, $500,000, all subscribed; directors, G. Adams, C. S. Goodman, C. Joost, W. H. Brown and C. W. Keeney.


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**References:**
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Henry S. Munroe, Professor, School of Mines, Columbia University, New York City.
Joseph S. Harris, President Phila. & Reading R. R. Co., Trustee Penn. University, Phila., Pa.
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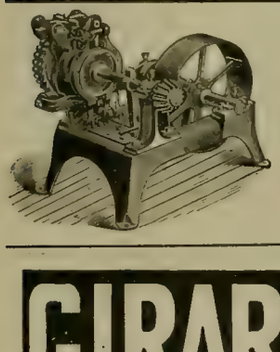
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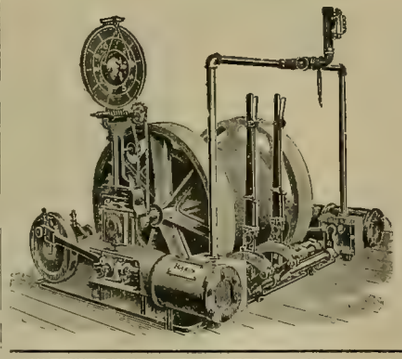
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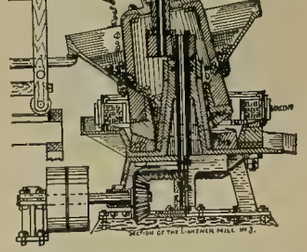
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## Coast Industrial Notes.

—An advance of $2 per M. feet on lumber is expected after Feb. 1st.

—There will be a general advance on eastbound freight rates on the 24th inst.

—In 1892 San Francisco consumed 1,593,850 tons of coal; in 1893, 1,479,785 tons; in 1894, 1,527,759, and in '95, 1,653,520 tons, the highest figure in the history of the city.

—The Stockton Ice and Fuel Company has incorporated in Stockton; capital stock, $50,000; A. W. Brooks, S. Newell, I. F. Stein, T. W. Newell of Stockton and A. Cornwall of San Francisco directors.

—The California Foundry Company has incorporated here: capital stock, $50,000; H. J. Rogers, A. F. Morrison, C. E. A. Forster and E. Schwab of San Francisco and W. M. Gardner of Oakland directors.

—The Keystone Boiler Works has incorporated in this city. Capital stock, $200,000; J. Hamilton, J. J. Moore and J. V. Hunter of San Francisco and W. Leach and J. M. Robinson of Oakland, directors.

—The Clear Lake Power Company has incorporated in this city; capital stock, $2,000,000; with F. Formpals, J. H. Culver, W. McGeorge, G. E. Huddick of San Francisco and E. O. Blethen of Oakland directors.

—The Columbia Bituminous Rock Mining Company has incorporated here; capital stock, $50,000; T. E. Treacy, R. S. Maxwell, C. S. Harvey, A. B. Clute of San Francisco and D. H. Whittemore of San Rafael directors.

—The Mexican International railway now carries the traveler from New York City to the City of Mexico in four days and eighteen hours, and from New Orleans to the City of Mexico in sixty-nine and one-half hours, distance 3210 miles.

—Right of ways have been secured for the Vance Brothers' Railroad, which, except for a short stretch of water, will connect Eureka, Cal., by rail with Arcata. A crew of 100 men is at work. This is an extension of the Humboldt Bay and Trinidad Logging Railroad.

—Puget Sound loggers have formed the Puget Sound Timberman's Association, to unite all persons in the lumber business generally in an effort to secure a uniform classification and scale of logs, spars, etc., and the establishment from time to time of a uniform schedule of prices.

—The Kings River Electric Power Company has incorporated at Visalia; directors, S. F. Earl and J. S. Jones of Reedley, J. Sibley of Dinuba, C. D. Wilcox and W. H. Hammond of Visalia; capital stock, $360,000, all subscribed; object, to develop electricity for lighting, power and railway purposes.

—San Joaquin Co. has just finished a dam in the bend of the Calaveras river, four miles above Stockton, to confine the river to its bank at that point and shut out a large amount of the water that has flowed down upon Stockton in past years. Stockton is now hopeful that the periodical floods above the city will cease.

—Los Angeles papers report the production of the oil field for the past year to be nearly three times that of the previous year, amounting altogether to 1,368,750 barrels. The average price received was fifty cents per barrel, or $684,375 for the entire output. According to the estimate of the oil exchange, there are 250 wells which have been operated during the year, the mean product of each being about fifteen barrels daily.

—Work is progressing on the electric plant on the North Fork of the San Joaquin river, from which power will be transmitted over a distance of thirty-five miles to Fresno, and it is expected that current will be turned on by March 1. It is reported that surveys have been made and rights of way secured for a canal, four miles in length, to carry water from the mouth of Mill creek to the Cobble House, at which point a power house will be erected to generate 4000 horse power. The fall is forty-five feet.

—There were received at San Francisco from the East, just before the recent holidays, nine carloads of poultry. More than a hundred cars, of a value probably exceeding $200,000, are sent here every year from Missouri, Kansas, Iowa, Illinois and other States. Most of the shipments are made from October to January, and so important is the business that special cars, called palace poultry cars, have been prepared for it. About one-half of the eggs used here are also imported from the East, the volume of the business being about $400,000 a year.

—E. S. Mackey, one of the promoters of a window-glass and bottle works at Seattle, Wash., says the factory will soon be running. In speaking of the business outlook of the company, Mr. Mackey says the demand is enormous, and outside of the output of a small bottle manufactory here everything is imported from the East and Europe. There is demand enough in this city to keep a large-sized factory busy all the time. Fruit shippers in California are beginning to use glass jars in which to ship their fruit, one firm alone giving in an order for over 2,000,000 last year.

—In '95 California produced over $22,000,000 in mineral products, exported $18,499,002 gold and silver bullion, packed 1,280,000 cases canned fruit, distilled 1,000,000 gallons grape brandy, produced 49,000,000 pounds prunes, 162,700,000 pounds dried fruits, exported 10,600 carloads of oranges, produced 92,500,000 pounds grapes, 73,500,000 pounds beans, 47,365,000 pounds butter, 15,300,000 pounds cheese, packed $5,000,000 worth of provisions, distributed 400,000,000 pounds sugar, exported 80,000,000 pounds vegetables, produced $4,000,000 fishery products, exported wheat worth $9,981,394, produced wool to the extent of 31,000,000 pounds, manufactured 13,000,000 pounds of blasting and gun powder, imported 26,372,756 pounds coffee, distributed $137,463,298 in dividends, and had a population of 1,654,000.

—The *Mexican Financier* says: "Although not all the census returns have come in from the remote parts of the republic, the Department of Statistics has tabulated those already at hand, with the result that the 14,000,000 mark has been passed. So far the census shows the following interesting facts: The republic has 196 cities, 496 villages, 5213 towns 8872 haciendas, 26,607 ranches, 2469 small ranches, and 902 hamlets. The States which have most cities are Jalisco 16, San Luis Potosi 16, Guerrero 15, Puebla 14 and Zacatecas 11. The State which has the least number of cities is Colima, having only the capital. Chiapas has the largest number of haciendas, numbering 1393; Yucatan comes next with 1214, Tabasco 753, Sonora 664, Guanajuato more than 400, and then follow the States of Mexico, Puebla and Sinaloa."

—*Bradstreet's* reports 1076 failures in the Pacific Coast States and Territories for 1895, with assets of $3,534,543 and liabilities of $6,503,400, as compared with 1084 for the previous year with assets of $5,211,090 and liabilities of $9,539,530. The failures for the past year are divided as follows:

| *State.* | *No.* | *Assets.* | *Liabilities.* |
|---|---|---|---|
| California | 809 | $1,985,677 | $3,927,593 |
| Nevada | 10 | 27,050 | 66,600 |
| Oregon | 136 | 681,719 | 1,076,895 |
| Washington | 114 | 818,947 | 1,392,971 |
| Arizona | 7 | 21,150 | 39,341 |
| Totals | 1,076 | $3,534,543 | $6,503,400 |

The following are the causes assigned for the failures: Incompetency, 311; inexperience, 76; inadequate capital for the business undertaken, 447; injudicious crediting, 52; personal extravagance, 5; neglect of business and bad habits, 34; excessive competition, 7; unfavorable circumstances, floods, fires, etc., 82; speculation, 3; fraud, 64.

—Discussing Sec'y of the Navy Herbert's recent award of the construction of the two new battleships to the Newport News Construction and Drydock Co., on the Virginia coast, the New York *Herald* says: "While the price the Government will pay for these two vessels is much lower than the bids of the other builders, there are two reasons why Secretary Herbert would have done well to accept the bid of the Union Iron Works for one of them—especially as he would have had express warrant of law for such a decision.

"In the first place, the successful bidder has had no experience in building large ships of war; and while a 'prentice hand may be very capable, it would have been better not to put both eggs in one basket.

"Secondly, the present defenses of the approach to Newport News, where the two ships are to be built, are practically nil, and in case we should have war during the three years required to finish the vessels, a hostile fleet might be able to destroy them in the shipyard."

## Personal.

C. H. MALLON is now superintendent of the Delaware (West Harmony) mine, Nevada Co.

PHILIP MILLER is again superintendent of the Dillon Mining Co., Bald Mountain, Mont.

ROSS E. BROWNE has assumed the general management of the Oneida mine, Amador Co.

PROF. CARLYLE is expected at Vancouver, B. C., Feb. 1, to take charge of the Provincial Bureau of Mines.

A. T. WALFORD of Grass Valley succeeds C. A. Russ as superintendent of the Gold Basin mine at Kerby, Or.

H. E. D. MERRY, late assistant manager for H. H. Vivian & Co., Swansea, has been engaged by the Le Roi at Rossland, B. C.

CECIL RHODES has resigned the premiership of the Cape Colony. He retains the presidency of the South African Exploration Co.

COL. DAY has made the sale of the Sunnyside and other mines on the North Fork, Plumas Co., to the Eastern parties recently noted.

C. E. HOGG has resigned as the superintendent of the Sutro Tunnel. President Franklin Leonard will in future act in that capacity.

C. N. CASEY, eight years manager of the Rising Sun mine, near Colfax, Cal., has resigned to take charge of some property of his own at Placerville, Cal.

H. P GRUGER is superintending the manufacture of machinery of his own design for working the placer ground of the Bon Accord Mining Co., near Bannock, Mont.

CAPT. C. E. GILLETTE, of the United States corps of engineers, recently received promotion from the lieutenancy held when he first assumed duty as a member of the United States Debris Commission.

THOS. G. MERRILL, president of the Montana Mineral Land Commission, will address the executive committee of the California Miners' Association at a special meeting in this city next Tuesday evening.

W. E. MEAD of Ward, Colo., says regarding the Fauvel process, described in last week's issue, that a company is formed to put in a complete reduction works to utilize by that process the iron sulphide ores at Ward, Colorado.

LIEUT.-COL. BENYAURD, late of the United States Debris Commission, has taken up his new detail of work in Florida, and will be succeeded by Col. Chas. R. Suter. Major Heuer will in future superintend Government operations at Cincinnati, O., and leaves for there upon the arrival of Major C. E. L. B. Davis, who succeeds him.


# HAMMOND M'F'G. CO.

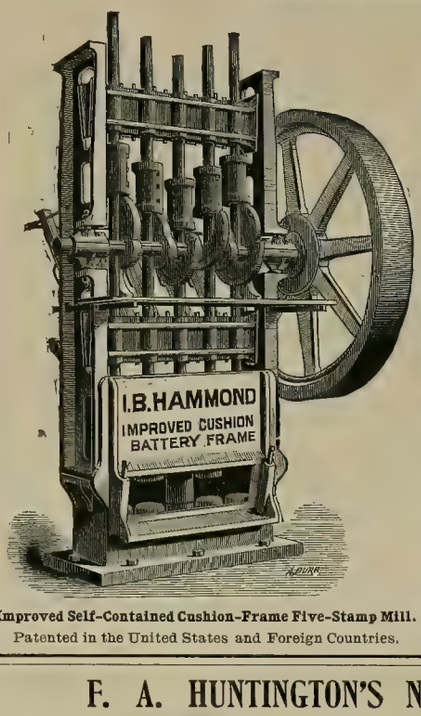
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Patented in the United States and Foreign Countries.

**The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Setf-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill.**

**FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.**

**SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.**

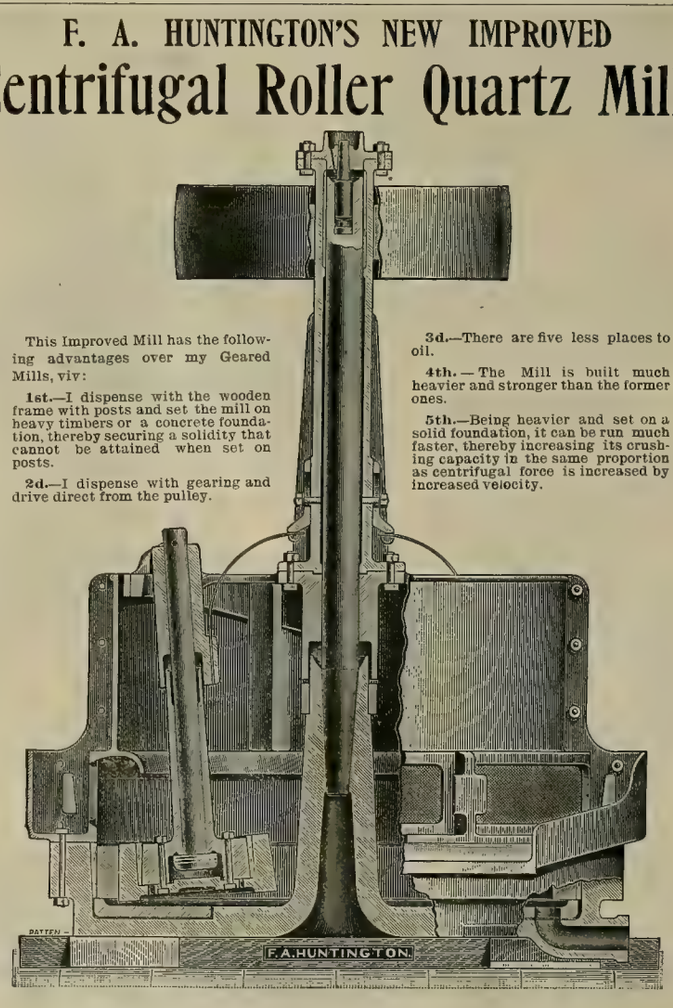
**THIRD: The Large Amount of Space Saved.**

We refer by permission to Mr. N. A. McMillan, Haines, Oregon, manager of the Blue Mountain Mining Co., at Rock Creek, Or., where ten of our stamp mills are in operation; also to Mr. John S. Miller, Helena, Montana, manager of the Diamond Hill Mining Co., operating one of our forty-stamp mills at their mines at Townsend, Montana.

Send for Catalogue and Price List.

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This Improved Mill has the following advantages over my Geared Mills, viz:

**1st.**—I dispense with the wooden frame with posts and set the mill on heavy timbers or a concrete foundation, thereby securing a solidity that cannot be attained when set on posts.

**2d.**—I dispense with gearing and drive direct from the pulley.

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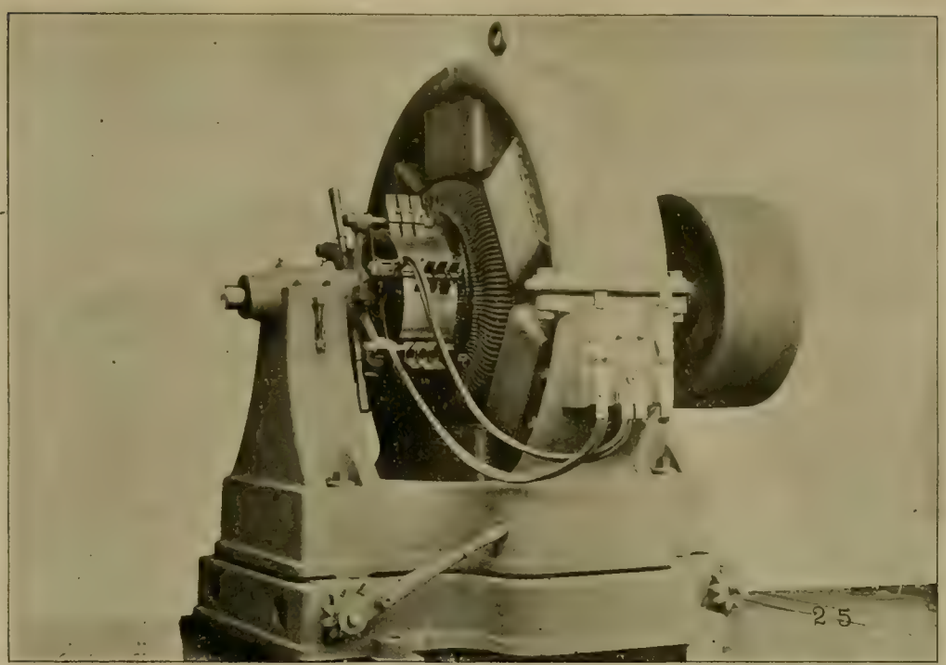
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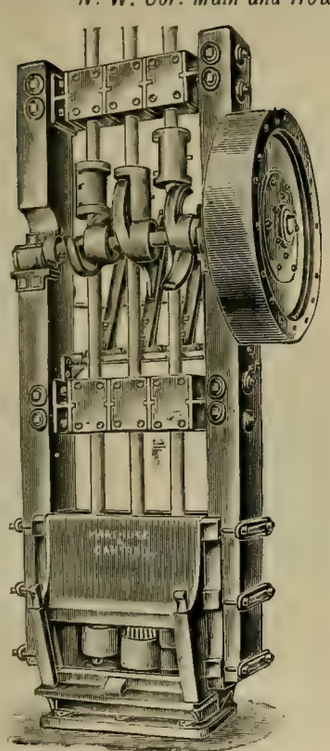
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Saves bill for heavy timbers, millwright and mechanics' labor, and a large amount of space. The term self-contained means a great deal for the mine owner, and can be readily recognized and appreciated in making an estimate for an ordinary plant when the comparative cost is considered

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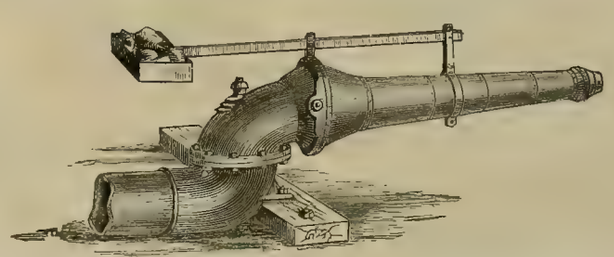
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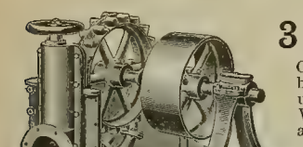
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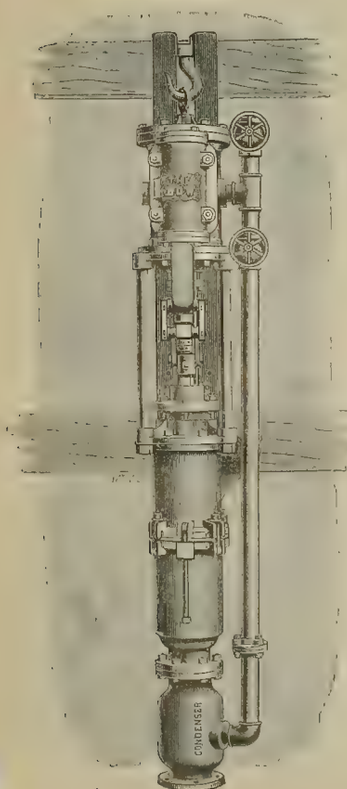
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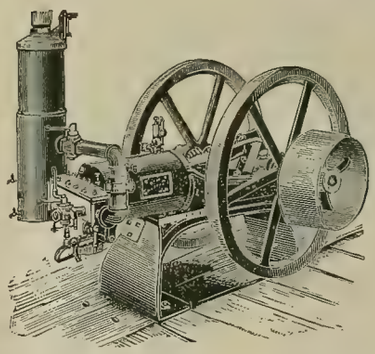
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|---|---|
| Coal Gas, ten hours' run, 1000 feet | $2 00 |
| Gasoline (74 deg.), ten hours' run, 8¾ gallons @ 14c. | 1 25 |
| Coal Oil, ten hours' run, 7½ gallons @ 10c | 75 |
| Crude Petroleum, asphaltum base, 16 gallons @ 3c | 48 |
| Crude Petroleum (35 deg.), paraffine base, 13 gallons @ 5c | 65 |

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon=21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1½c per horse power per hour; and on gasoline, 2½c per horse power per hour.

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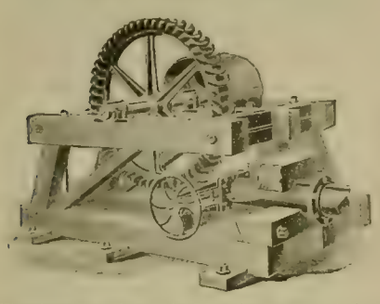
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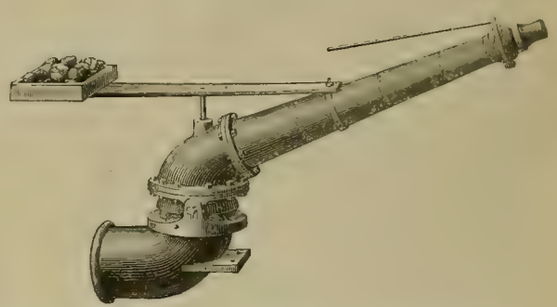
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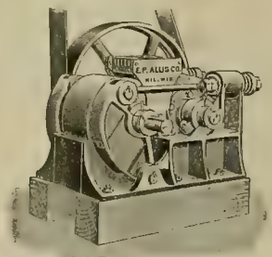
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MANHATTAN RUBBER BELTING, PACKING AND HOSE,
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL.

# Market Reports.

## The Markets.

SAN FRANCISCO, Jan. 9, 1896.

The New York reports say the situation in the metal markets generally is somewhat clearer, but has by no means recovered its former buoyancy. With one exception, and that for a large amount of finished material, there is but little inquiry in the market for iron and steel. Pig iron is very quiet; there is no demand and little inquiry except from the smaller trade, and is insignificant. Quotations are nominal only. Bessemer is lower in the West at $11.50. Northern coke iron is quoted at $13.25@13.75 for No. 1; $12.25@12.75 for No. 2, and gray forge at $12.25 for best brands, while Southern brands are $13.50@14.00 for No. 1; $13.00@13.25 for No. 2, and $12.50@12.75 for No. 3. Forge grades are offered at $12.00@12.25; Nos. 1 and 2 soft, $12.50 and $12.00. Steel billets are very quiet at $18.50 and foreign at $25.50. Domestic wire rods are $27.25@27.50; foreign $25.00@25.50, and Swedish $43.50. Steel rails for any purpose show no inquiry and price is $28.75 tidewater. Finished iron and steel, as regards new business, are at a standstill. Quotations are 1.35@1.50c on bars; steel plate, 1.50@1.60c; tees, 1.75@1.80c; sheared plates, 1.60c; angles, 1.55@1.60c; beams, 1.65@1.70c. Spikes are $1.70@1.75; fish plates, $1.40; track bolts, $2.00 and $2.10, respectively, for square and hexagon nuts. Old material is a drug on the market just at present. Iron rails are lower at $13.00@13.25. Old car wheels, $10.50. Steel rails are $11.00@11.50 and No. 1 wrought, $12.00. Ferro-manganese is steady at $51.50 for 80 per cent. Spiegeleisen is easy and very quiet at $25.50@26.00 for 20 per cent and $19@20 for 10 to 12 per cent.

Copper is unchanged, but it is understood there has been a good deal of quiet buying by the large consumers at current low prices. Lake Superior ingot is dull at 10¼c. Electrolytic 10⅛@10¼c, and casting copper 9¾@10¼c. Nickel is quiet but steady at 35c. Antimony is easy at 6¾c for Hallet's and 7¾c for Cookson's. Spelter is easier at 3.40c and in light demand. Pig lead is lower and weak at 3.15c. Pig tin is steady at 13.75c. American tinplate continues to show good sales. Quotations are $4.75 for IC Melyn, IX $6.00 for 14x20, other grades and sizes in proportion.

Under date of the 3rd, D. Houston & Co., 22 Platt street, New York, discussing copper, say the market has declined to 10 cents, which exactly corresponds with the price one year ago. This low price has been established by a large sale made a few days ago by the Calumet & Hecla Co. at this figure to manufacturers for deliveries extending over the next three months. Previous to this sale domestic demand throughout December remained very dull, and a considerably lessened consumption for November and December contributed its share to prevent any improvement in the market.

During the dull season here, however, some leading sellers sold freely to Europe of various grades for deliveries well into the current year, at prices considerably above those now ruling. The European visible supply of copper has not been so small since 1888, and the stock of copper outside of Chili bars held in warehouse in England and France at this date is only sufficient for about half a month's ordinary requirements. From January 1st to the middle of December, 1895, the stock of American copper in those countries was reduced from 4972 tons to 1100 tons, while the total stocks of all kinds during this period were reduced 8454 tons, with deliveries 10,450 tons more than the previous eleven and a half months. The statistical position of copper is in a very satisfactory condition, and such as to warrant much better prices.

The year just closed opened with Lake copper 10 cents, and gradually became weaker until it reached 9½ early in March. Later in that month it touched 9.35, but from that point there was a slow recovery, with May opening up at 9¾, when the advance was steady and almost uninterrupted throughout June, July and August, when the climax was reached at 12¼. The market remained almost stationary throughout September at these figures, until early in October, when values slowly receded to 11¾ at the beginning of November. From this on the price dropped more rapidly until 11 cents was touched during the last half of November, from which there was no recovery. December opened dull and nominal when 10¾ was soon reached, the market easing off an ¼ at a time until the year wound up with copper at 10 cents again.

The following are United States copper statistics; tons of 2240 pounds:

| | | |
|---|---|---|
| Estimated stocks of copper January 1, 1895 | | 34,698 |
| United States production, including reporting mines and outside sources, for 11 months ending November 30, 1895, as per official returns | | 156,522 |
| United States production for December, 1895, (estimated) | | 15 660 |
| | | 206,880 |
| Exports of American copper for year 1895 | 63,782 | |
| Estimate of domestic consumption for year 1895 | 118,303 | 182 085 |
| Stocks January 1, 1896 | | 24,795 |

Exports of copper during December amounted to 7414 tons fine copper.

European copper statistics per cable to-day show an increase in stocks of 606 tons, and in visible supply of 256 tons.

London quotations for G. M. B. copper at the close to-day are £41.5 spot, and £41.12.6 futures.

The market for copper here this date is 10 cents for Lake.

### New York Metal Market.

NEW YORK, Jan. 9.—PIG IRON—Southern, 11@12.00; Northern, 12@12.50.

COPPER — Brokers', 10.25c; exchange, 10.00c.

LEAD—Brokers', $3.00; exchange, $3.15.

TIN—Straits, 13c@13.50c.

SPELTER—Domestic, $3.40.

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.8 |
| London Merchants | $4.86½ |
| London Sight Bankers | $4.91½ |
| Refined Silver, peroz., 1000 fine | 66⅞c |
| Mexican Dollars | 54c |

### New York Silver Prices.

NEW YORK, Jan. 9. — Following are the closing prices for the week:

| | Silver in London. | N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 30⅝ | 66¾ | 10 25 | ..... |
| Saturday | 30½ | 66¾ | 10 25 | 3 00 |
| Monday | 30⅝ | 66⅞ | ..... | 3 00 |
| Tuesday | 30¾ | 66⅞ | 10 25 | ..... |
| Wednesday | 30⅝ | 66⅞ | ..... | ..... |
| Thursday | 30½ | 66⅞ | ..... | ..... |

### San Francisco Metal Market.

COPPER.

| | | | |
|---|---|---|---|
| Bolt | ¼ & 5-16, 21c; | ⅜ and larger, | 22c |
| Lake Superior Sheathing | 23 | @ | — |
| Ingot, jobbing | — | @ | 19 |
| Ingot, wholesale | 18 | @ | — |
| Sheet copper | — | @ | 22 |

ZINC.

| | | | |
|---|---|---|---|
| Sheet | 9½@ | | |

LEAD.

| | | | |
|---|---|---|---|
| Pig | — | @ | 3 85 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.

| | | | |
|---|---|---|---|
| Drop, sizes *smaller* than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and *larger* sizes, " | " | | 1 65 |
| Buck, Balls and Chilled, do, " | " | | 1 65 |

IRON.

| | | | |
|---|---|---|---|
| American Soft | 22 00 | @ | 26 00 |
| Pig, per ton | 18 00 | @ | 20 00 |

STEEL.

| | | | |
|---|---|---|---|
| English, lb | 16 | @ | 19 |

COKE.

| | | | |
|---|---|---|---|
| Gas Companies' | 75c | ₱ | bbl. |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 13 00 |
| " in sacks | — — | @ | 15 00 |
| Cumberland | 9 00 | @ | — — |

ANTIMONY.

| | | | |
|---|---|---|---|
| Per lb | — | @ | 10 |

PIG TIN.

| | | | |
|---|---|---|---|
| Per lb | 15 | @ | 16 00 |

QUICKSILVER.

| | | | |
|---|---|---|---|
| Home trade, per flask | 39 00 | @ | 40 — |

BORAX.

| | | | |
|---|---|---|---|
| Refined, in car lots | — | @ | 5⅛ |
| Refined, in sacks and barrels | — | @ | 5⅜ |
| Powdered, in car lots | — | @ | 5¾ |
| Concentrated, " | — | @ | 4⅞ |

TIN PLATE.

| | | | |
|---|---|---|---|
| Per bx | 4 75 | @ | 5 00 |

ZINC.

| | | | |
|---|---|---|---|
| Sheet | 8½@ | | |

NAILS.

| | | | |
|---|---|---|---|
| Wire | | | $1 75 |
| Cut | | | 1 50 |

LUMBER.

SAN FRANCISCO—WHOLESALE.

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

COAL.

SPOT FROM YARD—PER TON.

| | |
|---|---|
| Wellington | $ 8 00 |
| Greta | 7 50 |
| Nanaimo | 7 00 |
| Gilman | 6 50 |
| Seattle | 6 00 |
| Coos Bay | 5 00 |
| Cannel | 8 50 |
| Egg, hard | 10 00 |
| Wallsend | 7 50 |
| Scotch Splint | 6 50 |
| Brymbo | 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 35 |
| Liverpool Steam | 5 87 |
| Scotch Splint | 6 50 |
| Cardiff | 6 00 |
| Lehigh Lump | 9 00 |
| Cumberland | 8 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, Jan. 9, 1896.

9:30 A. M. SESSION.

| | | | | | |
|---|---|---|---|---|---|
| 100 | Alpha | 22 | 200 | Hale & Norcross | 1 20 |
| 200 | Alta | 12 | 100 | Mexican | 65 |
| 500 | Andes | 26 | 150 | | 64 |
| 300 | Best & Belcher | 96 | 500 | Occidental | 75 |
| 400 | Challenge | 30 | 100 | Ophir | 1 50 |
| 500 | Chollar | 73 | 100 | Potosi | 60 |
| 500 | | 72 | 100 | Savage | 32 |
| 50 | C. C. & Va | 2 55 | 200 | Sierra Nevada | 61 |
| 200 | Confidence | 1 20 | 300 | Union | 48 |
| 400 | Con. Imperial | 02 | 50 | Utah | 07 |
| 100 | Gould & Curry | 54 | 200 | | 06 |
| 200 | | 53 | 200 | Yellow Jacket | 46 |

SECOND SESSION—2:30 P. M.

| | | | | | |
|---|---|---|---|---|---|
| 400 | Ophir | 1 50 | 100 | Savage | 30 |
| 300 | Mexican | 62 | 100 | | 29 |
| 100 | | 63 | 200 | Alpha | 23 |
| 300 | Gould & Curry | 50 | 50 | Confidence | 1 15 |
| 300 | | 49 | 200 | Sierra Nevada | 59 |
| 300 | Best & Belcher | 93 | 100 | Utah | 06 |
| 100 | | 94 | 200 | Bullion | 18 |
| 300 | Con Cal & Va | 2 50 | 300 | Overman | 20 |
| 200 | Scorpion | 03 | 350 | Union | 47 |
| 200 | Chollar | 70 | 500 | Alta | 11 |
| 700 | | 71 | 200 | Challenge | 29 |
| 400 | Potosi | 58 | 400 | Occidental | 76 |
| 500 | Yellow Jacket | 44 | 300 | | 77 |

THE Smuggler Union Mining Company of Colorado paid a dividend of 50c per share on the 2d, amounting to $50,000. This mine paid $350,000 in dividends last year.

# MINING SHAREHOLDERS' DIRECTORY.

### ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied | Delinq't | Sale | Secretary. |
|---|---|---|---|---|---|---|
| Anita G M Co, Cal | 7 | 8c | Dec 7 | Jan 18 | Feb 4 | L F Reichling, 404 Montgomery |
| Challenge Con M Co, Nev | 20 | 5c | Dec 20 | Jan 22 | Feb 12 | C L M'Coy, Mills Building |
| Clara G M Co, Cal | 1 | 3c | Dec 17 | Jan 30 | Feb 20 | C M Cross, Chronicle Building |
| Con Cal & Va M Co, Nev | 5 | 25c | Nov 22 | Dec 28 | Jan 16 | A W Havens, 309 Montgomery |
| Con New York M Co, Nev | 14 | 5c | Dec 10 | Jan 15 | Feb 6 | C E Elliot, 309 Montgomery |
| Evening Star M Co, Cal | 2 | 1c | Dec 14 | Jan 22 | Feb 15 | M G Loefler, 137 Montgomery |
| Gold Bar Con M Co, Cal | 2 | 3c | Nov 5 | Dec 21 | Jan 16 | E C Godfrey, Crocker Building |
| Gray Eagle M Co, Cal | 42 | 5c | Jan 6 | Feb 7 | Mar 3 | W J Gurnett, 308 Pine |
| Hale & Norcross S M Co, Nev | 108 | 15c | Dec 10 | Jan 15 | Feb 7 | A B Thompson, 309 Montgomery |
| Haskell G M Co, Cal | 1 | 1c | Dec 11 | Jan 18 | Feb 8 | G W Osborn, 309 Montgomery |
| Hite G M Co, Cal | 2 | 10c | Dec 17 | Jan 20 | Feb 10 | H E Mathews, 120 Sutter |
| Home G M Co, Cal | 9 | 5c | Dec 24 | Feb 1 | Feb 19 | O E Johnson, 315 Front |
| Mexican M Co, Nev | 53 | 25c | Nov 19 | Dec 23 | Jan 14 | C E Elliot, 309 Montgomery |
| Mono G M Co, Cal | 36 | 10c | Dec 30 | Feb 2 | Feb 25 | M E Willis, 309 Montgomery |
| Occidental Con M Co, Nev | 21 | 15c | Dec 17 | Jan 20 | Feb 10 | Alfred K Durbrow, 309 Montgomery |
| Overman S M Co, Nevada | 74 | 10c | Dec 2 | Jan 6 | Jan 27 | G D Edwards, 414 California |
| Red J cket Con M Co, Nev | 3 | 1½c | Dec 18 | Jan 27 | Feb 17 | S M Capp, 413 Montgomery |
| Savage M Co, Nev | 88 | 20c | Jan 4 | Feb 6 | Feb 26 | E B Holmes, 309 Montgomery |
| Ybarra Gold M Co, Lower Cal | 3 | 50c | Dec 26 | Jan 27 | Feb 12 | T G Cantrell, 132 Market |
| Yellow Jacket M Co, Nev | 60 | 25c | Nov 12 | Dec 17 | Jan 22 | W H Blauvelt |

### MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Lone Star Q & G M Co, Cal | A W Blundell, 508 California | Jan 18 |
| Sierra Nevada S M Co, Nev | E L Parker, 309 Montgomery | Jan 15 |
| Standard Quicksilver Co, Cal | G Staacke, 426 California | Jan 15 |

## Mining Share Market.

SAN FRANCISCO, Jan. 9, 1896.

The entire list advanced slightly the past week. The largest percentage of gain was in the shares of the middle group of mines. The market does not act right from a speculative point of view. There is an absence of snap and life, which does not presage good for those that are long on the market. If there was any vitality it might lead to the belief that a moneyed pool was back of it, for experience has taught that when the latter are in the market lively moves and wide fluctuations are the order. This can be done owing to their being able to take at high prices every share thrown out by outsiders. They not only can buy all shares offered but they can also break prices quickly for another rise. The parties reported to be handling the market now seem to be afraid to make much of an advance for fear they could not be able to buy shares. By making a slight advance, say from 10 to 50 per cent, and even more on some, they can make the shorts fill and sell quite a line of shares on big bull points. The street is full of bull points — a big deal on foot. While this report may be correct, it does not stand to reason that those credited with manipulating the market would sell twenty-dollar pieces for five dollars, or in other words, they would not sell shares at present prices when by holding they could get considerable more money, provided their street reports are anywhere near correct. Dealers must not forget that the Hale & Norcross suit is still in court—not decided yet—and until this is well out of the way it is not at all likely moneyed men will go into the market. They are noted for not taking chances, they want an almost certainty before risking their money, and if the suit should go against their interests they would prefer letting others take chances and try to make a boom in the market. It is needless to say that the latter would fail, as they have done for months past.

The news from the Comstock mines is virtually unchanged, although there is every indication that in some the work grows in interest, but what it will result in, time alone can tell. In the Alta group they are still showing how well work can be done without finding anything of value. But there is some consolation: the work that is being done promises to lay the foundation for greater activity later on, provided the managers of the mines desire it. There are some who have great confidence in these mines, and that eventually ore of importance is likely to be found some time in this year. In the Gold Hill group the work that is being done in Overman points to better things before long, provided it is not changed so as to run in a direction which would be barren of results outside of assessments. From Seg. Belcher, Belcher, Crown Point and Yellow Jacket the news warrants better prices, but the public has been fooled so often on good prospects and the work reported in the right direction that it is hard to get them infused sufficiently to buy much. Several levels in two of the mines are being put in better condition for working more expeditiously later on. This work is to the west, so as to strike the ore found above. In the middle group of mines there is nothing of importance reported officially. A good deal of work is being done and there are chances for finding more ore than has yet been reported. They seem to be following up stringers or veins in the hope that they may lead to something of importance. In prosecuting this work some ore is extracted and raised. After exhausting the prospects the superintendents may push work to the west and see what can be found in that direction. In Best & Belcher and Gould & Curry there is no essential change in the work to report. Con. Virginia reports a larger output of ore with the assays slightly higher, still the market values of the shares have not advanced.

The slowness with which the shares move causes considerable disgust and creates a feeling of feverishness and uncertainty that does not look well. It would not take much to bring about a selling pressure and lower prices. If the mine promised well the shares would be cheap and insiders buy at present prices; this is what destroys confidence. In Ophir and Mexican they are still at work on the levels that have engaged attention for many months. On one of the levels they have been at work for over a year, and do not seem to be any nearer an ore body than when it was first started. In Sierra Nevada and Union there is nothing exciting or interesting to report. In Confidence, Challenge, Con. Imperial and Alpha they are still fooling around in the vicinity of the west lode. The ore found some time ago appears to have been lost, or at least nothing is reported to excite the cupidity of dealers.

On the Brunswick lode work is reported to be actively pushed, but so far as official letters go there is very little to encourage the belief that anything of importance will be found for some time yet. Even if a body of ore is found, it is not at all likely that much of an upmove in shares will follow in the absence of money backing. It is twenty-dollar pieces, and not ore, that make deals nowadays.

From the Bodie district nothing more comes to hand than the old stereotyped official letters, giving distances run and no ore run into. They will run into assessments before long.

The following is the usual monthly statement of moneys on hand:

| BODIE MINES. | | Con. Cal. & Va | $19,068 |
|---|---|---|---|
| Bodie | $11,503 | Exchequer | 4,287 |
| Bulwer | 3,780 | E. Sierra Nev | 28 |
| Mono | 920 | Gould & Curry | 9,889 |
| Standard | 25,415 | Hale & Norc'ss | 4,765 |
| Syndicate | 933 | Julia | 450 |
| WASHOE MINES. | | Justice | 205 |
| Alpha | $ 7,451 | Kentuck | 4,000 |
| Alta | 2 171 | Lady Wash'n | 158 |
| Andes | 2,183 | Mexican | 19,283 |
| Belcher | 1,774 | Ophir | 12,785 |
| Best & Belcher | 20,335 | Occidental | 499 |
| Bullion | 7,665 | Overman | 1,785 |
| Caledonia | 1,133 | Potosi | 19,560 |
| Challenge | 462 | Scorpion | 28 |
| Chollar | 18,510 | Seg. Belcher | 4,248 |
| Church | 16,202 | Sierra Nevada | 6,170 |
| Confidence | 6.550 | Silver Hill | 510 |
| Con. Imperial | 3,380 | Union Con | 5,371 |
| Con. New York | 198 | Utah | 2,497 |
| Crown Point | 534 | | |

The following mining companies reported having had an indebtedness on January 1st:

| | | | |
|---|---|---|---|
| Savage | $ 1,580 | Silver King | $ 5,437 |
| Summit | 1,638 | | |

The following illustrates the changes of the week:

| MINES. | Jan. 2. | Jan. 9. |
|---|---|---|
| Alpha | $ 26 | $ 23 |
| Alta Consolidated | 19 | 12 |
| Andes | 21 | 26 |
| Belcher | 31 | ..... |
| Best & Belcher | 88 | 95 |
| Bodie | 43 | ..... |
| Bullion | ..... | 18 |
| Challenge | 30 | 30 |
| Chollar | 72 | 73 |
| Confidence | ..... | 1 20 |
| Consolidated California and Virginia | 2 45 | 2 55 |
| Consolidated New York | ..... | ..... |
| Crown Point | ..... | ..... |
| Exchequer | 10 | ..... |
| Gould & Curry | 48 | 54 |
| Hale & Norcross | 1 08 | 1 20 |
| Justice | 05 | ..... |
| Mexican | 65 | 65 |
| Ophir | 1 45 | 1 50 |
| Overman | 21 | 20 |
| Potosi | 62 | 60 |
| Savage | 35 | 32 |
| Sierra Nevada | 53 | 61 |
| Union | 46 | 48 |
| Utah | 04 | 07 |
| Yellow Jacket | 50 | 46 |

## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Middle Fork Feather River, Plumas county, near La Porte.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 2) levied on the 5th day of November, 1895, the several amounts set opposite the names of the respective shareholders, as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| L. M. Hoefler | 24 | 2,500 | $75 00 |
| L. M. Hoefler | 25 | 2,500 | 75 00 |
| L. M. Hoefler | 88 | 1,000 | 30 00 |
| L. M. Hoefler | 89 | 1,000 | 30 00 |
| L. M. Hoefler | 90 | 500 | 15 00 |
| L. M. Hoefler | 91 | 100 | 3 00 |
| L. M. Hoefler | 92 | 100 | 3 00 |
| L. M. Hoefler | 93 | 100 | 3 00 |
| L. M. Hoefler | 94 | 100 | 3 00 |
| L. M. Hoefler | 95 | 100 | 3 00 |
| L. M. Hoefler | 96 | 500 | 15 00 |
| L. M. Hoefler | 97 | 500 | 15 00 |
| L. M. Hoefler | 98 | 500 | 15 00 |
| L. M. Hoefler | 99 | 500 | 15 00 |
| Raymond Parry | 15 | 625 | 18 75 |

And in accordance with law, and an order from the Board of Directors, made on the 5th day of November, 1895, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, 37 and 38 Crocker Building, San Francisco, California, on THURSDAY, the 16th day of January, 1896, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING DECEMBER 31, 1895.

552,344.—WAGON JACK—Arata, Brunnelli & Arata, S. F.

552,098.—RAIL FASTENER—C. G. Chamberlain, Pacific Grove, Cal.

552,355.—SAW SUPPORT—A. J. Deetz, Sisson, Cal.

552,240.—FUNNEL—A. G. Dyer, S. F.

552,149.—SECURING WHEELS TO AXLES—W. F. McQuivey, Seattle, Wash.

552,384.—GAS LIGHTER—P. Meyer, Alameda, Cal.

552,385.—BLOW-OFF—Thomas Mitchell, Grantsville, Nev.

552,301.—MOP—E. Stebbinger, Portland, Or.

552,210.—DISH CLEANER—M. Stone, San Diego, Cal.

552,305.—ROLL PAPER HOLDER—Sullivan & Mathews, Seattle, Wash.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ELECTRIC GAS LIGHTER.—Philip Meyer, Alameda, Cal. No. 552,384. Dated Dec. 31, 1895. This invention relates to that class of electric gas lighting devices in which opposing electrodes are located in proximity to the ignition point of the burner whereby, when the spark is generated, the gas is lighted. The invention is applicable to that class of burners known as "atmospheric" burners, in which the lighting surface or point of a Bunsen burner is enveloped by a mantle of a material adapted to become incandescent under heat, and it is especially applicable to that class of burners now known as the Welsbach. The invention consists essentially of electrodes centrally disposed upon the ignition surface of the burner, and suitable electrical connections for said electrodes. These connections include an inleading wire passing from without through the side of the burner at a point below the mantle and centrally upward through the burner to the electrode.

WAGON JACK.—Paolo Arata, Guglielmo Brunelli and Luigi Arata, of San Francisco, Cal. Assignors of one-fourth to Philip Giovannini of same place. No. 552,344. Dated Dec. 31, 1895. This invention relates to the class of wagon jacks, and more especially to those wagon-lifting devices which are adapted to elevate the entire wagon from the ground so that all its parts may be reached for washing, greasing, repairing, etc. The invention consists in an apparatus comprising a base frame, the upper surface of which is made on an incline, and a wheeled truck-frame adapted to freely pass under the wagon and while still thereunder to roll up the inclined plane of the base frame, whereby it is lifted up under the axles of the wagon, and said wagon is elevated. In connection with the truck-frame is a novel equalizing or adjusting frame.

BLOW-OFF FOR STEAM BOILERS.—Thomas Mitchell, of Grantsville, Nevada. No. 552,385. Dated Dec. 31, 1895. This invention relates to means by which the sediment in the bottoms of boilers is got rid of and the boilers cleaned. The object of the invention is to provide a blow-off device which is adapted to be moved from end to end of the boiler, while the latter is in use, and thereby reach and blow out the sediment completely and from all portions of the boiler. The device consists of a movable vehicle, carrying a suitable mouth-piece lying in the lower portion of the boiler; means for moving said vehicle and mouth-piece within the boiler to different points therein, and a yielding and controllable connection, whereby said mouth-piece communicates with the exterior.

THE CALIFORNIA DEBRIS COMMISSION having received applications to mine by the hydraulic process from Joe G. De Bons in the Kerr mine, near Yankee Jims, Placer county, to impound tailings in Devil's canyon; from L. M. Sherwood et al. in the Sherwood & Snyder mine, near Chinese Camp, Tuolumne county, to impound tailings in Moccasin creek; from Henry A. Hallsted in the Clay Bank mine, near Meadow Valley, Plumas county, to impound tailings in a ravine; from W. H. Glenn & J. H. Hayden in the Blue Gravel mine, near Rancheria, Amador county, to impound tailings in Rancheria creek; from J. F. Evans in the Emma Harding mine, in Cook's canyon Plumas county, to impound tailings in a swamp; from John Smith in the Roman mine, Mountain Meadows, Lassen county, to impound tailings in a swamp; and from Wiley Sexton in the Kendall mine, near Grizzly Flat, El Dorado county, Cal., to impound tailings in Dogtown creek, gives notice that a meeting will be held at room 92, Flood building, San Francisco, Cal., January 13th, 1896, at 1:30 P. M.

THE CALIFORNIA DEBRIS COMMISSION having received applications to mine by the hydraulic process from John Spaulding in the Polar Star mine near Dutch Flat, Placer Co., and T. G. Phelps in the Liberty Hill mine, Nevada Co., to impound tailings in Bear River, and from Olonzo Engle in the Adkins mine near Ono, Shasta Co., to impound tailings in a ravine, gives notice that a meeting will be held at room 92, Flood Building, San Francisco, Cal., on Jan. 20th, 1896, at 1:30 P. M.

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## Assessment Notices.

SAVAGE MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works Virginia Mining District, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors held on the fourth (4th) day of January, 1896, an assessment (No. 88) of twenty cents (20c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 50 Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the sixth (6th) day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 26th day of February, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. B. HOLMES, Secretary.

Office—Room 50, Nevada Block, No. 309 Montgomery street, San Francisco, California.

WEST SIDE CANAL AND LAND COMPANY.—Location of principal place of business, San Francisco, California. Location of Works, Fresno and Kings counties, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 30th day of December, 1895, an assessment (No. 5) of one (1) cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 8, Floor 8, Mills Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of February, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 27th day of February, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. E. NAYLOR, Secretary.

Office, Room 8, Floor 8, Mills Building, San Francisco, California.

ANCHOR COAL AND DEVELOPMENT COMPANY. Location of principal place of business, San Francisco, California. Location of Works, Kelso, Cowlitz county, Washington.

Notice is hereby given, that at a meeting of the Board of Directors held on the second (2d) day of January, 1896, an assessment (No. 6) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 632 Market street, Room 5, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the third (3d) day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the fifth (5th) day of March, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. D. FARISH, Secretary.

Office, No. 632 Market street, Room 5, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of December, 1895, an assessment (No. 21), of fifteen (15) cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 63, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of January, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 10th day of February, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 63, Nevada Block, No. 309 Montgomery street, San Francisco, California.

HITE GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Mariposa County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the seventeenth day of December, 1895, an assessment (No. 2) of 10c (ten cents) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, Room 27, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of January, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 10th day of February, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

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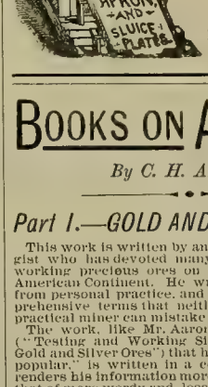
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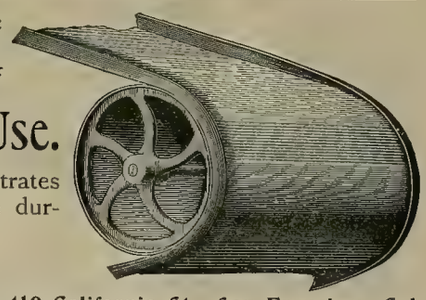
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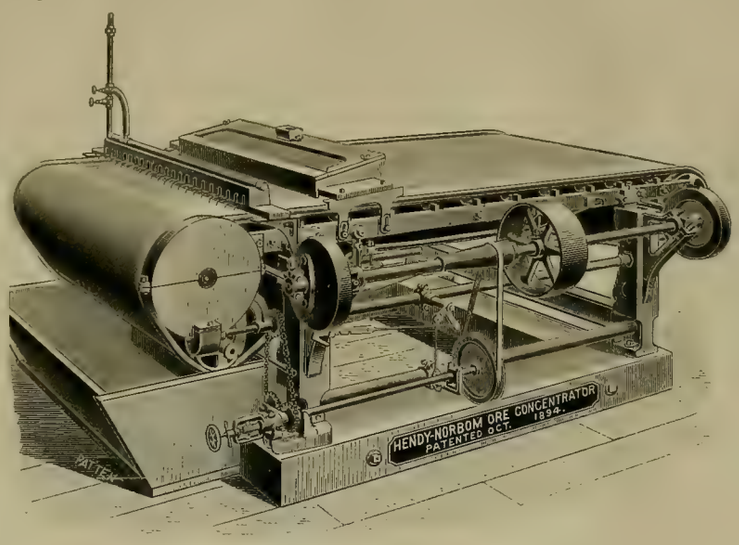
VOLUME LXXII. Number 3.

SAN FRANCISCO, SATURDAY, JANUARY 18, 1896.

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### A New Ore Concentrator.

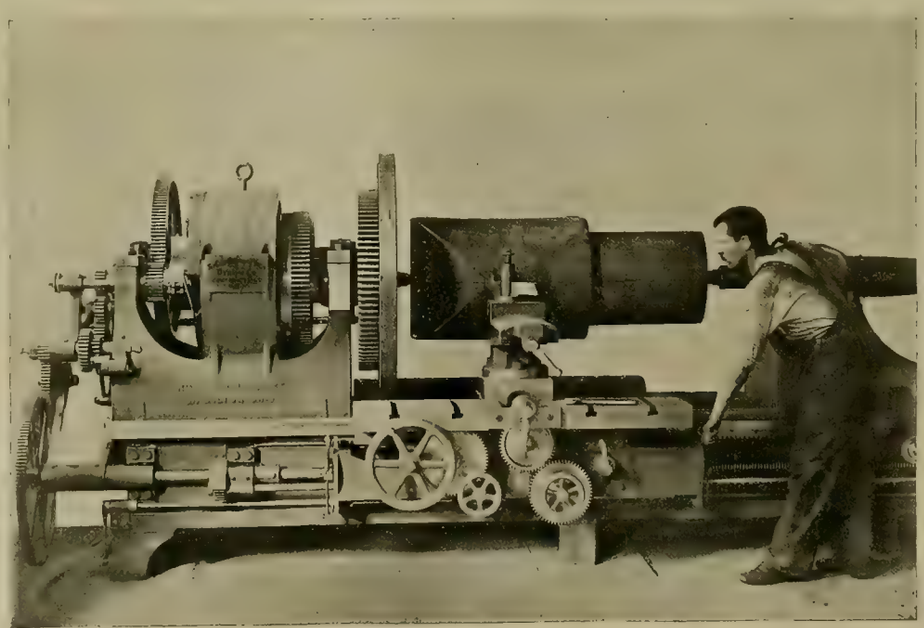
The new concentrator herewith illustrated is the invention of John O. Norbom, and manufactured by the Joshua Hendy Machine Works of this city. The machine is an endless belt vanner, built entirely of iron, the shaking frame or belt-carrying table made of channel irons; the eccentrics on the driving shaft are adjustable so that the table can be given different strokes, the 1-in. and 1½-in. being mostly used. Either a canvas or rubber belt, according to the character of the ore, is employed. There are devices for adjusting the grade of the table as well as for adjusting the belt speed. The device that gives the table its motion consists of four curved steel springs upon which the shaking frame rests. Two of these springs are placed on each side of the machine, curved or bent in opposite directions. The driving shaft lies on one side, and the eccentrics on this shaft, while giving a side motion to the table, cause the two springs on one side to bend down while the opposite springs straighten up, and vice versâ, thus giving a peculiar gentle side-tilting motion to the table. The longer the stroke, the greater the tilting. On a very short stroke the tilting or dipping of the sides of the table is very small. The machine can be worked on two different principles, viz., rubber belt, quick side-shaking motion with little tilting and short stroke; canvas belt, slow side-tilting motion and a long stroke. The manufacturers claim that this adjustability makes the machine suitable for almost any kind of concentrating gold ore, because operated on two principles of motion —either one of which concentrator manufacturers have always strived to attain — obviating the tendency of the pulp to pile up heavy and thick on the side of the belts along the edges, which reduces the effective surface of the belt and causes a loss of sulphurets that never could be separated from the gangue where the pulp was lying thick and dead. Where there is too much dipping of the edges of the table, the pulp would pile up heavy and thick in the center of the belt. It is claimed for this machine that the gentle tilting given by the curved springs overcomes the tendency of throwing the pulp to the sides, though not sufficiently strong to throw it to the center, and that the pulp is evenly distributed the full width of the belt, thus increasing the working capacity and close saving of sulphurets. While the machine takes care of the pulp from five stamps with ease, in one instance it is now taking the pulp from ten stamps, the ore carrying from four to six per cent of sulphurets. Mechanically, it is a substantial and durable machine. The canvas belt employed is made of heavy special-made duck. The belt has round edges, obtained by wrapping the canvas around rubber hose. The edges work in grooves on the end of the rollers, thus holding the belt in its place and preventing it from working sideways; the edges are protected so as not to be cut by the rollers. The machine is intended to meet the demand for a concentrator that can be adjusted in the mill to suit the character of the material treated, thereby avoiding the expense and inconvenience of putting up and trying two or three different makes to ascertain which motion gives the best result.




THE HENDY-NORBOM ORE CONCENTRATOR.

### Direct-Connected Motor and Lathe.

The lower engraving shows a direct-connected motor, built in the headstock of a 46-inch Niles Tool Works lathe. The motor is made upon a sleeve which slips over the spindle. Modern machine shops have traveling cranes, but in some cases the full advantages are lost, as it is difficult and expensive to place the tools so as to be easily served by the cranes. With a direct-connected motor on each large tool, shafting is dispensed with and the tool may be placed either to receive the work or to economize space. This motor runs at nine different speeds in either direction, from 57 to 275 revolutions per minute (the ordinary cone pulley runs at four or five), and the speed is controlled by a lever on either side of the apron of the carriage. As the position of the operator is always in front of his tool, this lever is always under his hand, and the motor can be stopped or the speed changed instantly from any speed in one direction to any speed in the other direction. As it is no trouble for the operator to change his speed, it is found in practice that he always keeps the tool cutting up to speed, which he generally does not do when he has a belt to shift. As the speed can be changed without stopping the lathe, the cutting speed can be kept constant as the tool works toward the center in facing off work, or the operator can avail himself of a quick return in chasing threads. This method is particularly desirable in turret lathe or similar work, where there are no two tools in the turret that should be run at the same speed to get the greatest amount of work from the tool. Most turret lathes have some mechanical arrangement for quickly throwing in or out some clutch or gears, thus giving two speeds without shifting a belt; but any one will appreciate the advantage of being able to instantly get any one of nine speeds in either direction, without shifting a belt or throwing a clutch. The power wasted in running line or countershafting is something enormous, and is seldom considered. In a test made in some thirty shops, it was found that the power thus wasted was sixty-eight per cent of the total power used when doing the ordinary work. A great saving in power can thus be obtained with the direct-connected motors. The motor herein described is built by the Card Electric Motor & Dynamo Co., of which J. W. Brooks & Co., 523 Mission street, this city, are general Western agents.



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OF LATE long dispatches have appeared in Montana and Colorado papers, and sundry interviews with Montana mining lawyers published regarding the filing and holding of claims that uncontradicted may make mischief and mean loss to the Montana miner. Without going into the assertions in detail or answering them at length, it is in order to state for the benefit of our Montana readers that Congress has made no recent change in the federal mining laws; that the annual assessment work had to be done in '95, and, in all probability, must be done in '96, and that no successful attempt can be made to have those laws declared "unconstitutional." Even were such a thing possible, it would cost less to comply with the law than to start in the initial steps of such an undertaking. The State of Montana cannot make any law regarding mining or anything else that conflicts directly or indirectly with any United States law on the subject of legislation. The State of Montana has recently passed a new mining law applying, of course, solely to mining claims in that State, that defines how claims shall be located and worked. This law, it is believed, does not conflict with the U. S. statutes, and is, on the whole, a benefit to the Montana miner. It goes into detail in the manner of how the location shall be made, prescribes that the locator of the claim shall have ninety days in which to perfect the location and record it. The details of how the location shall be perfected—stating exactly the boundaries, in case of a lode claim sinking ten feet, etc.,—are also given, much of the statute being made up in accordance with governmental rulings and decisions of the federal law, and being manifestly with the honest intent to supplement, make plain and individualize the general mining law of the U. S., applying it under State sanction to one of the mining commonwealths.

GENERAL interest in the recent stirring news from South Africa is locally intensified by the arrest of John Hays Hammond, Charles Butters and Thomas Mein. These three are prominent among the many California miners that have been secured by South African mine owners to manage their properties. It is probable that upon proper representation and full understanding of the case the Boer Government will promptly release them. While President Kruger and the South African Republic no doubt have grave cause for reprisal and repression, yet it is unlikely that there exists just reason for any menace to resident Americans. California miners, some fifty in number, have gone to South Africa solely as a business proposition to intelligently administer and superintend great business interests. The fact of their business association with Englishmen, with whom the home Government has come in armed collision, in no way justifies arrest or threatened confiscation of private property, and it is very unlikely that men like Hammond, Butters, Clark, Williams, Mein, Leggett, Abadie, Starr, Stokes, Webb, Dahm, Clement, Garthwaite, Richardson, Hawley, Smith, Stoddart, Elliott, Harvey and others, who have the skill, ability and knowledge that has caused them to be selected of all men in the world to conduct the great mining projects in South Africa, would allow themselves to be mixed up in political or revolutionary complications. It is probably their prominence that has made them objects of suspicion. Hammond is the right hand of Cecil Rhodes in his great mining projects in South Africa, and, Rhodes being implicated in the recent Jameson affair, the Boers probably assume that Hammond and his fellow-Americans have had something to do with the recent armed conflict whose echoes have rung round the world. Prominent State and Federal officials have interested themselves in the case, and the fair presumption is that as soon as it is shown that they are American citizens and have minded their own business they will be promptly released, with apologies for their detention.

## Of Immediate Interest to Mine Owners.

The changes in the taxation statutes made by the last Legislature now in practical operation are capable of resulting in serious injury to the mining industry of this State. The danger of such injury is imminent and requires to be anticipated by prompt action. The trouble is in the delinquent tax sales, where in years past the State has been the purchaser and holds the certificate, and it originates from the practice of assessing unpatented mining claims, homestead and preemption rights as real property, or where improvements on these claims and the poll taxes of owners were assessed as being liens on the land. Failure to pay these taxes has largely been due to abandonments and forfeitures of rights, and at the delinquent sale no personal buyer desiring such unsubstantial rights, the State received the certificate. These certificates have heretofore not necessarily been a cloud on the title to the land. Under the operation of the new law, deeds to the State must now be made of the property represented by these old certificates, and the language of the law is such that the deed once made and recorded is a cloud on the title, for the statute asserts for such deeds the absolute title of all patented lands and the right of possession of unpatented lands, and makes the deed conclusive as to the regularity of all proceedings and sale. No procedure is provided by which any examination and cancellation of actually invalid certificates can be made, except at the instance of the present owner or claimant, and that under such limitations that only a small percentage of the certificates are reached. As the statute acts in most cases, the owner or claimant must pay the taxes and penalties of assessments on abandoned rights that his chain of title does not connect with, or have the State take a deed and cloud his title. Either that or a suit still more costly, to keep the tax collector from making the deed to his property. Even should that portion of the statute be declared unconstitutional, the deeds to the State of other similar cases are of record and needlessly increase the costs of abstracts and searches of title. Many of these old certificates contain indefinite descriptions that cannot be absolutely located. These, in the form of recorded deeds to the State and subsequently passed by sale by the State, will become a menace to the titles to valuable property that is, in fact, in no way connected with the property covered by the old tax sale. As the matter stands there is seemingly only one practical method of avoiding the clouding of titles or at the least cumbering the record of them. It is for the Tax Collector to refuse to make the deeds to the State until compelled by the courts. There is no question that if but this be done and the State sue him to make the deeds, the courts will declare all the certificates of sale of unpatented mining claims invalid and order their cancellation. Such action will save the clouding of titles or cumbering the records unnecessarily. It is difficult enough now to sell unpatented mining claims without adding to it additional uncertainties of title. The immediate attention of those interested is directed to this matter. It is their province and may well be their purpose to afford such legal aid as will assist in carrying out this suggestion.

## Last Wednesday's Convention.

Prominent representative men from all parts of the State affected met in this city last Wednesday in the River Improvement Association Convention. Their deliberations are of interest to the hydraulic miners of the State. Last Saturday, Congressman Johnson introduced a bill in Congress which, however unobjectionable in other respects, seems to ignore and set aside the two official reports to Congress of the resident engineer officers of the United States, in which they recommend an appropriation to begin the work outlined in the U. S. Debris Commission's plan of reclamation. The recent bill meets with the approval of the Anti-Debris Association, but appears to be in opposition to the endorsed plans of the Commission, and cannot in the nature of things be satisfactory to the miners, not being in accord with general public sentiment nor the patent facts in the case. These matters came up in last Wednesday's meeting. With considerable judgment and practical knowledge of present requirements in their broadest sense, T. J. Sherwood of Yuba submitted the following, which was not adopted:

*Resolved*, That this convention is in favor of the plan outlined and recommended in the report of the California Debris Commission dated December 4, 1894, known as the Deguerre Point dam, or barrier, in Yuba river, for the retention of the heavy material in the channel of said stream and its tributaries above said point. And we favor the appropriation of $300,000, therein recommended by the Board of Government Engineers, to construct said retaining barrier as the initial point in the betterment of the Sacramento and Feather rivers.

This was no idle or perfunctory compliment to the Commission, but an endorsement of the official and reiterated recommendation of the Commission by eighteen counties and seven cities directly interested. R. T. Devlin, representing the Anti-Debris Association, succeeded in having the bill introduced by Congressman Johnson last Saturday endorsed. The memorial closes by saying that

> The saving now effected by these navigable waters in freight rates, as compared with those prevailing by rail, amount to the producers of the State to more than $2,000,000 per annum, and by their further improving this saving could be doubled. It is absolutely necessary for the future and continuous prosperity of California that these waters should receive that attention from Congress that their importance, viewed from the standpoint of commerce and agriculture, demand. We call your attention particularly to the reports of Federal engineers on file at Washington, and ask, in addition to the recommendations for improvement therein contained, to extend the work still further. We particularly pray that this matter of improvement of the waterways of California may not be conducted on the patchwork system that hitherto has been observed, but that the Government will adopt a complete system for their improvement, and that whatever may be done shall be done as a part of a comprehensive plan under the contract system. We desire to remind you of the vast sums paid by California into the Federal treasury and the meager attention in comparison given by the Federal Government to California in return. On the ground of relief to the farmer and fruit grower, of the extension of commerce, of cheapened transportation, of reparation for past neglect and of solemn duty, in improving the navigable waters of this vast empire, we earnestly implore you to carry out all the recommendations for improvement made by the Government engineers, and to take such other means as may be necessary and proper to improve and extend these waterways so as to benefit not only the people of California, but of the whole Nation as well.

Five delegates—Wm. Johnston of Sacramento, J. M. Gleaves of Shasta, H. J. Corcoran of San Joaquin, W. A. Coulter of Santa Clara, and E. McGettigan of Solano—were selected to go to Washington to back the memorial to Congress praying for a comprehensive system of river improvement. Active interest was manifested, there was practical unanimity of opinion and action, and it is to be hoped that the result will be beneficial to the general interests of the commonwealth.

OF GOLD, and gold alone, it can be truthfully said that it never cost less to produce it than at the present time, and its present purchasing power is greater than it ever was. It may also be said that its international disturbing power was never greater, as witness Venezuela and the Transvaal.

## Concentrates.

THE Everett, Wash., smelter has resumed operations.

PLACER COUNTY water consumers want the rates reduced.

THE week's downpour of rain makes every miner in the State happy.

DELINQUENT local mining assessments in January aggregate $57,320; in January, '95, $151,000.

THE total product of the Pueblo, Colorado, smelters for 1895 in gold, silver and lead was $14,474,363.38.

OVER 3000 stamps are now dropping in the Rand district, South Africa, crushing 325,000 tons monthly.

NOW THAT Utah is a State, the territorial law against foreign investments is abrogated and aliens may buy mining property therein.

VERY little antimony was produced in this State in '95; the aggregate production of this country for the year was less than 850,000 pounds, even including that reduced from foreign ores.

THE option which Capt. De Lamar had on the Mercur, Utah, mine expired on the 10th. The mine has resumed dividends, declaring $25,000, or 12½ cents per share, payable next Monday.

THE Arizona *Citizen* hears that the Tucson Mining and Smelting Company has extensive improvements in contemplation, one being the purchase and erection of a fifty-ton water jacket.

FROM 472 tons base ore worked at the Mexican mill, the concentrates of which were sent to the Selby Smelting and Lead Works, the Ophir Mining Co. received $7326 gross. The total cost was $3.53 per ton.

A. DERATTI and ten others have leased the Flagstaff property, Ferguson district, Lincoln county, Nev., and will prospect the ore chute cut on the Boss ledge, and continue the main tunnel to the Apex ledge.

THE Genoa, Nev., *Courier* says the Eastern parties who bonded the Zirn group of mines have been given thirty days longer, until January 24th, to take the property. The price was raised from $75,000 to $80,000.

UNUSUAL snowfalls in Wyoming, Idaho and Utah make placer miners there predict that, considering the large number of hydraulic plants put in late in '95, the result of next season's work will be something great.

THE Prescott, Ariz., *Courier* thinks there are more men working for themselves and not in the employ of any man or company who are making a living at mining in that section "than in any other mining country known."

THE amicable relations between the mineral and agricultural interests in Oregon is illustrated by the appointment this week by the State agricultural college of a committee to add a mining department to that institution.

THERE was considerable falling off in the production of silver from domestic ore in the United States in '95, as compared with '94, the figures so far as procurable being 41,238,704 ounces fine last year and 49,846,875 the year before.

CONGRESSMAN JOHNSON has introduced a bill in Congress to the effect that all reservoir sites reserved or to be reserved by the Geological Survey be open to entry and use and occupation under the Right of Way Act of March 3, 1891.

THE House Committee on Public Lands has reported favorably on the bill introduced by Wilson of Idaho granting States twenty-five per cent of all money paid the United States for mineral lands within their respective borders for the support of schools of mines.

AT the Broken Hill Proprietary, Australia, for the week ending December 26th, '95, 6671 tons of ore were treated, yielding 514 tons of lead, containing 138,038 ounces silver; also 1126 tons treated by amalgamating and leaching plants, producing 12,486 ounces silver.

TO THE Nevada State University at Reno Supt. Lyman of the Con. Virginia mine has presented a steam pump for the mechanical shop; Supt. Keating of the Savage a steam pressure blower, and Supt. Williams of the Mexican mill a concentrator for the reduction works.

LAST Monday the Boise, Idaho, assay office shipped $32,257.32 gold. The figure is large for this season of the year, showing growth of the gold mining industry. January is usually a very dull month, the highest shipments for the entire month never having been more than $40,000 in any year.

DURING last month the Tacoma Smelting and Refining Co. shipped 7100 bars of bullion, weighing 730,185 pounds, valued at $96,396.27. There were 16,633 ounces gold, valued at $34,379.99; 58,644 ounces silver, valued at $39,145.24, and 728,065 ounces lead, valued at $22,371.04. The total product for the year was $760,548.57.

THE executive committee of the North Star Co. in East Kootenay, B. C., have accepted the tender of B. W. Jones for the transportation of 3000 tons of ore from Fort Steele to Jennings, Mont. The company has twenty-two teams engaged in hauling ore from the mine to the Kootenay river, averaging about thirty tons a day.

THE Anaconda Co.'s new electrolytic refinery is expected to be completed for operation next month, thus enabling them to produce as much as 6,000,000 pounds of electrolytic copper per month at their own works. The reserves of ore in sight are estimated to equal three years' production at the rate of 100,000,000 pounds copper per year.

A ST. LOUIS mining man is trying to organize a company to work the bed of the Sacramento river for gold. The plan is to secure a concession to dredge the river, manipulate the dredger for gold and use the debris in raising the levees. Numerous analyses of the bed of the river have been made and gold in satisfactory quantities has been found.

LAST Monday the Debris Commission granted permits to the Badger Hill and Clay Bank, near Spanish Ranch, Plumas county; Blue Gravel, near Rancheria, Amador county; Emma Hareing, Plumas county, and Roman, Lassen county. The Keer mine, near Yankee Jim's, Placer county, was authorized to build a dam. This makes to date, 145 applications granted of 198 made.

CALIFORNIA'S production of borax in '95 was about the same as for '94 -11,750,000 pounds. Nevada's also amounted to the same as the previous year, 1,500,000 pounds. The price fell from an average of seven cents per pound in '94 to five cents in '95, "the markets of the world" having been opened to the California and Nevada product by a reduction in the tariff on that article.

MENTION was made last week of the sale of the Gold Drop mine in the Boundary creek district. The purchase was made by the Montreal and British Columbia Prospecting and Promoting Co. The first payment, $1500, has been made; on July 1st a further payment of $6750 is to be made, and the balance, $6750, is to be paid on or before December 1st, a total of $15,000.

THE London *Mining World* editorially argues that the Venezuelan mines are not worth fighting for, that British investors have lost enough money already, and that the best thing they could do would be to hand over the whole country to the Americans. But the London *Mining World* has missed the point—the Americans don't covet the Venezuelan mines, nor a foot of Venezuelan territory.

J. W. KELLEY, of Bodie, was in Virginia, Nev., this week to inspect the mill designed and recently erected by J. H. Kinkead near the C. & C. shaft. He talks if the Kinkead process is suitable a similar one will be put up at Bodie to crush the old Bulwer dump. An illustrated description of the Kinkead process has been in preparation for the last two weeks and will appear in this paper next Saturday.

COLORADO ore dealers note with dissatisfaction a constant tendency toward higher prices for smelter treatment, and say that there is plenty of room for another smelter in Denver. The Colorado smelters that were running last spring at scarcely half their capacity are reported to be in full blast and hardly able to handle all the ore offered them, notwithstanding the fact that most of them have meanwhile largely increased their plants.

ACCORDING to the Reno, Nevada, *Journal*, A. Livingston, of Carson, recently purchased a mining claim in Pine Nut of Wm. Zirn for $50, the understanding being that Zirn would return and put in a blast to burn the lime cap off. He did so and when the smoke cleared away he saw one of the richest pockets yet seen in Pine Nut. He hastened in and endeavored to buy the property back again, but Mr. Livingston refused to sell and is still the owner.

AT the Cariboo and Horsefly hydraulic mines, Cariboo, B. C., during the past season $635,000 has been expended, getting ready for work. J. B. Hobson, in charge of the work, says that the average Chinaman employed by him in ditch work, and paid $1.75 per day, moved three cubic yards of earth per day, while the white laborers in the same ground, paid $2.50 per day, moved on an average seven yards per day. Work will be resumed in the spring, when good monthly returns are expected.

NUMEROUS were the men who were ever ready to tell how they "staked" John W. Mackay. Every California miner knows one or two who were the first that helped him ever before the days that that millionaire miner used to pack a dinner pail. A new crop of those philanthropists is now showing up in the persons of people who were the first to help W. S. Stratton, the millionaire miner of Cripple Creek. If Colorado prove as rich in such reminiscence as California it will turn out a good many who were the original aiders of that much talked of man.

WHILE San Francisco, Alameda and other counties through their boards of supervisors have endorsed the pending hydraulic mining legislation in Congress, Sacramento county's board of supervisors have unanimously resolved that "we are unalterably opposed to the resumption of hydraulic mining, and protest against the passage of any bill committing the government to the resumption of hydraulic mining, or the building of dams at government expense." Still it is hoped Sacramento county will not secede from the State.

IT would pay some one who has the time and ability to get up a prospector's handbook, a compact little 100 pages, giving in handy shape some condensed practical points about practical mineralogy, ore, assaying, etc. Every week there are two or three applications at this office for such a work. The Colliery Engineering Co., Scranton, Penn., some time ago published such a little work, written by a Colorado miner, which, though largely local in its nature, is meeting with good sale. Such a little volume compiled by a Californian would certainly be a good hit at present.

DURING '95 the San Francisco Mint coined $25,427,213, against $25,447,053 in '94. Last year's coinage consisted of $22,870,000 in double eagles, $490,000 in eagles, $560,000 in half eagles, $400,000 in standard dollars, $554,043 in half dollars, $441,170 in quarter dollars and $112,000 in dimes. While the difference between the two years is only $20,000, there was an increase of $419,500 in the gold coinage and a decrease of $439,310 in the silver coinage. Since the establishment of the Mint in this city in April, 1854, the coinage has been as follows: Gold coinage, $870,356,857; silver coinage, $137,786,693; total, $1,008,143,550.

SECTION 11 of Arizona's new mining law says: "The relocation of forfeited or abandoned lode claims shall only be made by sinking a new discovery shaft and fixing new boundaries in the same manner and to same extent as is required in making a new location; or the relocator may sink the original discovery shaft ten feet deeper than it was at date of commencement of such relocation, and shall erect new or make the old monuments the same as originally required. In either case a new location monument shall be erected, and the location certificate shall state if the whole or any part of the new location is located as abandoned property."

SOUTHERN OREGON miners would do well to note the publication notices issued from the Roseburg Land Office of lands for which patents are asked by the Oregon and California Railway Company, comprising the east part of the south half of Section 23, township 39 south, range 1 east, which is in the neighborhood of Neil creek; also part of the west half of Section 7, in township 37 south, range 2 west, near Jacksonville; also parts of a large number of sections in township 35 south, range 4 west, in the Evans Creek district. In another notice of the same date there is listed part of the east half of Section 10, township 38 south, range 1 east, north of Ashland, in Antelope district; also part of Section 31, township 38 south, range 1 east. This is near the Golden Fleece mine, now known as the Edna; also a part of the east half of Section 35, township 39, range 1 east, this within the Ashland Butte timber reserve. On the Siskiyou it comprises nearly all the odd sections in township 40 south, range 2 east, and in the same township south, range 3 east, and the odd sections in a large tract of land in the Dead Indian country. Those interested have only another month in which to make special and detailed protest.

DURING '95 there were 33,789 flasks of quicksilver of 76½ lbs. each received at San Francisco. The receipts for '94 were 26,082 flasks; '93, 26,034; '92, 21,686; '91, 14,556; '90, 13,130. The receipts represent about the annual yield of the State. Twenty years ago the production of California quicksilver mines was 75,000 flasks. During the year there were sent by sea 18,436 flasks, 11,698 to New York, the rest to Mexico, Central America, and British Columbia; there were also shipped east by rail 13,429 flasks. The price in the earlier months of the year was $36.50 per flask, being $40 for the last four months of the twelve. The duty on foreign quicksilver which for many years was ten cents per pound is now seven.

CALIFORNIA still occupies first place in the gold producing States of the Union, and the United States first place in the gold-producing countries of the world. According to the estimate of the Director of the Mint, the gold yield of this nation for '95 was $52,644,000, which, however, is probably about $6,000,000 too great. When exact figures are reached, the total will not be far from $46,000,000. In '94 it was $39,500,000. South Africa's aggregate for '95 will probably be $45,000,000; Australasia third with an approximate yield of $33,000,000; Russia fourth with about $35,000,000. It is probable that last year's gold output of the world aggregates $205,000,000 in value, an increase of $26,000,000 over '94, and that in '96 the total gold yield will be close to $225,000,000.

IN the Old Dominion copper mine, Arizona, at the first level a vein of 20% ore was exposed 3 feet 3 inches in width, which it is expected will continue to surface, yielding a great deal of ore at this point. Ore of the same quality was found at the second level, while at the third level a solid ore top and bottom and side for 40 feet was encountered, some of which assayed 43% copper. It is believed this will extend down through virgin ground to fifth level. At that level a winze was sunk for 43 feet in oxide ore. This will be one of the largest stopes and will yield both oxides and sulphides. Pay ore was found at seventh level and also at eighth level. The main shaft has been sunk 25 feet below the eighth level and another compartment added.

WHAT this paper considers the best mining authority in Colorado furnishes the following regarding the gold and silver yield of that State: "The output for 1894 was as follows: Gold, 513,571 ounces, valued at $10,616,463; silver, 23,747,915 ounces, having a coinage value of $30,704,375 and a market value of $14,721,751; lead, $3,199,175; and copper, $761,575. The output for '95 is conservatively estimated at: Gold, $15,500,000; silver, $12,500 000; lead, $2,850,000; and copper, $850,000. There is a decline in silver, a slight decrease in its companion metal and an increase in copper. The gold output has made a big jump, chiefly due to the fact that Cripple Creek increased from $3,000,000 to $8,000,000. It would seem at the time of this writing that the gold yield of California and Colorado was last year very nearly equal."

PROBABLY the most prominent mining engineer in the world to-day is John Hays Hammond, whose recent arrest at Johannesburg, South Africa, and removal to Pretoria has occasioned so much comment. The arrest was because of his intimate connection with Cecil Rhodes, and the latter's political difficulties with the Transvaal government. Hammond is a Californian, is at the head of many South African mining enterprises, practically directs the movements of over 18,000 men, has nearly twenty mining superintendents, Californians all of them, and has made considerable money in legitimate enterprises. He is of course a shining mark. His arrest and one or two other incidents there emphasize the need of an official American representative to attend to governmental affairs in that country.

DUE acknowledgement is made of a most cordial invitation from Pres't Dennis to attend the convention of the Northwestern Miners' Association in Spokane, Wash., on the 22nd prox. Among other pleasant things, the invitation says: "The object of the convention is for the discussion of mining and science, and to obtain a more intelligent understanding of the needs, legislative and otherwise, of the States of Washington, Montana, Idaho, Oregon and the province of British Columbia upon this topic, all of which territory is embraced within the jurisdiction of this Association. The occasion is one of great importance to the mining interests and will do more to perpetuate the greatness of the work than any other effort heretofore put forth. I have the pleasure to extend to you an urgent invitation to attend, and to address the convention upon some topic of mining. The Association asks that you be its guest of honor, and in doing so will most sensibly appreciate the distinction of your presence. You are also most cordially invited to a seat at the banquet, and there to be one of our honored guests." Organization is necessary for the protection and proper perpetuation of the mining industry, and the Northwestern Miners' Association deserves a meed of success commensurate with the extent of the interests it proposes to represent and foster.

D. F. VERDANAL, in his New York correspondence to the San Francisco *Chronicle*, writes as follows of an old-time Grass Valley mining man and editor: "George D. Roberts, the veteran mine operator, who has been looking for a real good mine property for years—sampling the country from Maine to Alaska to South America—sailed for London last week with 'Eureka!' emblazoned in his colors. 'After looking everywhere for a mine, where do you suppose I found it?' queried George, with a merry twinkle in his eye. 'Why, out in California, on the mother lode, right under my very nose for years. It is a gold property, has been paying handsomely, and will pay bigger with increased facilities. After all, California is the place where you find the gold. Cripple Creek? Oh, yes; big mines there, but more money will be lost in speculation there than will be taken out of the earth. California gold mines have been paying for nearly half a century, and I really believe they have only commenced to open up quartz mines as they should be. I am taking this mother-lode mine over to London for an English syndicate that want all the good gold mines they can get, and they are willing to pay for them.'" George is now waxing along in years, but he doesn't look much older than when, in the early days, he put up and worked the first Grass Valley quartz mill.

## Treatment of Low-Grade Ore.

Written by EDMUND B. KIRBY. M. E., Denver, Colorado.

Notwithstanding the remarkable records of African gold fields, all present developments show that the United States will continue to produce more of the world's gold supply than any other country. It is not so generally understood that mining men have only begun to utilize the great resources of the West in low-grade ores. As metallurgical skill is applied to the various large deposits already known and exposed, it will be found that no new processes are necessary to make many of them yield a handsome profit. All that is required is an intelligent selection and application of some one of the methods already known and in use. It is therefore a matter of interest to describe the principal differences in low-grade ores and the way in which these differences affect the selection of a milling process.

It is well understood that of the two general divisions, "sulphide" and "oxidized ores," the former includes all those forms in which gold was originally deposited in veins. Within reach of the aerated surface waters the sulphide minerals are found more or less decomposed, with their gold contents set free. Nature has here done slowly the very work which would otherwise have to be performed in roasting furnaces.

Various other products, such as iron oxide and the secondary minerals of copper, zinc and lead, also result from this decomposition and seriously affect the milling character of these "oxidized" ores.

In sulphide ores by far the most common gold-bearing mineral is iron pyrite. Copper pyrites, the telluride minerals, zinc blende and galena are also apt to occur and are named in order of their frequency. Most ores consist of ordinary rocks or vein quartz with crystals of ore or several of the above minerals sprinkled through the mass. Unless the ore has been partly oxidized there is no gold present, except what is contained in those crystals.

Now, the investigations of recent years have already established the fact that the gold in a crystal of iron pyrite is generally, and perhaps always, in the metallic state. It is not, however, disseminated uniformly throughout the substance of the crystal. On the contrary, the gold is in the form of thin sheets or delicate films, gilding portions of the surface or filling the microscopic crevices caused by the cleavages of the crystal. In ordinary amalgamation the mercury readily attacks the gold upon all exposed surfaces, but cannot reach that within the cleavage crevices.

If the crystal is shattered to very small fragments by fine crushing or grinding, the fractures always occur along the natural cleavage planes, thus exposing more of the gold fibers. Fine grinding and thorough amalgamation will thus extract most of the gold contents from pyritic ores. Under the practical limits of mill work, however, the sulphur interferes with amalgamation and there is also a large percentage of gold which cannot be reached by the mercury. Pyrites from different mines differ greatly as to the percentage they will yield in this way.

Less is known about the distribution of gold in crystals of blende or galena. Some of it is certainly in the metallic state as fibers in the cleavage planes, but these are either very minute or else the bulk of the gold is uniformly distributed through the mass of the crystal. Fine grinding and amalgamation therefore extracts a much smaller percentage from blende and little or nothing from galena. The gold in copper pyrites and tellurides is generally uniformly distributed and amalgamation is useless upon these minerals.

In ores completely oxidized the gold is not by any means always free milling or within the reach of mercury. This is only true when the liberated gold occurs in particles large enough to be exposed or broken entirely apart from the rock by stamp crushing. But in a large number of valuable gold deposits the oxidized ore yields little to amalgamation.

The old theory of rusty gold, created to account for this difficulty is now known to be a myth. In such cases it is almost invariably found that the trouble is due to the extremely small size of the gold particles. Microscopic measurements have shown that in many ores a large proportion of these particles range from one two-thousandth to one ten-thousandth of an inch in diameter. The smallest grains of rock produced by crushing may therefore be large enough to completely enclose a number of such minute particles and protect them from the action of mercury.

In these cases extremely fine grinding and perfect amalgamation, such as may be secured by milling in pans, will sometimes give a satisfactory yield, but it is generally unnecessary, as in the case of Cripple Creek ores, to resort to wet processes. It is interesting to notice that the gold liberated by the oxidization of iron pyrite is generally coarse enough for ordinary free milling.

Telluride minerals, on the contrary, deposit their gold in the form of microscopic powder which it is impossible to mill in the usual way without very heavy loss. The ores of Cripple Creek are a notable illustration of this. As a matter of fact very few mines have ore which is entirely oxidized. Even during the first few years of operation, while the ore is nominally free milling, it contains more or less original sulphide crystals which have escaped oxidation. This percentage increases with depth and the ore sooner or later passes entirely into unaltered sulphide.

This method of milling must therefore be changed to correspond with the new character of the ore. It is of the greatest importance to a mine owner to provide for this beforehand and arrange to lose as little capital as possible by changing from one process to another.

With a large supply of ore completely oxidized and strictly free milling there can be no question as to the best plant. A modern high-speed stamp mill should be used, with simple battery and plate amalgamation. It ought to be of the California type, because the greatest daily crushing capacity is wanted rather than perfect amalgamation. There is no trouble in saving a satisfactory percentage with such favorable ore. The cost ranges from 35 cents to $1 per ton, according to the size of the mill and its design.

In the usual case where the ore is partly oxidized but also contains a certain percentage of sulphide crystals, these should be separated by adding simple concentrating machines to the California mill. The concentrates are sold to smelters and treated by Plattner combination, the latter plan being adopted in remote places. The cost of freight and smelting charges upon the small bulk of concentrates is here added to the first expense of milling. For instance, if ore milled at an expense of sixty cents per ton yields one-tenth its weight of concentrates and the freight and smelting charges upon each ton of this product is $8, then 80 cents per ton of ore must be added to the sixty cents, making the total expense $1.40 per ton of ore.

When the gold is free but too finely subdivided for the above treatment, the mill is arranged to crush by stamps and amalgamate in pans. These grind the stamp sands very fine and give the most perfect amalgamation possible. The American mill pan is such a thorough amalgamator that it seems to leave no room whatever for improving this operation. If inventors realized its efficiency they would stop trying to design new amalgamators and devote their efforts towards the improvement of other operations in the milling process.

The Gilpin county type of stamp mill was evolved to treat more difficult ores than the above, but little or not at all oxidized. To secure a high extraction they ought to be milled by some one of the more complex processes hereafter mentioned. These, however, require very expensive plants and must treat a large tonnage in order to be cheap. Since the average mine owner has neither the tonnage nor the capital needed, such processes are generally out of his reach. In these cases the simple, cheap and slow Gilpin county stamp mill is a great blessing. It has solved the problem for many a poor mine owner struggling with fortune and put him financially upon his feet. It may not save more than sixty or seventy per cent of the gold, but this is enough if it enables the mine to clear a profit. The Gilpin county mill crushes very slowly, but exceeding fine. The sulphide crystals are broken so small that most of the gold films in the cleavage planes are exposed. Everything is arranged so as to secure the most thorough amalgamation possible with a battery and plates, and in this way even the sulphides yield enough of their gold for profit.

When within reach of the smelter market the impoverished sulphides are then separated and sold. Since they contain only a portion of their original contents, it is no longer necessary to do this carefully, and simple, cheap concentrating machinery like Colorado bumping tables is good enough for the purpose.

It is impossible to either amalgamate or concentrate telluride minerals, and when these are present it is necessary to treat by barrel chlorination or the cyanide process.

If a mine with sulphide ore is able to supply enough tonnage, and the necessary capital can be raised, it generally pays to adopt one of the more complex processes, designed to save a higher percentage of the gold. Of these, combination milling is the cheapest in both first cost and expense of working, and should, therefore, be the first considered. This is merely an improvement on the usual method of amalgamation, followed by concentration. The plant is, therefore, more elaborate and expensive, and is arranged to concentrate out the sulphides first and then amalgamate whatever free gold remains in the ore. The reason for this reversal is that the fine crushing required for amalgamation interferes with the subsequent work of concentration, which is best performed on coarsely crushed ore. Moreover, the presence of sulphides interferes seriously with amalgamation, and it is, therefore, desirable to have them out of the way. In many cases the preliminary concentration secures all the gold and further treatment by amalgamation is unnecessary.

Two general types of combination plants are in use. In one the ore is crushed by stamps to the usual sand size and then treated on vanners or other simple concentrating machines. The sands, now free from sulphides, are then ground fine and amalgamated in pans.

In the second type the ore is crushed by rolls to about bean size. It is then treated in a complete concentrating plant of screens, jigs, hydraulic sizers, buddles, vanners, etc., more or less elaborate, according to the requirements of the case. The tailings from the concentrating department are then recrushed to sand size and amalgamated on plates or in pans. Combination plants of fifty tons daily capacity cost from $30,000 to $60,000, and the expense per ton is also greater; but a much larger extraction is secured.

When the problem cannot be solved by any of the above methods it is necessary to resort to barrel chlorination or the cyanide process. In barrel chlorination all the sulphides must first be removed by roasting before chlorine can act effectively upon the ore. This is more difficult and expensive than ordinary roasting, where a complete removal is not necessary. In ores like those of Cripple Creek, with only one to two per cent of sulphur, this is not a very expensive matter, but when the sulphur amounts to seven to twenty per cent, as in so many gold ores, the cost of dead roasting becomes very heavy and practically bars the use of the process upon ores. Concentrates may be treated notwithstanding their high sulphur contents, because the bulk is so small compared with the original ore that the increased expense is not a serious matter.

Another objection to the chlorination is that no silver is saved, and, since most gold ores also contain silver, the loss from this cause may be serious.

The cyanide process requires no roasting, since the solutions penetrate the cleavage planes of the sulphide crystals and dissolve a large percentage of both gold and silver. Neither process will recover the gold present in coarse flakes and grains. Both require very expensive and carefully designed plants, which may cost $50,000 to $75,000 for fifty tons daily capacity. Chlorination extracts ninety to ninety-four per cent of the gold only, while the cyanide process recovers seventy-five to eighty per cent of both gold and silver. The latter is, therefore, specially adapted to the lower grades of ores, and its expense is about two-thirds that of chlorination. Each process has its own field of application, and the question as to which is best for a given case is not easy to decide.

At present the cyanide process is being applied to ores in three different ways:

First—As an adjunct to the process of ordinary wet stamp milling. The tailings from the stamp mill are further treated in a cyanide department. This is the method in universal use throughout the South African fields. At first the old dumps of accumulated tailings were worked up, and then the cyanide plants were modified to take fresh tailings continuously from the stamp mills. The system has the following advantages: It is the cheapest of the three in cost of plant and expense per ton. All large grains of gold which would escape from cyanide solutions are saved by the amalgamation. Moreover, since many of the mills use concentrating machines, the sulphides are separated in a small bulk, and this is treated with more care and expense than would be profitable upon the ore itself. The disadvantage of the system is that the crushed material flowing as tailings from a wet stamp mill contains such a large proportion of flour-size particles or slimes that the cyanide solutions will not percolate through it. It is, therefore, necessary to separate the sands from the slimes and treat only the former. The slimes, amounting to thirty per cent of the total weight, have to be thrown away. The Johannesburg ores average $12 in gold and the stamp mill amalgamation takes out about sixty per cent of this, or $7, leaving $5 per ton in the tailings. Thirty per cent of these tailings are thrown away as slimes and the remaining sands are subject to cyanide treatment. This extracts seventy per cent of the gold in the sands, making the total recovery $9.50, or about eighty per cent of the gold originally present in the ore. The remaining $2.50 is lost. If it were only possible to treat these slimes effectively by cyanide, this system would be the one best suited to most mines in the United States. A cyanide plant could then be attached with ease to any Western stamp mill and the saving greatly improved. Up to the present such attempts in this country have been failures. Various plans have been proposed to overcome the difficulty, and it is probable that a working plant could now be built to treat slimes.

Second—The ore is crushed in an ordinary dry crushing stamp mill. It is placed dry in vats and the cyanide solutions allowed to percolate through the mass. This system has been tried in New Zealand, Australia and various parts of this country. Its results have, on the whole, been rather unsatisfactory. The trouble is that dry stamp crushing produces so much fine powder that percolation is very difficult and slow.

Third—The ore is crushed dry in a more complicated and expensive plant of rolls and screens. The object of this is to avoid the production of slimes and thus to do away with all the difficulties of percolation. It is a very delicate undertaking to accomplish this without at the same time having the

grains of ore so coarse that the solutions cannot reach their gold contents. The large number of failures which have occurred in the attempts to apply cyanide by this system have made it clear that in order to ensure success it is necessary to have a very expensive plant, designed by the best metallurgical skill.

The best designed and most successful plant in the world for the use of cyanide by this system is that of the Metallic Extraction Company at Florence, Colorado.

The first and third of the systems described are those now approved by the experience of metallurgists. Each one is best adapted to certain conditions and it would be a very expensive error to select the wrong one.

Various districts of the West contain sulphide gold ores of such a character that it is impossible to treat them by any of the above methods. In such cases the pyrites constitute the principal bulk of the ore, and it is impossible to amalgamate, concentrate or treat by wet process at a profit. The Austin process of pyritic smelting will frequently meet the requirements of such cases. The gold and silver are collected in a small bulk of copper-iron matte, which is then shipped to refining works for separation. Little or no fuel is required, since the charge is smelted by the heat produced from the combustion of its own sulphur. A very peculiar and rare combination of conditions, both technical and commercial, are required to make this process pay, but when these are secured it is very effective.

In conclusion, it may be said that the selection of a process is not generally a simple matter. The large number of wrecked mills throughout the West attest the frequency with which mistakes occur. The best treatment can always be determined beforehand by suitable tests, and it is poor economy to omit this safeguard. One great source of danger is the difficulty in securing samples for these tests which really represent the future ore supply. It is also necessary to determine what probable changes will occur in the character of the ore as mining continues.

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THE most important, as well as the commonest, metal of the world is iron. It is almost everywhere in nature. We are bombarded from cosmic spaces by meteorites of nearly pure iron; the spectroscope finds it in stars so distant that the naked eye sees but emptiness in the abysses wherein they burn. It makes a twelfth part of the crust of the earth. Its particles are mingled in the dust of every country road, in the air we breathe, in the water we drink, in the food we eat. It is the great colorist of nature. Even the red of our blood is due to its presence.

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THE directors of the Baltimore Centennial Exposition of 1897 have decided to go ahead with the scheme and to push it vigorously. It is announced that $460,000 of the first $500,000 has been subscribed, and when the balance is raised it is thought that the city and State will each give $500,000 and the United States Government twice as much.

## California Irrigation.

Millions of dollars have been invested in this State in hydraulic mining ditches and canals, and in irrigating works in parts of our State purely agricultural. So many mining scenes have been depicted that by way of variety is herewith portrayed one which bears the same relation to the former that the flume or ditch does to the miner. The scene chosen by our engraver is a check drop in a branch canal in Fresno county, in the great San Joaquin valley, and is a characteristic one, showing the passage of an irrigation canal over the plains at a distance from present horticultural areas. This is a canal out on the open plain, forty miles from its headgate. The allusion shows how extended some of our irrigation enterprises are, for forty miles is not such a great distance as irrigation canals go. The dam is a check drop, put in either to arrest the current to keep it from washing its banks or for the purpose of turning water out into a shallow lateral for adjacent irrigation. Irrigation canals have these check drops in abundance, and often at quite short intervals.

The team in the background is illustrative of plains-crossing with loads of grain on the way to the shipping point. As railroads are multiplying in the San Joaquin, and as navigable canals and electric transportation are among the things of the near future, it is quite likely that these old team outfits may take their places beside the prairie schooners as memories of the early affairs of a well improved and populous region.



IRRIGATION IN THE SAN JOAQUIN VALLEY—A CHECK-DROP IN A BRANCH CANAL IN FRESNO COUNTY.

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IT is frequently asserted that the law of supply and demand makes wages uniform all over a country, at least for some labor. But the average earnings of persons engaged in manufacturing industries show that in Colorado the average pay is $720 a year; Montana, $722; Wyoming, $768; California, $760; New York city, $550; Philadelphia, $492; Massachusetts, $494; Alabama, $376; Mississippi, $310, and North Carolina, $216. Leaving out of consideration the possible influence of the cost of living, competition, the employment of women of and children, it may be possible to explain the differences here exhibited by the fact that the principal manufactures of the South, East and West are dissimilar in kind and quality.

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LOCOMOTIVES intended for express trains require as much "training" in their way, for fast running, as do race horses. Thus the Pennsylvania Railroad company builds its own engines, and those built for express trains are known as class P. When one of these big engines is taken out of the shops to be placed on the road, instead of putting it to the work it is intended for at once, it is run for two or three weeks on some of the local branches, in order to train it, so to speak, for faster running. By this means all the bearings and journals connected with the running gear becomes settled to their work, for, should anything about the new machine not work harmoniously, there is time to adjust the defect.

## Mines, Miners and Monopolies.

Written by J. V. EDMAN.

NUMBER I.

TO THE EDITOR:—The miners of California should and will accept nothing less than the so-called Idaho-Montana bill, substantially as introduced in Congress by Mr. Caminetti in January, 1895; the so-called compromise bill contains nothing that does not strengthen the railroad company in its present policy.

Among all the propositions for the classification of the mineral lands, the Idaho-Montana bill certainly offers the most practical, if not the most just, solution of this question, as strikingly evidenced by the late report of the Mineral Land Commissioners of the Helena district, which fully disproves the predictions of that eminent advocate of the railroad companies, Commissioner Lamoureux, who, in his letter to the Secretary of the Interior of July 30, 1894, says: "The work of a Commission under this (the Idaho-Montana) bill at best would be superficial. To examine thoroughly into the character *of each smallest legal subdivision* of the 30,000,000 acres involved, to publish lists thereof and to take testimony relative thereto, would take years of time, and would entail expense that no one can estimate—an expense which should not be charged to the United States."

If the required classification should take years of time and some millions even of money, it would be a great boon to the common people of the United States and a pillar of safety to a republican Government, so industriously undermined by the great conspiracy, which, ever since the beginning of the Civil War, has been subverting the liberties of the people by providing for the absorption and control by a privileged few of one hundred and twelve million acres of the public domain of the United States under the iniquitous land-grant system.

The people of California know too well the policy pursued by the railroad power of the State—the fraud, corruption and oppression which has marked every period in the history of the Southern Pacific and its affiliated lines; but as yet the great portion of the American people appear to be oblivious of the immense power conferred upon the railroads of the Western States and Territories, and through them on the money power of the country. This is evidenced by the inaction of Congress to enforce the obligations of the land-grant roads and the general ignorance and apathy on the subject to be met with even in the halls of Congress, as it cannot be presumed that the Huntington combination is rich enough to buy up a majority of our national legislature. So far the Acts of Congress and the rules and regulations of the General Land Office bear testimony, obvious to any close observer, that the whole land system relating to the disposal of the mineral lands of the West has been conceived and directed to prevent the acquisition of mineral lands by the individual citizen until the corporations would have

time and opportunity to absorb these lands, as well as much of the agricultural.

Commissioner Lamoureux estimates the land grants to the western railroads to be one hundred and twelve million acres—enough to furnish comfortable homes and subsistence for more than five millions of workers—and of these over twelve million acres had been patented to them up to July, 1894, since which time list after list has been approved and patented to the Southern Pacific and leased lines. Would it have been too much if the representatives of California had demanded in Congress that, pending a settlement of the obligations of the Central Pacific, all the lands granted to that road had been reserved by the Government until all the obligations by that company had been fulfilled to the letter. It would then have been impossible for the Southern Pacific to replete its corruption fund by hypothecating these lands, both actually held and prospective, to other wealthy corporations, intimately connected with the railroad companies, and thus add to the number of their partisans and active supporters in and out of Congress.

Means may yet be devised to control and recover to the General Government and to the people much of the land granted to corporations. As for the absorption of mineral lands, in direct contravention of the plain language of the land-granting acts, the time is now ripe that the American people should declare and enforce the warning, "Hereunto shall ye go, but no farther," and preserve at least thus much or thus little for the legitimate industrial activities and needs of the individual citizen, as opposed to monopolies.

The whole of our public-land system, as applied to the gold and silver-bearing regions of the Western States, may be characterized as a system to promote and perpetuate fraud and perjury, to which end many of the Acts of Congress, and especially the rules and regulations of the General Land Office, appear to be framed, or readily to adapt themselves. The onerous, costly and often vexatious and impracticable rules enforced, and which require repeated proofs by the miner, supported by a number of witnesses, being on the ground and familiar with its actualities, may be contrasted with the wholesale attestation by hired subordinates allowed to a railroad company, as attested by the rules promulgated by the Department of the Interior in July, 1894, as follows: "When the lands selected by the company are within a mineral belt, or proximate to any mining claim, the railroad company will be required to file with the local land officers an affidavit *by the land agent of the company*, which affidavit shall be attached to said list when returned, setting forth in substance that he has caused the lands mentioned to be carefully examined *by the agents and employes of the company* as to their mineral or agricultural character, and that to the best of his knowledge and belief none of the lands returned in said list are mineral lands."

What admirable simplicity and directness in this rule! The land agent lumps several thousand acres in his affidavit on knowledge and belief, and does not even have to go to the expense of hiring perjured testimony, as the individual speculator is compelled to do. The honest miner who actually works his patch of ground must prove location, occupation and valuable improvements made on every twenty-acre tract, and then often wait from two to ten years before his patent will issue. If this is the best that republican principles can do for us, the writer prefers the old Spanish mining laws and regulations or the now prevailing mineral land laws of the British colonies, vexatious as the latter may appear in some of their details.

All the railroad land grants except the mineral lands (coal and iron excepted) from their operation. What, then, is meant by the term "mineral lands," what the manifest intent of these words as used by Congress in the Acts now in force? Simple as they are, different and widely diverse interpretations have been offered us by parties directly interested, and the present definition of mineral lands, as accepted by the General Land Office, may be said to be that evolved by the united efforts of the attorneys of the combined land-grant railroads. This, in brief, may be defined to be: First, the negative evidence "that no land is mineral when any one can be found to swear that in his opinion it is agricultural land." The second or positive evidence accepted is the actual development of a mine on the land, and the production of bullion therefrom, provided always "that no one can be found to make oath that he could have made more out of the ground by raising hypothetical crops thereon." Under this delectable system some of the best mining lands of California are entered every day under the homestead and pre-emption laws, to say nothing of the railroad claims, and the area of mining ground available for the actual working miner is becoming more and more circumscribed every year until the danger is imminent that, within a decade more, or but little over half a century from the first development of gold mines in California, placer mining will cease to exist, and the further expansion of quartz mining be possible only for wealthy corporations, affiliated with, submissive to or dependent upon the controlling money power.

The true meaning and definition of the term "mineral lands" evidently is to be determined by the permanent physical character of the land, and chiefly in its topographical, mineralogical and geological relations, as determined by trained inspection and actual development, in contradistinction to the crude and wavering opinions by interested individuals or corporations. The Interior Department has, within its machinery, one division abundantly able to give its aid in classifying the mineral lands, and so far apparently not controlled by the railroads, as the General Land Office evidently is; and this is the Geological Survey of the United States, among the members of which men can be found intimately acquainted with the mineral and agricultural regions of California, and fully able to give unbiased and reliable opinions. Prominent among them, as yet actively in the field, may be mentioned Messrs. Becker, Turner and Lindgren. We have also in California many practical and working miners—men of life-long experience in all departments of mining as here practiced, and with a clear understanding of structural geology, and with that sense of perception of physical evidences pertaining to a mining region, which is innate or acquired only by long and varied experience. From their ranks accurate testimony can be had on disputed or doubtful points.

A Commission appointed mainly by the General Government, and consisting of one member of the Geological Survey, together with California miners of experience, and including also a prominent and able representative of the farmers, would be able to classify and report upon the mineral lands of California; and the same system would apply to other States and Territories. The physical features of California are so marked and prominent, and consequently the distinction between mineral and agricultural lands generally so apparent, that it would be comparatively easy to segregate the mineral lands of this State, except perhaps those of southern California.

These characteristics and their bearing upon the question at issue will be presented in another paper.

Meadow Valley, Cal., Jan. 11, 1896.

## Notes on Gold Milling in California.

NUMBER X.

By E. B. PRESTON, M. E., Field Assistant State Mining Bureau.*

The following is a description of an improved canvas plant erected and operated in Amador county, by the patentee, Mr. Gates. In this case, the pulp and waste water are conducted from the mill in a flume to the plant, and there divided into two equal streams by the insertion of an adjustable division plate in the flume. The divided pulp passes into boxes 4 feet long and 1 foot wide, and having steel screen bottoms with one-eighth and one-sixteenth inch perforations, set on a reversed grade of 6 inches to the box. The object of these screens is to prevent any chips, leaves, lint, or foreign substance from passing into the sizing-box beneath which consists of a wooden V-shaped trough, 6 feet long, 15 inches broad at the top and 2 inches in the bottom, constructed of 1½-inch boards. A piece of canvas is tacked on the bottom for packing; underneath is nailed a piece of scantling, 4 inches by 6 inches, at one end of which, reaching within 2 inches of the end of the box proper, a slot, 14 inches long and 2 inches broad, is cut: here a flattened, galvanized iron funnel ending in a 2-inch pipe, is attached. The pulp falls through the screen with some force and is considerably agitated in the separator-box. Naturally the coarser and heavier particles have a tendency to settle toward the bottom. Were the outlet there large enough, all the pulp would pass down and out. Its size of 2 inches causes the box to fill to the height of a sluice-box in the end, through which the finer pulp flows to the canvas-tables. To facilitate the separation, a device is placed in the lower end, consisting of an iron pipe, ½ inch inside diameter, connected with the main pipe above the screen, and divided into two sections, which are connected by rubber hose for ready detachment. The lower 6 inches of the iron pipe has small perforations, through which clear water is ejected, causing an agitation of the pulp. The end of the pipe is stopped with a wooden plug, easily removed. The agitation at the end of the pipe causes the fine material to be carried upward and into the sluice at the end of the separator-box. Only coarse sand passes through the bottom pipe, and on examining this with a magnifying glass, very few particles of sulphurets are discernible. This separator works well, and disposes of a lot of coarse, valueless material that would otherwise interfere with the subsequent working of the slimes on the canvas platforms. The fine pulp flowing from the top of the separator is conducted in a sluice to a broad, flat box, in which the stream is divided by partitions into ten separate currents, each terminating over a canvas-table, ten in a row. The pulp goes over a spreader made of strips of galvanized iron, ¾ inch in height, radiating from a common center to the farthest side of the table, which is 12 feet wide. These strips are nailed to an inclined board extending across the canvas-table, having an iron strip 1 inch high, fastened to the lower end, perforated or notched, with indentations one-sixteenthinch deep and 1 inch long, affording a perfect distribution. Twenty tables are arranged in two rows of ten each, covered with canvas laid crosswise and overlapping about 2 inches. These tables have a grade of 1½ inches to the foot, are 13 feet long and 12 feet wide. After receiving the flow for an hour, it is shut off from the table and a flow of clear water turned on, which in a few minutes washes away the sand, when it is also stopped; then with a hose ending in a flat nozzle, the accumulated sulphurets are washed from the canvas into a trough below, extending along the base of the entire series. In order to secure sufficient fall for this sluice, each succeeding table is set 4 inches lower than its predecessor, giving 40 inches fall on 125 feet of sluice length. Two extra tables are arranged, one at the end of each row, to take up the surplus flow during the time one of the tables is shut off, to avoid overloading, as each table already carries the proper amount of pulp. The effectiveness of the canvas tables depends on maintaining an even flow of pulp during a given time; it will not do to overload them. All the pulp that leaves the table is considered waste, and is collected in a flume, to be used a short distance off as power on an overshot wheel, by means of which the patentee runs a vanner of his own invention. This waste water is caught up again and used on a second wheel, which also runs a vanner. The sulphurets washed from the table flow through a sluice to a box outside the building, 12 feet long, 2 feet wide, and 12 inches deep, with a cross piece 2 feet from upper end, reaching within 2 inches of the top of the box. In this upper section the coarser grade of the material is retained, while the finer flows over the weir. The two grades are shoveled out separately and placed in separate V-shaped boxes, over which are perforated iron pipes, from which small streams of water trickle, gradually carrying the pulp down and passing it through sluices onto the spreaders of separate vanners. These two machines work with different motions, doing excellent work on this impalpably fine stuff. The slimes flowing from the washing-boxes beneath these vanners are conducted, with the overflow of the two compartment boxes above referred to, to two other canvas-tables, below which they are allowed to escape as waste; not that they have given up all the precious metal they carried, but because the point is reached where it is more economical to lose the remnant than to attempt to save it.

As the slimes from most of the canvas plants, as usually operated (especially where the ore crusued carries a heavy percentage of sulphurets, or has been stamped with a high discharge), are still valuable in gold, they can be conveyed to so-called slime-settlers, or tanks. These tanks, for there are generally several, are placed below the canvas platforms, and are about 2 feet deep, 2 feet wide, and 12 feet to 20 feet long; they are divided into sections of 2 feet square, by 2-inch plank set on edge, extending alternately from each side, leaving an opening 4 inches wide and 2 feet deep, causing the slime water to take a serpentine course in passing through. The tanks stand level, and the slimes, in settling, form their own grade as they enter at one end of the tank, and, passing through the successive sections, issue at a diagonally opposite point only slightly clouded. These tanks require cleaning only at long intervals.

Up to the present time, the concentrates in the California mills have been generally handled by the chlorination process, to free them from their gold, but within the last year several plants are successfully working them by the cyanide process.

The tendency in the construction of mills at the present day is to a substitution of steel for iron, where possible, and to an increase in the weight of the stamps.

A greater application of grinding and amalgamating machines, in place of or subsidiary to the stamp-mill, is also noticeable, the most popular of which will be shortly described.

For a more thorough appreciation and knowledge of the work done by mills, records should be kept, by the amalgamator, of all transactions connected with mill work, showing every item, loss of time, consumption of mercury, iron, fuel, water, amount of rock treated, etc., in addition to the records kept in the assay office. This is already being done to some extent, but such records should be kept in the small mills as thoroughly as in the large ones.

(*To be Continued.*)

* Bulletin No. 6, California State Mining Bureau.

## Chicago Mining Commissions.

H. Burkholder, LaSalle and Monroe streets, Chicago, Ill., furnishes the following section from the constitution of the new Chicago Mining Exchange and fixes the rates of commissions to be charged:

Commissions shall be charged to all non-members and paid in all transactions in the purchase or sale of stocks, the term "stocks" including stocks, bonds and securities, and the minimum rates will be as follows:

| | *Per 100 Shares.* |
|---|---|
| Stock selling at 25c and under | $ 25 |
| Stock selling at over 25c and under 50c | 50 |
| Stock selling at over 50c and under $1 | 1 00 |
| Stock selling at over $1 and under $2 | 2 00 |
| Stock selling at over $2 and under $5 | 3 00 |
| Stock selling at over $5 and under $10 | 5 00 |
| Stock selling at over $10 and under $20 | 6 25 |
| Stock selling at $20 or over | 12 50 |

## Annual Report of Precious Metals.

From JNO. J. VALENTINE, President Wells, Fargo & Co

The following is our annual report of precious metals produced in the States and Territories west of the Missouri river (including British Columbia) during 1895, which shows in the aggregate: Gold, $48,667,383; silver, $35,274,777; copper, $27,052,115; lead, $7,170,367. Total gross result, $118,164,642. The "commercial" value at which the several metals named herein have been estimated is: Silver, 65 cts. per oz.; copper, 11 cts. per lb.; and lead, $3.23 per cwt.

Allowance must always be made for probable variations from reported figures, by reason of constantly increasing facilities for transporting bullion, ores and base metals from the mines outside of the express and the difficulty of getting entirely reliable data from private sources. Estimates obtained in this way are liable to be exaggerated and are, to a considerable degree, guess work; but with some modifications on this account, made herein, the general results reached, while only approximately correct, may be accepted as the closest approximation possible under the circumstances.

| States and Territories. | Gold Dust and Bullion by Express | Gold Dust and Bullion by Other Conveyances | Silver Bullion by Express | Ores and Base Bullion by Freight | Total. |
|---|---|---|---|---|---|
| California | $10,940,400 | $3,063,617 | $157,320 | $286,575 | $14,447,912 |
| Nevada | 1,230,735 | 319,581 | 662,647 | 359,050 | 2,581,013 |
| Oregon | 1,509,785 | 150,000 | 102,645 | ..... | 1,852,430 |
| Washington | 314,817 | 35,000 | 202,650 | ..... | 552,467 |
| Alaska | ..... | 1,454,420 | ..... | 15,000 | 1,469,420 |
| Idaho | 2,521,000 | ..... | 2,723,646 | 2,182,252 | 7,426,898 |
| Montana | 1,500,000 | ..... | 9,425,000 | 23,907,500 | 37,832,500 |
| Utah | 647,405 | 704,785 | 1,110,767 | 6,753,005 | 9,222,052 |
| Colorado | 13,386,271 | ..... | 12,888,401 | 2,270,987 | 28,545,659 |
| New Mexico | 256,995 | 1,321,300 | 293,881 | 627,710 | 2,499,886 |
| Arizona | 1,206,503 | 1,230,069 | 160,019 | 4,756,185 | 7,352,776 |
| Dakota | 3,475,785 | ..... | 175,000 | 38,000 | 3,688,785 |
| Texas | ..... | ..... | 380,300 | 7,040 | 387,340 |
| Wyoming | 32,500 | ..... | 1,750 | ..... | 37,250 |
| British Columbia | 267,654 | ..... | ..... | ..... | 267,654 |
| Totals | $40,388,611 | $8,278,772 | $28,392,935 | $41,204,324 | $118,164,642 |

The gross yield for 1895, shown above, segregated, is approximately as follows:

| | | |
|---|---|---|
| Gold | 41.19 | $48,667,383 |
| Silver | 29.85 | 35,274,777 |
| Copper | 22.80 | 27,052,115 |
| Lead | 6.07 | 7,170,367 |
| Total | | $118,164,642 |

ANNUAL PRODUCTS OF LEAD, COPPER, SILVER AND GOLD IN THE STATES AND TERRITORIES WEST OF THE MISSOURI RIVER, 1870-1895.

| Year. | Production as per W. F. & Co.'s Statements (including amounts from British Columbia and West Coast of Mexico). | Product after deducting amounts from British Columbia and West Coast of Mexico. | The net products of the States and Territories west of the Missouri river, exclusive of British Columbia and West Coast of Mexico, divided, are as follows: Lead. | Copper. | Silver. | Gold. |
|---|---|---|---|---|---|---|
| 1870 | $54,000,000 | $52,150,000 | $1,080,000 | ..... | $17,320,000 | $33,750,000 |
| 1871 | 58,284,000 | 55,784,000 | 2,100,000 | ..... | 19,286,000 | 34,398,000 |
| 1872 | 62,236,959 | 60,351,824 | 2,250,000 | ..... | 19,924,429 | 38,177,395 |
| 1873 | 72,258,693 | 70,139,860 | 3,450,000 | ..... | 27,483,302 | 39,206,558 |
| 1874 | 74,401,045 | 71,965,610 | 3,800,000 | ..... | 29,689,122 | 38,466,488 |
| 1875 | 80,880,057 | 76,703,433 | 5,100,000 | ..... | 31,635,239 | 39,968,194 |
| 1876 | 90,875,173 | 87,240,850 | 5,040,000 | ..... | 39,292,924 | 42,886,935 |
| 1877 | 98,421,754 | 95,811,582 | 5,085,250 | ..... | 45,846,100 | 44,880,223 |
| 1878 | 81,154,622 | 78,276,167 | 3,452,000 | ..... | 37,248,137 | 37,576,030 |
| 1879 | 75,340,501 | 72,688,888 | 4,185,769 | ..... | 37,032,857 | 31,470,262 |
| 1880 | 80,167,030 | 77,232,512 | 5,742,300 | $898,000 | 38,933,055 | 32,559,067 |
| 1881 | 84,564,417 | 81,198,474 | 6,361,302 | 1,195,000 | 42,987,613 | 30,653,059 |
| 1882 | 92,411,835 | 89,207,549 | 8,008,155 | 4,055,037 | 48,133,039 | 29,011,318 |
| 1883 | 90,313,612 | 84,630,212 | 8,163,550 | 5,683,921 | 42,975,101 | 27,816,640 |
| 1884 | 81,075,954 | 81,633,835 | 6,834,091 | 6,086,252 | 43,529,925 | 25,183,567 |
| 1885 | 90,181,260 | 87,311,382 | 8,562,991 | 7,838,036 | 44,516,599 | 26,393,756 |
| 1886 | 103,011,761 | 100,160,222 | 9,185,192 | 9,276,755 | 52,136,851 | 29,561,424 |
| 1887 | 104,645,959 | 103,327,770 | 9,631,073 | 10,362,746 | 50,833,884 | 32,500,067 |
| 1888 | 114,341,592 | 112,605,569 | 11,263,630 | 18,261,490 | 53,152,747 | 29,987,702 |
| 1889 | 127,677,836 | 126,723,384 | 14,503,323 | 14,703,763 | 64,808,637 | 32,527,661 |
| 1890 | 127,166,410 | 126,804,855 | 11,509,571 | 20,569,092 | 62,930,831 | 31,795,361 |
| 1891 | 118,237,441 | 117,946,505 | 12,385,780 | 13,261,663 | 60,614,004 | 31,685,118 |
| 1892 | 111,531,700 | 111,250,508 | 11,432,947 | 19,370,516 | 50,967,891 | 29847,441 |
| 1893 | 104,081,501 | 103,827,623 | 7,756,040 | 23,631,339 | 38,491,521 | 33,948,723 |
| 1894 | 105,113,489 | 104,844,112 | 8,223,513 | 22,276,294 | 28,721,014 | 45,623,291 |
| 1895 | 118,164,642 | 117,896,088 | 7,170,367 | 27,052,115 | 35,274,777 | 48,390,729 |

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, $31,023,480; from San Francisco, $12,933,307. Total, $43,956,787, as against $60,022,858 last year. Pounds Sterling estimated at $4.84.

### UNITED STATES OF MEXICO.

STATEMENT OF THE PRODUCT OF GOLD AND SILVER IN THE REPUBLIC OF MEXICO, REVISED AND CORRECTED FROM 1877 TO 1895. VALUES UPON MINTAGE BASIS.

| Years. | Gold. | Silver. | Total. |
|---|---|---|---|
| 1877-1878 | $747,000 | $24,837,000 | $25,584,000 |
| 1878-1879 | 881,000 | 25,125,000 | 26,006,000 |
| 1879-1880 | 942,000 | 26,800,000 | 27,742,000 |
| 1880-1881 | 1,013,000 | 29,234,000 | 30,247,000 |
| 1881-1882 | 937,000 | 29,329,000 | 30,266,000 |
| 1882-1883 | 956,000 | 29,569,000 | 30,525,000 |
| 1883-1884 | 1,055,000 | 31,695,000 | 32,750,000 |
| 1884-1885 | 914,000 | 33,226,000 | 34,140,000 |
| 1885-1886 | 1,026,000 | 34,112,000 | 35,138,000 |
| 1886-1887 | 1,047,000 | 34,600,000 | 35,647,000 |
| 1887-1888 | 1,031,000 | 34,912,000 | 35,943,000 |
| 1888-1889 | 1,040,000 | 40,706,000 | 41,746,000 |
| 1889-1890 | 1,100,000 | 41,500,000 | 42,600,000 |
| 1890-1891 | 1,150,000 | 43,000,000 | 44,150,000 |
| 1891-1892 | 1,275,000 | 45,750,000 | 47,025,000 |
| 1892-1893 | 1,400,000 | 48,500,000 | 49,900,000 |
| 1893-1894 | 1,425,000 | 47,250,000 | 48,675,000 |
| 1894-1895 | 4,750,000 | 54,225,000 | 58,975,000 |
| Totals | $22,689,000 | $654,370,000 | $677,059,000 |

EXHIBIT OF COINAGE OF GOLD, SILVER AND COPPER, IN THE REPUBLIC OF MEXICO, FROM THE 1st OF JULY, 1873, TO THE 30th OF JUNE, 1895.

| Years. | Gold, Dollars. | Silver, Dollars. | Copper, Dollars. |
|---|---|---|---|
| 1873-1874 | $866,743 | $18,816,067 | $15,066 |
| 1874-1875 | 862,630 | 19,789,358 | 21,712 |
| 1875-1876 | 809,501 | 19,451,054 | 30,654 |
| 1876-1877 | 695,550 | 21,115,128 | 9,065 |
| 1877-1878 | 651,558 | 22,084,503 | 11,364 |
| 1878-1879 | 658,306 | 22,162,987 | 16,300 |
| 1879-1880 | 821,826 | 21,018,528 | 14,065 |
| 1880-1881 | 402,068 | 21,617,395 | 12,258 |
| 1881-1882 | 452,580 | 25,146,260 | 11,972 |
| 1882-1883 | 407,600 | 24,883,021 | |
| 1883-1884 | 326,698 | 25,377,379 | |
| 1884-1885 | 421,250 | 25,840,078 | .... |
| 1885-1886 | 425,000 | 25,850,000 | |
| 1886-1887 | 410,000 | 25,000,000 | |
| 1887-1888 | 300,000 | 26,711,000 | |
| 1888-1889 | 305,000 | 25,274,500 | |
| 1889-1890 | 243,208 | 24,328,326 | |
| 1890-1891 | 308,000 | 24,238,000 | ..... |
| 1891-1892 | 291,040 | 25,527,000 | |
| 1892-1893 | 361,672 | 27,169,876 | |
| 1893-1894 | 553,078 | 30,185,611 | .... |
| 1894-1895 | 545,238 | 27,628,981 | .... |
| Totals | $10,905,294 | $534,946,902 | $203,296 |

SUMMARY.

| | |
|---|---|
| Totals—Gold | $10,905,294 |
| Silver | 534,946,902 |
| Copper | 293,297 |
| Grand Total | $546,145,492 |

EXHIBIT OF THE COINAGE OF MEXICO FROM THE ESTABLISHMENT OF THE MINTS IN 1537 TO THE END OF THE FISCAL YEAR OF 1895.

| Colonial Epoch. | Gold. | Silver. | Copper. | Total. |
|---|---|---|---|---|
| Unmilled coin from 1537 to 1731 | $8,497,950 | $752,067,456 | $200,000 | $760,765,406 |
| Pillar coin, 1732 to 1771 | 19,889,014 | 441,620,211 | ..... | 461,518,225 |
| Bust coin, 1772 to 1821 | 40,391,477 | 888,563,989 | 342,893 | 927,298,329 |
| Independence. | $68,778,441 | $2,082,260,656 | $542,893 | $2,151,581,960 |
| Hurbide's Imperial Bust, from 1822 to 1823 | $557,302 | $18,575,569 | ..... | $19,132,961 |
| Republic Eagle—1824 to 30th June, 1873 | 45,040,628 | 740,246,405 | $5,235,177 | 790,522,290 |
| Republic. | $45,598,020 | $758,822,054 | $5,235,177 | $809,655,251 |
| Eagle coin, from 1st July, 1873, to 30th of June, 1895 | $10,905,294 | $534,946,902 | $203,296 | $546,145,492 |

SUMMARY.

| | |
|---|---|
| Colonial Epoch—from 1537 to 1821 | $2,151,581,960 |
| Independence—from 1822 to 1873 | 809,655,251 |
| Republic—from 1892 to 1895 | 546,145,492 |
| Total | $3,507,382,703 |

It will be observed that in current product—both gold and silver—Mexico shows a continued increase.

## Venezuela, Its Industry, Mining and Commerce.

Written by I. B. STORCH, M. E.

The Republic of Venezuela is one of the most beautiful tropical countries in the equatorial zone of South America, extending from 1.7° to 12° Lat. N., and situated on the southern shore of the Caribbean Sea. The climate is delightful, with the exception of the lowlands on the Rio Orinoco, near and at the coast. The interior and the mountains are blessed with the healthiest and most agreeable climate of the South American continent.

Venezuela is encircled by mountains, northwest extending the grand Sierra Madre de Merida to the height of 15,255 feet, connecting with the coast range at Barquesimeto (5495 feet) and embracing a wide plain, while southeast the Sierra Tarima, with the peak of Maraquaca (8352 feet) extending to the east and forming the highlands of Guiana, the country in dispute.

The mountains are partly thickly covered with wood and extensive, impenetrable forests, with luxuriant, lively-green foliage of all shading, numberless palm trees, shrubbery, plants, flowers with blossoms of all tints, size and fragrance, blooming all year around, are covering the shores of the Orinoco.

The savanas in the interior—a grass-land with sparingly scattered trees—resemble in the springtime the northern meadows; towards the end of the dry season looking more like thinly-sowed grain fields.

The llanos are endless plains, bare of trees, partly deserts and partly inundated by the equinoxial storms.

The principal river of Venezuela is the Orinoco, with its tributaries, the Apure, Meta, Guaviari, Cusiquaire, then the Rio Cuyuni (Esequibo).

The large lake, Maracaybo, is connected with the gulf of Venezuela; the lake Valenzia is near the seashore, and many smaller lakes are to be found in the interior.

The climate is tropital, with two seasons, the dry and the rainy season (from April to October). The coast is very hot, and so are the lowlands of the Orinoco. The higher region is mild and healthy; the average temperature never exceeds 60° F. Frequent and sometimes destructive earthquakes are unwelcome visitors.

The republic consists of the federal district of Caracas, the State capital, and nine States: Bermudez, Bolivar, Carabolo, Faleon, Lara, Los Andes, Miranda, Zamora, Zulia. besides the Territores, Amazonas, Colon, Delta, Goajara and Yurnary. The area is 566,159 square miles, with a population of 2,121,988 (fifty-two per cent of which are females - census of 1891), a mixture of negroes, Indians, whites and mulattoes. The colored race is predominant. Full-blood Indians inhabit the Territories of Goajara and Guiana. According to the census of 1892, there were 34,916 foreigners in Venezuela—11,544 Spanish, 4041 English, 3237 Italian, 3206 Dutch, 2186 French, 1171 German, 204 Danish, 8729 Colombian, 179 Americans (United States).

The agricultural productions include principally coffee, cacao, sugarcane, cotton, tobacco, indigo, maiz, cassava, bananas, potatoes, wheat and various medical herbs and roots (remember the Angostura bitters). Venezuela raises a large number of cattle, horses, mules, burros, hogs, sheep and goats. The general industry is still in its infancy, but begins now gradually to develop.

The mining industry is rather neglected and is the question of future times. The annual production of gold averages about 180,000 ounces; copper, 30,000 tons. The salinas of Araya supply the country with fine salt, while natrium is produced at the Laguna Luganilla. Guano-phosphate is plentiful on the island of Orchilla. Extensive coal fields are awaiting their development, save a very few operated on a small scale. The large gold and copper mines are operated with English and German capital, and they have paid handsome divideuds for years. Venezuela is supposed to be extremely rich in minerals and mineral-bearing veins, but prospecting is very difficult on account of the thick underwood, the impenetrable bushes of the gigantic tropical vegetation and the entangled network of milliardes of roots, covering entirely the formation and croppings. There is no chance for miners getting work. The mint is in Caracas, and the standard coin is the "bolivar," about twenty cents U. S.

The El Dorado of Venezuela are the rich gold fields of Caratal, 154 miles southeast of Angostura (Bolivar) on the Rio Yurnary, a tributary of the Orinoco. Bolivar is the old capital city of the Venezuelan Guiana. This department is formed of the State of Bolivar, the Territory of Yurnary and part of the Territories Alto Orinoco and Amazonas of the united republic of Venezuela. The area of Guiana is calculated at about 360,000 square miles, with 90,000 people. The largest part of the territory is inhabited by free and independent Indians, about 20,000, and they are scattered all over the country.

Venezuela is governed by a President and eight ministers, who are elected for two years; also by a federal counselor, who is elected by the Congress. The Congress consists of twenty-seven members, no member being under the age of thirty years, and all born in the country. There are three from each State. The Legislature consists of fifty-seven members, none being under twenty-one years old. Both of these bodies are elected by the people for four years. The President and ministers are elected by the executive corporation. Every State has equal regulations, laws and rights, and the Federal Supreme Court is in the capital city of Caracas, the seat of the government.

Fruitvale, Cal., Jan. 13th, 1896.

## Native Labor in South African Gold Mines.

Discussing the question of "Labor and the Gold Industry," the South African *Mining Journal* says that 45,000 natives are at present working in the gold mines on the Rand, another 5,000 in the coal mines at Boksburg, another 15,000 in Johannesburg and along the reef employed in general work, the total being 65,000 men for the Rand alone. Other mining centers employ 10,000 men, and 25,000 must be at work among the Boer farmers, making the present total labor demand of the Transvaal equal to 100,000 men. * * * * To insure prosperity, the Rand has to face the difficulty created by the fact that wages must be reduced during the next five years in the face of a trebled demand.

The native population of the Transvaal is estimated at 700,000; but, placing it as high as 800,000, and allowing one able-bodied man for every six inhabitants, a total available supply of 130,000 laborers is arrived at as the approximate maximum to be obtained from within the State borders if every man were constantly employed. But, as only a small fraction of this number is at work at any one time, it is clear that only by a wholesale importation of labor can any solution of the difficulty be reasonably anticipated.

LAST Tuesday the Geographical Society elected its officers as follows: President, Professor George Davidson; vice-president, Ralph C. Harrison; second vice-president Irving M. Scott; third vice-president, Charles L. Laylor; recording secretary, John Partridge; home corresponding secretary, Jeremiah Lynch; foreign corresponding secretary, Mark Sheldon; directors—Professor George Davidson, Charles L. Taylor, Harry Durbrow, John Partridge, E. J. Bowen, Louis L. Nelson and John Dolbeer; counselors—Hon. Ralph C. Harrison, Hon. Jeremiah Lynch, William Hood, Charles Goodall, Mark Sheldon, Dr. F. Stevens Cook, James F. Houghton, Gustave Niebaum, Senator George C. Perkins, Henry Lund, Irving M. Scott, Adolph Sutro.

# Scientific Progress.

## Hints in Regard to Tellurides.

Written by DR. RICHARD PEARCE, Manager Boston and Colorado Smelting Co.

At the present time, owing to the discovery of gold in Cripple Creek in combination with tellurium, prospectors are on the search for similar conditions in other districts, and it has occurred to me that a few hints in regard to tellurides might be of some value.

Tellurides proper are rarely found to exist near the surface of lodes that may contain them in depth. This is due to the fact that tellurium is susceptible to oxidizing action like iron pyrites and other minerals when they are exposed to weathering influences.

This weathering action, in the case of tellurides, has the effect of converting the tellurium into an oxidized form, which combines with oxide of iron and seldom shows any evidence of its existence, except in rare cases, when the ore is exceedingly rich, and then the oxide of tellurium appears as a yellowish-brown stain on the rock.

The gold resulting from the oxididing change occurs as a brownish powder, and does not possess the properties of gold found under other conditions. It has little or no luster, and is so light in weight and spongy that the ordinary process of panning fails in most instances to indicate its existence. The ordinary method of assay will, however, prove its presence, and this should be done by some assayer who is not only qualified by experience to make the assay, but whose honesty is beyond question. Prospectors will do well to give a wide berth to the quack assayer, who has some particular method of his own, or what he is pleased to call a "chemical analysis" process, which he claims is the only true method for determining the value of an ore.

These frauds are scattered all over the country and are often the cause of no little disappointment to the honest prospector. It sometimes happens that a prospector is so far away from a reliable assayer that it is impossible for him to ascertain whether the ore contains gold or not when the presence of tellurium is suspected.

A very simple test, requiring no particular skill, can be used to determine whether or not tellurium is present in an oxidized form; for if it is found that tellurium is present, it is pretty safe to presume that gold accompanies it. This test, which I will give here, is one which I recommended in a paper read before the Colorado Scientific Society some two years ago, and was the result of some investigations on oxidized Cripple Creek ores.

Fifty grammes of the fine pulp ore are treated with dilute hydrochloric acid, consisting of equal parts of acid and water. The mixture is heated to boiling and filtered, and to the filtrate is added a solution of stannous chloride. The tellurium, if present, will immediately be precipitated in a black flocculent form as metallic tellurium; if its quantity is small it is best to heat the solution, which aids the separation. It must, however, be remembered that this test is only applicable to ores which contain the tellurium in an oxidized form, and is of no value in other cases.

Below the water line the tellurides proper occur, and in Cripple Creek they are represented by the minerals sylvanite and calaverite. Sylvanite is as white and lustrous as pure silver, and contains, when pure, about twenty-seven per cent gold. Calaverite has a slight yellow appearance, resembling somewhat a pale variety of iron pyrites, and contains about forty per cent of gold.

The presence of tellurium does not in every case prove the existence of gold, but I think it may be said to be the rule at Cripple Creek. Boulder county has produced what is termed native tellurium and telluride of lead (altaite) which contain no gold whatever, and I have known of the occurrence of telluride of bismuth (tetradymite) in Montana containing little or no gold, but these examples are rare. The occurrence of fluorite of a purple or amythestine color, so characteristic of Cripple Creek ores, may be regarded as a favorable indication of the coexistence of tellurides. This peculiar association is well marked in other districts, such as Boulder county, Colorado, and in the tellurium gold ores of South Dakota, so that it indicates some sort of close kinship between the two minerals, or rather that they owe their existence to some one common origin.

The distribution of tellurium is infinitely more extensive than is generally supposed, but its importance as a mineralizer of gold has not been recognized to any great extent in connection with important gold deposits.

Careful investigation has proved its existence in localities where its presence had not hitherto been suspected. Recent examinations have shown that the gold deposits in the so-called Potsdam sandstone of South Dakota, and that of the famous Mercur mine in Utah, owe their importance to gold in combination with tellurium, so that this element which, until recently, has been regarded as occurring in few localities may claim a far more intimate relationship with gold than was ever supposed.

## Geological Maps.

A series of maps is in progress under the auspices of the United States Geological Survey the use of which cannot fail to exert an important influence upon all industries in the least dependent upon the treasures of the earth. When the series is completed, which will be some considerable time in the future, every district in the entire country will be covered. The following description gives an adequate idea of the maps and suggests some of the uses to which they may be put by business men.

As the maps are now appearing, each district under consideration is represented by several map sheets, and the whole is called a folio, is 19x22 inches in size, and is bound in heavy manila paper. So far the MINING AND SCIENTIFIC PRESS has received three of those folios. On the cover is the name of the map, as the Jackson or the Livingston folio, the sheet being named after some feature shown upon it. Inside the cover is an explanation, in clear and simple language, of the geological map of the United States, of which the folio forms one sheet. This is followed by a description of the geography, geology and mineral resources or soils represented in the particular sheet, and this account, written for all, is given in untechnical language as far as possible. The descriptions are specially prepared for the public, and there is no doubt that these folios may be used to advantage in geographical school instruction in the regions to which they apply.

At the Geographical Congress in London recently several distinguished geographers expressed their opinion that our topographical map sheets are the finest of their class produced by any nation. All water features are in blue, the hills are in brown, contour lines show topographic forms and heights, and names, roads, towns, and so on are in black. The next sheet is the same basal map overprinted with the geological colors, showing the surface extent and position in the embraced area of the various rock formations. This sheet is entitled Aerial Geology, and the next map of the same area is called Economic Geology, and differs from the preceding chiefly in the fact that the rock masses, which are of special importance from their yield of iron, gold, etc., are printed in strong, and the other rocks in subdued, colors. These two maps show the surface only, but the next sheet, entitled Structure Sections, takes the map student down among the under formations, perhaps a half mile, more or less, and shows him what the geologists believe they have learned about this deeper lying portion of the earth's crust. The last sheet of the folio is a diagram bearing the title Columnar Sections, and illustrating the geological age and thickness of the rock masses under investigation.

For the present the edition of these folios is 5000 copies. The price of those thus far issued is 25 to 50 cents a folio.

# Mechanical Progress.

## The Art of Assaying.

Written by PROF. E. M. WADE.

The art of assaying is of very ancient origin. Properly, the term is applied to the quantitative determination of the metallic elements by means of fire, fluxes and crucibles—process called commonly the "dry assay" in contradistinction to the methods with the use of acids and other liquid ingredients. The term now is often used to designate either process—"wet" or "dry." The subject of this article will be that of the dry assay. The metals now most commonly determined by this method are gold, silver and lead, the other elements being most satisfactorily determined by means of wet methods, or a combination of the two. We will now confine the subject further to that of the gold and silver assay. The process in general consists in "fluxing" off the gangue matter and base elements with borax, soda, niter, litharge and other substances, and collecting the precious metals alloyed with a small button of lead, and then burning off the lead in a "cupel." The employment of any or all of the above substances, and the quantity, depends upon the nature of the ore under treatment. Here comes in the judgment and experience of the assayer. These substances are chiefly employed in the crucible process, which is most convenient for the gold assay, a large quantity of ore being capable of treatment in one operation. Such is often necessary on account of the relatively minute quantity of gold extracted, sometimes almost invisible, and its uneven distribution through the rock. The crucible is a small pot made of fireclay. The ore is weighed out—generally about an ounce—mixed with the fluxes and poured into the crucible. The crucible and contents are then placed in a furnace and heated until thoroughly fluid, and the lead, which has been reduced by charcoal, flour or other reducing agent previously added, settles to the bottom with the gold and silver. A chemical union takes place between the soda, borax and other fluxes and the silica and base elements of the ore, making a fusible slag or glass. When sufficiently melted, the pot is taken out and the contents cooled. The button of lead is broken out, hammered and cleaned and "cupelled." The cupellation consists in oxidizing off the lead in the aforesaid cupel—a small, round cup, one inch more or less in diameter and as tall, made of bone ash, into which the lead button is placed. The cupel is previously placed in a clay muffle heated to almost a white heat, and kept very hot during the operation. The lead burns away and is absorbed by the cupel, while the gold and silver are left in the shape of a small button on the bottom. The button is weighed, the silver dissolved out by means of nitric acid, and then the gold weighed. The difference in weights gives the silver. Silver is most often assayed by the "scorification" process. The ore is mixed with granulated metallic lead and a little borax in a shallow clay cup and heated very high in the muffle. The lead is oxidized to litharge partly, which fluxes off the gangue matter, the gold and silver being absorbed by the metallic lead. After the ore is thoroughly fluid, and the remaining lead is of convenient size, the contents are poured out into an iron mould and the lead button cupelled. Both metals may be assayed by either process, but one is more suited to certain kinds of ores than the other.

A NEW way of getting rid of scale in a boiler is credited by a Boston paper to an engineer in that city. The scale came from the use of well water. The feed pipe enters the front of the boiler just about the water line, and has slots cut in it about an eighth of an inch wide, instead of the ordinary spraying method of distributing the water, and surrounding the feed pipes in the larger pipe, about six inches in diameter and cut away at the top; the feed water enters the boiler and discharges through the slot in the feed, depositing all the foreign matter in this water into the catch pipe instead of into the boiler—the success of the plan depending upon having a high temperature of feed at about the boiling point, when the solids held in suspension of or solution in water will be deposited.

## An Attachment to Traction Engines.

Steam engines intended to run threshing machines, hoist logs on to cars and do much other work while stationary are often so constructed that they can propel themselves from place to place. To a certain limited extent such locomotives have been used to draw plows and harvesting machinery, but their chief application is to the purposes first indicated. In traveling from place to place, however, traction engines are often compelled to run over rather rough land or roads; and as they are heavier than ordinary vehicles, the difficulties thus presented are sometimes hard to surmount. It is customary to apply the driving power only to the rear wheels. Joel Mosiman of Falls City, Neb., thinks that, if the forward wheels also could be made to draw, several advantages would be secured. The engine would be more nearly in the condition of a horse having calks on all four shoes instead of on his hind feet merely, and therefore could get along better. Furthermore, he expects to divide the wear and strain and make the machine last longer. Still another desirable result would be increased safety and convenience in crossing bridges. He says he has devised a way of transmitting power from the rear to the front wheels. Whether he gains enough to offset the waste of power which always results from the use of gearing, and whether any better method of accomplishing the object can be found, are still unsettled questions.

AT a recent meeting of the Verein fur Eisenbahnkunde a paper of considerable interest was read by Herr Boedecker on "a means for the prevention of noise caused by trains in passing over iron railway bridges." The author had made a number of experiments, all of which proved more or less unsuccessful; but in the end a final and effective method was found, which consists of a decking of one and one-quarter-inch planks between the cross-girders, resting on three-inch timbers laid on the bottom flanges. On the planks a double layer of felt (Papplage) is laid, which is fixed to the vertical web of the cross-girder; at the connections with the girder a timber cover-joint is placed on the felt, and two hooked bolts connect the whole firmly to the bottom flange of the cross-girder. A depth of four inches of slag gravel covers the decking, and the decking is inclined towards the center of the bridge, small tubes being inserted through the decking connected to a suspended gutter for drainage purposes. Great care is taken that the felt is fixed accurately to the girders and drainage tubes, and an arrangement is made by means of which only water and no gravel can pass through into the gutter. A layer of felt is also laid between the planks and the timbers they rest upon, and the ironwork in contact with the decking and ballast is well asphalted. The whole decking weighs 600 pounds per lineal yard for a single-line bridge, eleven feet in width, and costs 11.15d per square foot. The result of this means for preventing noise has been so satisfactory that other bridges are being treated in the same manner. The decking has, moreover, proved watertight.

THE Schenectady Locomotive Works are using for certain parts of their

work what is called "steeled iron," being a mixture of 70 per cent good iron and 30 per cent steel. The castings obtained are claimed to be about 25 per cent stronger than ordinary cast iron.

*Stahl und Eisen* describes a new method to protect iron and steel against rust, for which a patent has been issued to the Elberfeld Paint Works, formerly Friedr. Bayer & Co. The iron or steel is sponged with a solution of ferro-cyanic acid in connection with a strong acid in watery solution, in cold condition. Hereby a bi-muriatic of iron is formed, which protects the iron effectively against rust. Iron, thus treated, can be provided with a coat of any kind of oil paint.

# Electrical Progress.

### Have We Too Many Electricians?

The great development of electrical interests, telephone, lighting and railway, during the last fifteen years, has naturally created a need for the services of men especially educated in a branch of science that had only a few devotees before the present era. With commendable enterprise, a large number of students in our technical schools gave electricity particular attention, and the schools themselves made careful provision for this demand. Nearly two years ago, however, the question was asked in print whether or not our colleges were turning out rather more electrical engineers than the business world required. Among those who were then inclined to answer that query affirmatively was Henry Floy, who returns to the subject in the current issue of *The Engineering Magazine*. He says that late in the month of September last he sent letters of inquiry to the young men who were graduated in the summer preceding from Cornell and Lehigh universities and the Massachusetts Institute of Technology. There were 260 in all. Replies were received from nearly half of the graduates, and of these about three-fourths had already obtained employment. Of those who studied civil engineering and who sent replies, 87 per cent found engagements in their chosen profession; while the proportion for mechanical engineering was 71.4 per cent, and for electrical engineering, 65.3. In some instances young electricians secured employment only after they had betrayed a knowledge of German, shorthand or something else likely to be of use in business. On averaging up the hours of labor and the weekly pay, it was found that these three classes of young men made their start in life in the following manner: Students of electricity, $10.64 cents per week, working 8 hours and 54 minutes per day; of mechanical science, $13.52, and 8 hours 56 minutes a day; of surveying, $13.27, and 8 hours 27 minutes. Mr. Floy interprets these facts to mean that he was right when, in 1884, he hinted that the profession of electrical engineering was in danger of becoming overstocked.

### Telephone Weather Bulletins.

An important step has been taken in the organization of a supplementary weather warning service by means of the telephone, and a plan is now being proposed for affording to a large number of communities the advantages of the new scheme. In New York the local telephone company has placed at the service of the chief of the weather signalling department a telephone to be used only in giving special information of weather forecasts to the general public. Anyone can call for answers to special questions at any time and be sure of an immediate reply. Moreover, any subscriber who wishes to have all important weather news can send his name to the telephone company and he will thereafter be telephoned by them whenever any marked change is expected. These special warnings, all of which are to be sent to the office of the telephone company, and from there to the subscribers wishing to receive them, include all heavy storms, cold waves, warm waves, sleet and storms, etc. This movement for bringing the weather reports more within the reach of the general public has the strong support of the chief of the Weather Bureau at Washington and he has written to all the principal cities urging the making of the necessary arrangements. In this way the country will be practically covered.

One of the most important changes now going on in electric railway work is the substitution of mechanical or automatic power brakes for the crude hand brakes that depend upon the muscle of the motorman. All the progressive street car lines are evincing a preference for brakes that eliminate the factor of human power and endurance, and are rapidly substituting air brakes, the air for which is compressed by the car itself. There are also one or two forms of magnetic brakes, and a new form is that of a hydraulic brake. It is worthy of note that until recently street railway men had a prejudice against power brakes on the score of their causing flat wheels. Investigation shows that the truth is exactly opposite, and that the quicker the brake is applied the less the flattening effect. The hand brake, working with comparative slowness and with less facility, tends, it seems, to make the wheels skid and flatten. Strangely enough, outside this country there is very little public worry on the subject of fenders, but the demand for power brakes almost everywhere takes the form of a government or municipal regulation. It is believed that American opinion will also reach this point in time, no matter how good the fenders may prove to be. Another modification of street car practice is expected in the adoption of more musical gongs. The prevalent types not only deafen the passers-by, but use up the energy of the motormen and jar their nervous systems. It has also been predicted that the big, heavy lever handles now familiar on the cars will disappear and that the men will be seen controlling the movements of the car by a small lever or even by a simple unobtrusive push-button.

Every new development of electricity adds to the demand for copper, but it is only of late that in telegraphy a very large use has been found for the metal, as the majority of the circuits hitherto have been of iron wire. An instance of a new demand for the metal which had hitherto been hardly suspected is found in the last report of the Western Union Telegraph Company. It is there stated that the company, during the year ending June, 1895, added to its wire lines a net length of 11,859 miles, and that over 10,000 miles of the new wire is of copper. Further, the company has adopted the policy of replacing all defective iron wires with copper, the intention being to use that metal alone on all the principal lines hereafter. The advantages of saving in weight, increased capacity for electrical transmission and diminished liability to interruption from atmospheric conditions, are sufficient to make the copper wires more economical in the end, notwithstanding their greater first cost. The decision has been assisted, also, by the fact that the improvements in processes for drawing copper wire has enabled makers to furnish material well adapted for telegraphic use. The size of copper used for telegraph lines is generally No. 9 or 10 B. and S., weighing about 199 pounds to the mile. This would require, for 10,000 miles, about 760 long tons of copper—an amount not so important in itself, but as indicating a tendency to increased demand.

Like San Francisco, Chicago is extending its electric lines in every possible direction. Right of way is being secured by the Chicago and Wisconsin Inland Lake Railway for a system of electric lines to connect Chicago with the Wisconsin lakes. The capital stock is $10,000,000; 265 miles of track are to be built and laid with 90-pound rails.

# Practical Information.

### A Chance for Young Engineers.

If Commodore Melville's bill now before the Senate receives the approval of Congress, ambitious young engineers in civil life have a new career in view which they may feel is worth striving for. There are not nearly enough naval engineers in the service now, and the Naval School at Annapolis does not furnish enough, and the bill proposes to make it possible to supply the deficiency by drawing on the various scientific schools and colleges in the country.

The bill provides for an increase of the corps to 300 commissioned officers. The rank and titles of the line officers are asked for. The engineers ask that their chief of bureau be known as the Naval Director-General of Engineering and that he shall have the rank of Rear Admiral. To relieve him of the duties which are comprised in his work it is proposed that he shall have two Assistant Inspector Generals of Engineering, who shall rank as Commodores. The engineers ask that they have command of their department, subject to the authority of the commanding officer alone, and a naval engineering experimental school is suggested, which the engineers believe should be established at New London.

Those colleges which are to establish a course of marine engineering satisfactory to the Secretary of the Navy shall be empowered to graduate men who shall be appointed cadet engineers in the naval service. These young men will be sent to sea and to some post-graduate school of instruction for two years and then undergo competition with the Naval Academy graduates for commissions in the Navy. A radical change is suggested in the manner of appointing the cadets of the engineering branch at the Naval Academy. As there seems a disinclination on the part of these young men to choose the engineering profession, it is proposed that the appointment of naval engineering cadets be vested in the Senators of the several States, the delegates from the Territories and four appointments at large by the President, it being compulsory to appoint one resident of the District of Columbia. As the Senators would have an appointment every four years, it would give a class of cadet engineers numbering about twenty-four annually. The general sprit of this bill is to give the engineer his proper status on board war vessels.

### Pitting in Steam Boilers.

It has long been well known that very pure and soft feed water may, under certain conditions, be dangerous to boilers. The plates subjected to this form of corrosion have sometimes almost exactly conical pits, but usually the form of the pits is spherical. While this corrosion is going on the pit is filled, sometimes with a brown, sometimes with a yellow or red powder. Since the volume of this powder is greater than that of the metal from which it is derived, it forms a rounded elevation above the surface of the plate, which is often covered with a tough skin. In one case the analysis of the powder gave the following percentage composition: Oxides of iron 86.26; water 0.59; fats and organic substances, 6.29; calcium salts, 4.52; silica, alumina, etc. 2.34. In another case the skin had the following composition: Calcium carbonate, 28.0; magnesium carbonate, 8.7; calcium sulphate, 12.8; silica, 8.2; oxides of iron, 32.2.

The depth of the pitting varies; sometimes the corrosion quite pierces the plate. This corrosion is found generally in places where the circulation is feeble—in boilers lying idle and which have not been completely emptied; in empty boilers in connection with neighboring boilers when the stop valve is not perfectly tight, and steam even in small quantities is allowed to enter; but seldom on plates which are constantly below the water level.

Pure feed water which has been long boiled in order to expel the dissolved gases is harmless. The experiments of Messrs. Scheurer-Kestner and Meunier-Dollfus show that the corrosion is due to the dissolved gases, of which oxygen and carbonic acid are the most prejudicial. Professor Grace Calvert has shown that iron is not attacked by dry oxygen and corbonic acid, nor by moist carbonic acid, weakly by most oxygen, but is rapidly oxidized by a mixture of moist oxygen and carbonic acid. It seems that the greater the proportion of carbon in metal, the better it can resist this corrosion; wrought iron corrodes easier than cast iron.

Certain substances — soda, potash, borax—added to the water diminish the dangerous property. As regards the influence of the temperature of feed water, it may be mentioned that where a feed heater is used the corrosion of the feed heater is either very small or non-existent, while the boiler is nearly always free from corrosion.

### The Trans-Siberian Railway.

Regarding the new trans-Siberian railway, the Russian Government hopes to have the line completed and open for traffic in 1900. Engineering works of vast magnitude must be constructed, including bridges for spanning three of the greatest rivers in the world—the Obi, Yenise and Amoor. The most troublesome task will be to get around the south end of Lake Baikal. That great sheet of water is 350 miles long, comparatively narrow and very deep and lies in the midst of a high plateau. It is surrounded by mountains, over which the road will have to pass. The highest point is 3600 feet above the sea level, near Sheeta, a considerable distance east of the lake.

The line will be 6700 miles long. It starts at Chelabinsk, on the western edge of Siberia. At that point it connects with the European system of railways in a direct line to St. Petersburg, by way of Moscow. What may be termed the first section of the road extending east from Chelabinsk to Omsk—a distance of 500 miles—is already practically finished, and will be opened for before the end of this year.

From Omsk to Crasnoiarsk is a distance of 800 miles. The road joining those two points is built—that is to say, the embankments are constructed, the cuts are made and the rails are laid, but there are no bridges yet. This section will be opened for the running of trains in 1896. From Crasnoiarsk to Irkutsk is a distance of 700 miles. That section will be finished and in running order in 1896. This will carry the road nearly to Lake Baikal.

Notwithstanding the difficulty and expense attending the transportation of material by water all the way from Europe, a beginning has been made in the construction of the railway from the Pacific coast end—the Russian port of Vladivostock, on the sea of Japan. From that point northward to Graska, about 200 miles, the road is built and in running order, and from thence it is being carried forward as fast as is practicable.

On the eastern portion of the line the labor of convict exiles will be employed to a considerable extent, but not so elsewhere. About 25,000 men are now at work on the railway. The railway and everything in connection with it is under the control of a Government Commission, the president of which is the Czarowitz.

A contrivance for quickly stopping machinery—as in case some person is being drawn between cogs or rollers—has been devised by a French electrician. On touching one of a series of push-buttons placed at convenient points, the power is shut off and a powerful brake is applied to fly-wheels. A twenty horse power engine, working at ninety revolutions, was stopped in two-thirds of a second.

The *Railway Engineering and Mechanic* states that careful measurements taken on a steamer in heavy weather showed that the propeller shaft was at times sprung out of line 1¼ inches in a length of 112 feet. Measurements on deck showed the same amount of deflection. The ship was stiffened, and the shafting gave no further trouble.

# Mining Summary.

## CALIFORNIA.

### Amador.

THE GOVER MINE.—*Record*: Supt. C. E. Purrington of the Gover mine has returned from San Francisco and has put a number of men at work at the mine. Additional machinery is on the road, and the mine is running in full blast. The mill will start Monday.

THE ONEIDA MINE.—At the Oneida mine a force of carpenters is employed and the buildings will soon be ready for occupancy. The company recently closed a contract with P. A. Buell & Co. of Stockton for 125,000 feet of lumber. Machinery for the hoisting plant has also been ordered and will soon be delivered on the ground.

SUTTER CREEK.—*Record*: The present operators of the Mechanics mine at Sutter Creek have paid $2000 on the purchase price and intend to develop the property as soon as possible to a paying proposition. They have purchased and hauled the ten-stamp mill of the Hardenburg to the property and will erect it immediately.

HOME.—Mr. Roberts, who has organized a company to operate the Forest Home ranch of John Graham, is superintending the installation of a plant for hydraulic purposes, and has contracted for water from the old Haywards ditch which will be taken up by an 18-inch pipe line from a point two and a quarter miles east of the ground the company will operate. They already have a restraining dam constructed, and as soon as water is gotten through the pipe, the work of tearing down the gravel banks will be commenced in earnest. After the water is restrained and settled, it is to be conducted down the country to the Holsinger place and again used there for the purpose of ground-sluicing in some rich gravel deposits. This work is being prosecuted by Los Angeles capital.

BAY STATE.—Ever since the Bay State people commenced to mill rock and work toward the west of their mine, the owner of the adjoining property west has contended that the managers of the mine were trespassing on his property. This week surveyors were locating the lines of the two properties.

### Butte.

D. W. Smith of the Golden Feather mine is repairing the Miocene ditch through Morris ravine.

The tunnel of the Gold Bank mine, at Forbestown, has reached the quartz lode, which is larger and richer than where worked above. The tunnel is 1200 feet in length and strikes the lode at a depth of 2400 feet below the level of the surface.

The Durbeck Mining Company has control of the old Osgood property and considerable machinery is being placed there. The object of the company is asserted to be to obtain control of the entire mining interests of Bangor and conduct their operations on a large scale.

### Calaveras.

WORK TO START.—*Citizen*: All the machinery for the Donnallan mine is now in position and ready to start. The track is being built and will no doubt be completed by Monday. Mr. Hackett says there is now nothing more to do about the grounds except to start the work of development, and this will commence about the middle of next week.

AROUND MURPHYS.—New Year's eve saw a great influx of those volatile beings known as the midnight mine jumpers; nearly every mine in the vicinity has been peremptorily gobbled, and the mining notices are thick throughout the woods. All the mining laws in the land have been cussed or discussed until it will now be useless for Congress to pass any act relating to the mineral sections. Miners here believe that the labor required by law must be done and the affidavits filed before the close of the year, to comply with the statutes. Others just as firmly and heroically maintain that if labor be commenced on the last day of the year they will have thirty days to complete their labor and come within the requirements of the law. Be this as it may, some of the latter contestants will have an opportunity to test their theories in the courts, as many of their claims have been relocated by other persons. The discussion of "midnight jumpers" brings out occasionally some funny stories, and one told a few evenings ago was as follows: "During the rich mine excitement in Tuolumne county a few years ago, the time for relocation came around. An enthusiastic miner swam the raging Stanislaus, in waters as cold as ice, and posted a notice about as follows upon coveted property: 'NOTICE.—I, ———, the undersigned, hereby locate and claim 1500 feet of this leg running 750 feet up the hill to a black oak tree with a lump on its butt.'" Another instance is that of a heroic location writer who sat himself down and said he claimed "1500 feet of this lode east, 1500 feet west, 750 feet south and 750 feet north, and he intended to hold the same and work it according to law." The mines of note near Murphys that have been reported jumped are the Mayflower, Beatrice, Robles, and the quartz mine near the toll gate. These are only a few out of many that bear the patriotic inscription of miners within a few miles of town.

### El Dorado.

(Special correspondence).—A shaft was started last week on property to be known as the Live Oak mine. This is an extension of the Larkin, upon which the work is showing gratifying results. Both properties are operated by San Francisco parties.

The success following the deviation from ideas of forty years ago is showing itself in the Big Canyon, the Taylor and the Grand Victory to a great degree. These were all low-grade propositions when first opened, but they are rapidly growing rich in the quality and abundance of ore as depth is attained.

It may be curious to note that seven years ago mines in Tuolumne county, after several expensive ventures, were in ill repute. Three years ago Mariposa shared a like fate. To-day's investments in those counties need no comment. It is said that a funny story was published in an interview with Mr. Nevills, that the mother lode did not extend north of the Cosumnes river; yet at present writing it is well known what the old Springfield in this county produced. To-day, the Church mine, another mother lode property, and the Gentle Annie likewise are a strong refutation. History is beginning to repeat itself in El Dorado county. The number of capitalists turning their attention in this direction and actually beginning development work shows that faith in El Dorado's possibilities is returning, and perseverance without fear and no squeamishness about investing capital is developing the fact to a certainty that gold is here and will be unearthed.

Placerville, Jan. 13, '96.

### Mariposa.

HORNITOS MINES.—*Gazette*: The Dorse or Brooks mine, adjoining Quartz mountain, is doing considerable development work. The Dorse is being operated by Chas. E. Stuart of Piqua, Ohio. J. Sullivan is superintendent. Machinery is to be erected.

R. W. Barcroft's Enterprise mine is reported to be sold shortly. It is in good running order.

### Mono.

THE STANDARD'S NEW CYANIDE.—*Mining Index*: The material to be used in the construction of the Standard Company's additional cyanide plant is at hand, and the plans are being prepared by Andrew Smith, who will supervise the work. The new plant will be located about half way between Blanchard's station and the Wayner place, at a point near where a bend in the canyon has banked up a large quantity of tailings. It is intended that the plant shall be in operation by May 1st.

COPPER MOUNTAIN.—Supt. Jones is pushing work steadily at Copper Mountain and will have something to show for it in the spring, when he will have the ground pretty thoroughly opened and ready for any kind of a mill proposition that may be decided upon. At present a forty-stamp plant is being calculated on, to be built just below the mouth of the lower tunnel.

### Napa.

QUICKSILVER SHIPMENTS.—The number of flasks of quicksilver shipped from the various mines during December, as reported by the station agent at Calistoga, is: Napa Consolidated, 475; Ætna Consolidated, 305; Great Western, 255; Mirabel, 235; Sulphur Bank, 634; total, 1954 flasks, making an increase of 380 flasks over the November shipment. The total shipment for '95 was 1,771,400 pounds, against 1,617,500 pounds for 1894.

### Nevada.

PROSPECTS WELL.—Hugh Dundon, superintendent of the Live Yankee drift gravel mine near Graniteville, informed a *Transcript* reporter that they have crossed the channel and have started to run up-stream in the channel. The gravel prospects well all the way. The tunnel is in 700 feet.

MILL STARTED UP.—*Union*: Superintendent Dennis on Thursday started up fifteen stamps at the Mountaineer mill and they will be kept running day and night. About twenty men are employed on a shift at the mine now, and the water has all been pumped out. The prospects are very good.

The *Herald* hears that the Oak Tree mine, at Maybert, has a new ledge in the 500 level that is eight feet thick.

*Telegraph*: A large ledge has been located and the claim named the Western Light. The company will be called the Mammoth Gold and Silver Mining Company. The claims under its management are the Belle of California, the Colorado Central and the Western Light. The ledge averages from 300 to 500 feet in width and has been traced a distance of thirty-five miles through Nevada and Yuba counties, and is the same lode as the Boss mine near San Juan. Frank Wright, who traced the ledge, is sure that he has found the mother lode.

### Placer.

RISING SUN MINE.—*Sentinel*: A bedrock tunnel has been started at the Rising Sun mine, one mile west of Colfax, which will tap the mine at about the 500-foot level. The starting point is near Bear and it will require about 1800 feet of tunneling to tap the old works. If the present tunnel is completed it will be the key to the successful working of that valuable property. The Rising Sun has produced hundreds of thousands of dollars worth of gold bullion in the past. It was worked through a shaft to the depth of 900 feet. W. H. Thomas, of Colfax, has a contract to run 200 feet of the tunnel.

AT CLIPPER GAP.—The Ellen Dip Consolidated mine is in Codfish canyon, Colfax district. The lead shows up for 200 feet. The ledge where it crops out on top is 20 inches to 2½ feet wide and at No. 2 is about 18 feet wide; $6 or $7 rock. The facilities for working this mine are excellent. This mine is about 1¼ miles from Black Oak mine which sold for a large sum some time ago. The company has 80 acres; four claims consolidated. The owners are S. F. Woodworth, of Clipper Gap; R. S. Young, of Seattle; D. A. Murdock, of Auburn.

### Riverside.

Sinking in the main shaft of the Santa Rosa mine has been discontinued for the present. The shaft is now down 475 feet and at the bottom the ledge is five feet wide.

J. M. Day has had laid off the men at the Golden Chariot till he could erect more extensive hoisting works, that now in use being inadequate to handle the material from the bottom of the shaft, which is over 300 feet deep. The new hoist will be put in place at once, and the old one will be used in sinking on the new double-compartment shaft of the Santa Fe mine, which is now down 100 feet.

### San Bernardino.

VANDERBILT.—The Brick Mining and Milling Co. has closed down the St. George and is moving everything over to the Boomerang, where it is preparing to do some deep mining. The mill will be started as soon as the new machinery arrives. The Vanderbilt Mining and Milling Co. has suspended operations. Patton & Powell, in doing some development work on the Queen of Night mine, opened a rich vein of free quartz and free gold, which has made every one in the camp feel jubilant. In the Virginia Dale mining district miners are reported coming in by the hundreds. The Virginia Dale is now reported to be richer than ever. The ledge is worked deeper and the mill is to be moved up to the mine and five more stamps added. It has been located down at the water supply, five miles from the mine, but the water will be pumped to the mine, the mill placed by the shaft and doubled in capacity. The rock is porphyry. The district is located about thirty miles east of the McHaney's Desert Queen.

### San Diego.

THE GOLDEN CROSS.—The Golden Cross Mining and Milling Co. at Hedges is in the hands of a receiver. The company's indebtedness is $125,822. A deed of trust has been made conveying the property to trustees authorized to operate the property and apply the proceeds to the payment of debts. The company has transferred to the trustees the Golden Cross, Golden Crown, Golden Queen, General Miles, Sutton, Black Hawk and Union mines and has fifteen months to pay up its indebtedness and redeem its property. If at the expiration of that time the same is not paid in full the property will be sold at public auction. The trustees have taken possession of the mine. Mr. Dolan has been appointed superintendent. The Golden Cross has the largest number of stamps—140—under one roof in California, has an excellent property, and will doubtless be able to liquidate all claims.

### Shasta.

NEARLY FINISHED.—*Free Press*: The grading work on the Iron Mountain railway is about finished. On Friday 100 mules and 150 men came down from the McLean brothers' camp, having been taken off, as the work is nearing completion.

THE OLD SPANISH MINE.—*Democrat*: Considerable development work is just now being done at the old Spanish mine, on the Shasta road, at the old Wiser place. The property is owned by Messrs. Fred H. Deakin and Capt. Taylor. Grading for the hoisting works is now being done. The sinking of the big shaft will be let by contract. The Spanish is a promising piece of property and the owners will put up extensive works on the mine. J. C. Frick is superintendent.

Fowler, Rhodes and Benton came down from Harrison gulch, Shasta county, says the *Sentinel*, bringing with them a gold brick worth $2400, the result of twenty days' run with a little roller mill on ore taken from the Lucky Baldwin and Gold Hill mines. This is a splendid showing and certainly justifies the opinions of those who predicted that Harrison gulch would be one of the liveliest mining camps in northern California. The gold brick was taken to the Bank of Tehama County for shipment to the U. S. mint at San Francisco.

### Siskiyou.

At Happy Camp the Siskiyou Mining Co. has turned the water into a new ten-mile ditch, intersecting Clear creek, from which the water supply is secured; the Chinese Oak Bar mine runs two giants, and the Wingate Hill mine is being prepared for operation next month.

MINING NOTES.—*Journal*: The cold weather lately has frozen up the water supply in several ditches and streams, to prevent washing, and the ground is also hard, to prevent digging in the placer claims. The drift and quartz mines are worked, however, in getting out pay gravel and quartz, preparatory for washing and crushing when the weather moderates.

All the quartz mine owners throughout the county are making greater preparations than usual for extensive operations during the coming spring and summer, and we anticipate a greatly increased gold product in Siskiyou this year, to exceed that of any county in the State.

Hunter & Co. have completed arrangements for opening out the old Punch creek quartz ledge on Humbug creek, which is considered one of the most promising ledges in Siskiyou. It is below the water line, and with a good tunnel extended into it, will no doubt yield handsomely. It shows signs of being a strong, permanent and extensive ledge, and with proper development may prove a bonanza of great richness.

The Espy, Hunter & Co. mine at Hawkinsville is now being worked steadily, with prospects of excellent success. The broken pump has been fixed up by the engineer, Rousiow, so that it is now stouter than before the breakage. The hydraulic work at the claim is under the supervision of Mr. N. Lange of Barkhouse, one of the best hydraulic miners in Siskiyou.

The Horse Creek Mining Co., interested in placer mining ground near Oak Bar, Klamath river, in consequence of not being able to secure water from McKinney creek, owing to the prior right of Wm. Jackson, is now planning to put in a large pump for raising water from the river upon the same principle as the pumping plant at Shasta river near Yreka.

### Trinity.

The *Journal* learns that the Poker Bar Company has a lease from Wm. Weaver on his quartz mine in the Lowden Ranch mining district and will open up the property. A force of men has been put to work.

The Altoona mine at Cinnabar is turning out from 25 to 30 flasks of quicksilver per day. It is one of the richest mines in the world.

At the Integral mine the company has nine men employed in running tunnels. The Altoona and Integral are in close proximity to each other.

## NEVADA.

AROUND MONTGOMERY.—At the Confidence, in Death Valley, the mine is developed with three shafts and a tunnel, all in ore that runs from $30 to $100 per ton. The deepest shaft is 125 feet deep, with a continuous streak of ore from six to fourteen feet wide. The Confidence Company is putting in a twenty-five-ton mill, which will be ready to run about Feb. 1st.

At the Johnnie mine the mill is crushing about thirty tons a day. The new gasoline hoist at the Johnnie is said to be the finest hoist ever on the desert. The Chispa mine, owned by the same company, is temporarily closed on account of the teams being unable to supply both mills with gasoline.

### STOREY COUNTY.

ON THE COMSTOCK.—The Con. Cal. & Va. Company is still finding a considerable amount of good ore on the 1650 and 1750 levels, where it has streaks of ore three to four feet in width assaying $30 to $50 a ton. The average of 303 tons of ore shipped to the Morgan mill the past week was $41.87.

At the Ophir old works they have found some ore—a streak a foot wide—that assays $22.30 a ton. In exploring they find a great deal of rock that assays $2 to $4 a ton. They recently sent the concentrates from 372 tons of ore to the Selby Works to be smelted. Other leading producing mines are yielding about the usual quantity and quality of ore, which is being sent to the mills as extracted.

Material yielding low assays is being encountered in the inclines that are being sunk on the Brunswick lode. Thus far the work is outside of the vein and no crosscutting has been done.

THE BRUNSWICK LODE.—Herman Zadig, during his recent visit to the Comstock, told an *Enterprise* reporter that a number of prominent capitalists, among whom is Colonel Alvinza Hayward, were about to take an active interest in the operations of the Brunswick Exploration Company. We have learned since Mr. Zadig departed that his plan to run a drift from the Comstock out to the Brunswick lode is now almost a certainty, enough support having already been given to the project to assure its success, and Engineer Gooth Haist has been engaged to make maps and to report on the most favorable terminus of the drift. It is believed by the promotors of this plan that valuable bodies of ore will be encountered between the west wall of the Brunswick lode and the east wall of the Comstock.

Regarding the proposed connection to be made between the Sutro tunnel and shaft No. 1 on the Brunswick lode, these capitalists are willing to undertake the substantial backing of the stocks of the various Comstock mining companies for half the expense, but will expect the Comstock Tunnel Company as an equal beneficiary to assume the other half of the cost, which in reality will be but slight.

Frank Leonard, president of the Comstock Tunnel Company, was seen last Tuesday by an *Enterprise* reporter. He said: "I am in favor of accepting the proposition and shall do all in my power to get the people of my company in New York to see it through, but first it is necessary to establish confidence in the East."

Eastern capitalists are slow and conservative and it takes some time to arouse their enthusiasm. It is certain that in case a strike should be made in the Brunswick, as it is generally believed will be, the Comstock tunnel, having no connection with the Brunswick lode workings, the tunnel company would lose all benefit from the strike.

### ESMERALDA COUNTY.

At Aurora some ground, on which tailings have been accumulating since the early days of that once flourishing camp, has been located under the mining law. The ground is now covered with a dense growth of sagebrush.

The Hawthorne *Bulletin* says the report of the sale of the Silver Star group of mines is merely rumor, as the owners of the claims fail to verify the report.

### LYON COUNTY.

The Dayton *Times* says Peck Bros. will put up a concentrating plant at Dayton next spring that will give employment to thirty or forty men.

### LINCOLN COUNTY.

Fifty-six tons of gold ore from the April Fool, that netted the owners about $15,000, was sold in Salt Lake City last week. The *Tribune* says the ore was in two lots, both high grade, but one containing thirty-six tons, selling at $320 a ton; the other containing twenty tons and bringing $135 a ton. The grade is not up to that which was made by a previous shipment, for which $13,000 was received for less than twenty tons; but with $15,000 to their credit the owners will experience no difficulty in reconciling themselves to the disappointment.

The story of the April Fool promises to be the story of its sensational neighbor, the De Lamar, the present production of which has been variously estimated at from $60,000 to $100,000 per month, the company pleading, as an excuse for withholding the real facts, that the road agent might be irresistibly tempted. To date the April Fool has produced and marketed in this city about 400 tons of this high-grade material, and now that it has the ores blocked out sufficiently to justify it, the erection of a mill will take place at an early day.

Those who have seen the dump say the ores are identical with those that are being so successfully milled at the De Lamar. It is claimed that the contents of the entire vein will average between $85 and $100 per ton; and before returning to the property, Manager Wilson will very likely place the order for a mill. At present the haul from the mine to the railway is a long one and an expensive one, and the owners are precluded, as were those of the De Lamar, in its patriarchal day, from marketing anything but that which is worth its weight. Around the De Lamar mine has grown up a camp with a population of 1200, lighted by electricity, and with waterworks and other modern conveniences; and with the April Fool employing as many in its mine and mill, the strides of the camp in 1896 should place it among the foremost at the close of the year.

Concerning the April Fool, the De Lamar *Lode* says that for the past year the property has been under lease to Frank Wilson, the principal owner, and W. J. Dooley, who have operated it with good results. The group consists of six mines, and an application for patent is now pending on the group. During the past year water has been acquired by the April Fool Company, and is now being piped to the mine, a distance of nine miles, and it is stated on very reliable authority that before spring sets in this company will have a combined ten-stamp, with capacity for twenty stamps, cyanide mill, in full operation. There is certainly something to justify this, otherwise it would not be done.

### OREGON.

#### BAKER COUNTY.

DOING CUSTOM WORK.—The Riverdale quartz mill, Powder river, owned by the Keystone Mining Company, J. T. Bolles superintendent, is crushing one hundred tons of free milling ore from the Buckeye mine, situated four miles east of North Powder.

John Vass is superintendent of the Bellevue mine, Granite district. During '95 development work done on the property to the amount of 256o feet, 4500 feet on the vein is exposed.

### BRITISH COLUMBIA.

TRAIL CREEK.—A new air compressor is installed on the Center Star, capable of running several new drills. This claim adjoins the Le Roi. There is now a tunnel of 500 feet driven on the ledge and 100 feet from the face is an uprise of 172 feet. The plan of development is to continue the tunnel 800 feet to the line of the Le Roi, and crosscut 250 feet to the south and 350 feet to the north. There are four parallel veins on the claim. It is estimated that development will be completed by August.

F. E. Ward, acting for Aug. Heinze, who controls the Trail Creek smelter, has published a notice of an application for a charter to construct a railway from Trail Landing to Rossland, thence through by way of Midway to Penticton or some point on Okanagon lake. The first part, that to Rossland, is under construction and will soon be completed. There is said to be no suitable pass from Trail creek to Boundary creek, but if the road goes through it is with the evident intention of bringing Boundary creek ores to the Trail smelter.

The Rossland *Miner* devotes some space to differences between D. C. Corbin, of the Nelson & Fort Sheppard railway, and the mine owners. When applications were made for crown grants of certain mineral claims, Mr. Corbin filed adverses. The Paris Belle was one of these, and J. W. Winthrop, of Spokane, came to Rossland and it is presumed circulated inflammatory cards calling a mass meeting. He did not appear at the meeting, but a committee was appointed to interview Mr. Corbin as to what his contentions were. A committee was also appointed to confer with the Provincial government and take such steps as are necessary to protect the miners' interests. The day after the meeting Mr. Corbin telegraphed the Rossland *Miner* that his company did not intend to put obstacles in the way of mining development, but would grant them surface rights necessary to work them, wood for building and fuel, but not for commercial purposes. The land was granted to the Nelson & Fort Sheppard.

AINSWORTH.—An Ainsworth correspondent of the *New Denver Ledge* relates how the Lady of the Lake mineral claim has been made to pay. The property is situated one and a half miles southwest of Ainsworth, and alongside Loom lake, a body of water half a mile long and 300 feet wide. The water retarded them, so they decided to siphon the lake, which they did with a three-inch pipe. This ran several months, and then the winter of 1894-5 froze it up. In January the siphon started running again, and now the lake has been lowered twenty feet and by spring it will be dry. Clark & Van Hook, the proprietors, sunk on the vein as the water went down, and from the surface shipped two tons which went $76.50 to the ton. About $3000 worth of work has been done.

CARIBOO.—The Ashcroft *Journal* gives an interview with John K. Barber, who was foreman of the men constructing the flume for the Cariboo mine at Quesnelle Forks, in which Mr. Barber says the walls of the pit are 300 feet high, and will be higher next year, as the large nine-inch nozzles eat into the bank. A change will probably be made to some extent in the mode of operation. A tunnel will be run for flume and sluice box into the gravel back from the direction of the river. This tunnel is to get through some indifferent gravel, which will not be worked for a year or two.

Mining of gold-bearing gravel deposits by hydraulic, drifting, sinking and sluicing are old methods in Cariboo, but mining by dredging has resulted unsuccessfully in the few attempts that have been made. Dredges have been and are being built on the upper and lower Fraser river, which, it is claimed, will be able to suck from the bottoms of streams the millions of gold known to exist there. The beds of the Quesnelle and Fraser rivers and branches for many hundreds of miles have been leased for this purpose.

A company is also being promoted in England for the purpose of erecting a dam to change the waters of one fork of the Quesnelle to the other, for the purpose of taking the gold from the river bed, where, a prominent mining man recently said, there is gold enough to pay off the national debt.

A local company is now endeavoring to turn the north fork of the Quesnelle by a cut through an abrupt bend in the river, with the object of cleaning up about 3000 feet of river bed, which is known to be very rich.

Quartz mining is also being resumed in Cariboo. The whole district is lined with reefs and ledges, many of known value.

### ALASKA.

The coming season will doubtless see renewed activity in mining operations.

It is stated that a steamer is being fitted out at Seattle to take 300 miners to Quarnagain arm this spring, and that a Fresno man named Dusoy has chartered a steamer to take a party of 100 or more from San Francisco. It is estimated that 600 or 700 miners will leave the coast for Cook's inlet this year.

### IDAHO.

MINERAL PRODUCTION FOR '95.—Wells, Fargo & Co.'s report of the mineral production of the State for the year 1895, prepared by Alfred Eoff, cashier of the Boise City National Bank, is as follows:

| COUNTIES. | Gold. | Silver, Ounces | Silver, 97 cents per ounce. | Lead, Tons | Lead at $40 per ton | Total. |
|---|---|---|---|---|---|---|
| Ada | $ 27,000 | 6,300 | 4,120 | | | $ 31,120 |
| Bingham | 52,000 | | | | | 52,000 |
| Blaine | 52,000 | 4,000 | 2,600 | | | 54,600 |
| Boise | 26,000 | 415,000 | 271,810 | 2,000 | $ 80,000 | 377,810 |
| Canyon | 26,000 | 70,000 | 45,850 | | | 71,850 |
| Cassia | 26,000 | | | | | 26,000 |
| Custer | 52,000 | 4,000 | 2,620 | | | 54,620 |
| Elmore | 52,000 | 158,000 | 103,480 | 1,000 | 40,000 | 195,480 |
| Fremont | 52,000 | 2,000 | 1,310 | | | 53,310 |
| Idaho | 52,000 | 96,000 | 62,880 | 2,000 | 80,000 | 194,880 |
| Kootenai | 52,000 | 2,000 | 1,310 | | | 53,310 |
| Lemhi | 52,000 | 2,000 | 1,310 | | | 53,310 |
| Logan | 52,000 | 2,000 | 1,310 | | | 53,310 |
| Nez Perce | 52,000 | 2,000 | 1,310 | | | 53,310 |
| Oneida | 52,000 | 2,000 | 1,310 | | | 53,310 |
| Owyhee | 52,000 | 96,000 | 62,880 | 2,000 | 80,000 | 194,880 |
| Shoshone | 52,000 | 2,000 | 1,310 | | | 53,310 |
| Totals | $ 821,000 | 1,000,300 | $ 655,190 | 7,000 | $ 280,000 | $ 1,756,190 |

SUMMARY.

| | 1895. | 1894. | 1893. |
|---|---|---|---|
| Gold | $2,521,000 | $1,870,000 | $1,645,000 |
| Silver | 2,807, 50 | 2,359,000 | 1,848,946 |
| Lead | 2,028,960 | 2,605,400 | 1,524,000 |
| Totals | $7,355,310 | $6,843,400 | $5,017,946 |

This shows a total increase over last year of $511,910. The increase of Ada county was $69,120; for Boise county the increase was $44,000; for Elmore county the increase was $4500; for Owyhee county the increase was $595,850.

THE LUCKY BOY MINE.—At the Lucky Boy in Custer, the mine and mill have eighty men at work. The altitude of the Lucky Boy mine is estimated at 9,000 feet above sea level on Custer mountain, and the mill is about 2,000 feet lower, the two being connected by a Hallidie suspended wire tramway. About $40,000 has been expended in purchasing and delivering supplies to the mine and mill to insure the working of the property at full blast during the present winter, but as an offset to this the mill is turning out about $4,000 in gold and silver bullion each day. As yet the winter weather has not interfered with the shipment of bullion, which has been regular since the mill started on October 1st last, the bullion which carries an average value of $8 per ounce being shipped to Omaha. The Lucky Boy is a close corporation being owned by four Salt Lake men. Major W. Stanton, formerly chief of the Salt Lake fire department is superintendent of the mine; Charles M. Dunloy, chief engineer; Theodore Wust is metallurgist and superintendent of the mill. Henry Knapp is the assayer and melter for the company.

(Special correspondence).—Your article in reference to assessment work is concise and to the point. There is a general opinion among most miners that twenty days' work constitutes an assessment, but I am inclined to believe that your opinion is right in reference to the time being governed by the current rate of wages. A notable instance of which I was an eye-witness occurred here on Jan. 1st. The Best Chance and Golden, two claims originally owned by D. Doles and sold by him to Clem. King, Capt. Thomson and others for $30,000, and on which the first payment of $2400 was made, were relocated by J. B. Williams of Spokane and Capt. Baughman of Lewiston. The locators claim that the property was open, for the reason that there was insufficient work done on it for the year ending Dec. 31, 1895. It will doubtless occasion an expensive lawsuit. The Golden Ribbon quartz lode, owned by M. A. Ellis and others, is bonded to J. B. Williams, consideration unknown. The ore in this ledge is small, but it runs about $125 a ton, free milling. J. B. Williams has also secured an option for Spokane parties on the Caledonia lode. The Caledonia is a large ledge of low-grade ore, the ledge in some places being thirty feet wide, average value about $4 per ton. It is a contact between porphyry and silica schists. The property is free-milling; it has had hardly any work beyond assessment work done on it, similar in that respect to many other ledges in this camp, the repeal of assessment work for '93 and '94 having retarded all, or mostly all, development in the camp.

Dunn Bros & Co. have incorporated their property under the name of the Crescent Gold Mining Co.

The Idaho mine is showing up well, the tunnel on the second level being now in seventy-five feet. The tunnel on the first level is showing up about two feet of ore in the face, about 50% of the ore being free, the balance being slightly rebellious. The Idaho mill has been closed down for about two weeks on account of water freezing up; but it will start up again on the 7th inst. There is at present about 100 tons of ore awaiting treatment in the ore bins of the Idaho.

Pierce City, Shoshone Co.

The Yellow Jacket Mining Company, has completed its new tramway; the output in 1896 promises to show a large increase with its forty additional stamps at the mill.

A Huntington mill will be in operation on the Uncle Sam and Idaho claims at Black Bird Camp, by May 1st. A half interest in them was purchased last fall by J. Y. Swift for $12,000. It is claimed that on the property are seven feet of ore, the average value of which is $30 a ton.

### UTAH.

NEW MINING COMPANY.—*Tribune:* The Mercur King Mining Company has incorporated at Salt Lake; capital stock $1,000,000, divided into 200,000 shares of the par value of $5 each, 150,000 of which are taken; officers, G. W. Thatcher, president; G. E. Blair, secretary and treasurer; these, with E. A. Wall and E. L. Sloan, constitute the board of directors. The company owns the Mercur King group of claims in the Camp Floyd district, the group comprising the Golden Fleece, Golden Circle, South Bend and Gable End.

### MONTANA.

A new company, the Washington Valley Mining Company, has acquired 42 claims in the Timbered Buttes, near the city of Butte, and expect that development will bring to light a big copper ledge. J. H. Morong is secretary and manager. The development work includes a shaft of 800 feet on the Free Coinage and a 400-foot shaft on the Alice May—two of the most promising of the claims.

The shaft on the Free Coinage will be double-compartment. A shaft house is now being erected. All the claims upon which development work has been done assay high in gold and silver with a good percentage of copper and all the indications lead to the belief that the ledges will eventually turn into copper. In some of them assays as high as $280 in gold have been obtained. The other claims which have been partially developed are the Little Hattie, with a shaft of 80 feet, the Mitsch, which is down 40 feet, the Brooklyn Boy, with a shaft of 60 feet and a tunnel 107 feet, and the Gold Courier with a shaft 40 feet. Many of the others are developed to a depth of 10 to 25 feet.

The properties are located about one and a half miles west of the Timbered Butte and in the early days this locality furnished a large amount of gold from the placers. The new owners are of the opinion that there is a good deal of placer gold yet in that locality and will put in a dam to work the Meadow Lark placer in Grove gulch next spring.

The Elk Horn Mining Company of Montana has purchased claims on East Fryer hill at Leadville, and is moving its hoisting plant, pumps, etc., to that camp.

### SOUTH DAKOTA.

A BREAK-DOWN.—Deadwood *Pioneer:* The Highland Chief mine has closed down until a better foundation can be placed under the ball pulverizer. Between thirty and fifty tons were pulverized with perfect success, and it was proven that the pulverizer could handle more ore in a day than a twenty-stamp mill, but Saturday night, owing to a displacement of the machine, the balls got to pinching and three of them were broken to fragments. These balls are of tempered steel, 9 inches in diameter, and weigh 105 pounds; before leaving the factory they were subjected to an 800 pound blow to test their flexibility. That they should be rent in pieces seems remarkable, but they are run by powerful machinery at the rate of 1200 revolutions per minute, and when there is any impediment to their progress something has to give way.

THE MOFFITT PROCESS.—*Pioneer:* The Moffitt oxidizer which has been put in at Pluma has proven a success. Test runs have been made upon all kinds of Black Hills ore obtainable, a half ton of each class being operated upon. One run was made upon ore from the Golden Summit mine, above Lead City, the ore being of a low grade, averaging $5 to the ton, and from 92 to 95 per cent of the gold was saved, according to assays made of the tailings. A run was then made upon half a ton of concentrates from the Homestake, carrying $9 to the ton, and the same percentage of the gold was saved as in the Golden Summit rock. The Kildonan chlorination plant roasts the ore in the White-Howell roaster, requiring twelve hours to put it in shape for treatment by that method. The Moffitt plant yesterday put this ore through at the rate of a ton an hour, the oxidizing cylinder disposing of it as fast as it could be conveyed from the crusher. The pulverizer and plates are not in running order at the plant, owing to some defects, and the ore, after going through the oxidizer, is sent to Lead City, where it is treated by the ordinary amalgamation method. The plant at Pluma has a capacity of twenty-four tons per day (two shifts) and by a careful estimate it is found that the expense of treating this amount of ore does not exceed $30, or at the rate of $1 25 per ton. The ore is crushed to a twenty-mesh fineness before it is carried to oxidizer, which is a sheet iron cylinder 12 feet long, the inside being fitted with little troughs running lengthwise of the cylinder. At every inch along the bottom of a trough is a blow pipe, one thirty second of an inch in diameter, and as the cylinder revolves very slowly, the troughs carrying the ore, hot air at a very high pressure, plays upon the ore, subjecting it to a violent action, the oxygen freeing the gold as thoroughly as can possibly be desired. Precipitating tanks have not yet been put in, the crushed ore being handled in dry state, and the dust is almost suffocating. In treating concentrates the fumes of sulphur are very disagreeable, but it is said that by driving the powdered substance into tanks this feature may be removed.

The Keystone *Nugget* reports that the Holy Terror Mining Company has resumed sinking the main shaft, which will be carried down another 100 feet. A carload of machinery, consisting of a complete battery—five stamp-shanks, shoes and dies—and a new improved steel cage for the hoist, has arrived.

There have been formed in the Black Hills country within the past few months twenty gold-mining companies with a total capital stock of $20,000,000. Most of these companies have been formed since the late remarkable finds in all parts of the Hills, which have been developed far enough to show their real value and the permanency of the mines.

### MICHIGAN.

CALUMET & HECLA CO.—The production of this company from data for '95 amounts to about 75,000,000 pounds of refined copper. The mine is reported opened ahead for seven or eight years, and some think that their present openings are sufficient to supply a product of over 70,000,000 pounds of copper per year for over ten years. They are opening crosscuts from the conglomerate to the amygdaloid or Osceola lode, which is about 800 feet to the east of the conglomerate. This lode has been exposed at several points and is showing copper in paying quantities where it has been pierced, with but one exception.

THE TAMARACK MINING CO.—At North Tamarack valuable ground is being opened south of No. 3 shaft. The new hoisting shaft is one of the best at Lake Superior, which enables the company to handle its rock very economically. The lode at No. 4 shaft is expected to soon reach the rich run of productive ground that is in the Tamarack, Jr. The lode is understood to be as rich at a depth of over 7000 feet on the line of the lode as at the surface. The company owns 1160 acres of mineral land under which the Calumet conglomerate and the Osceola amygdaloid lodes dip at an angle of 38°, which is ample territory to supply, it is said, the present output for 100 years.

### COLORADO.

A BROMIDE PROCESS.—A press dispatch from Boulder, Colorado, declares that "an invention of importance for the treatment of the low-grade ore of Cripple Creek, Boulder county, and other telluride camps, has just been successfully demonstrated on a large scale by its inventors. A fifty-ton mill has been erected at Boulder by a few New York capitalists to test the process, and an extremely high extraction has been obtained from $8 ores. The mill is now in operation day and night, and the process will open up immense fields of low-grade tellurides hitherto considered untreatable. The inventors use bromide, but recover it continuously at extremely low figures.

At Sawpit gulch, in southwestern Colorado, A. S. Blake, the first discoverer of gold there, is reported to have sold through George Crawford of New York the Commercial group of mines for $250,000 and the Belle Champion for $50,000.

### NEW MEXICO.

The Maud S. at Mogollon, is running full. The company has recently purchased the Grey Hawk mine from Trailer & Deany.

The Confidence Company at Whitewater, is running seventy-five men and has added a new hoist.

Bland is reported "booming." The Iron King is working a full force two shifts and taking out about sixty tons per day. The J. D. Snider Mill Company is working on Iron King ore; the ore runs nearly $80 per ton. The Star mine is working a full force and is shipping ore to Pueblo. Another stage line has been put on.

### ARIZONA.

MINE SOLD.—A press dispatch says the Last Resort mine, in the Mohawk mountains, thirty miles northeast of Yuma and twenty-two miles from the Gila river, has been sold to Col. T. C. Lane of Salt Lake for $150,000 cash. It was discovered by Hulbert, Albert and Thomas. "Hulbert and Thomas were barefooted when Col. Lane struck the camp in July last, and inside of an hour he had bonded the property and paid each man $1000 as evidence of good faith. The shaft was sunk 150 feet, with crosscuts at fifty feet. The ore at the first cut assayed $110, at the second $115, and at the bottom, where the ledge is twelve feet wide, it ran $150 per ton in free gold. A twenty-stamp mill will be put up at once and water is to be pumped something like twenty miles. During the development under Lane's bond water for all purposes was transported on burros from the Gila river. The first prospect was made in a little blowout that was covered by malpice rock or lava."

### MEXICO.

#### SONORA.

*Oasis:* The Santo Domingo mines of M. G. Levy, of Nogales, are assuming importance. In 1895 Mr. Levy did 2000 feet of development work and has now exposed a body of ore ranging in value from $18 to $20 per ton, which an expert recently estimated could

readily stope out from 30 to 50 tons per day. Development will be continued through 1896 on a much larger scale. At present the ore is reduced by the arrastra process, assorted ore running $30 per ton being treated. The contemplated improvements include a thirty-stamp mill and roasters on the Santo Domingo river, eight leagues away, and a narrow-gauge railway connecting the mines with these reduction works.

### NEW JERSEY.

EDISON'S SUCCESS.—A press dispatch this week says that Thomas A. Edison has at last brought to a practical conclusion his ore separating process at his mine at Edison, near Ogden, N. J., on which he has been at work for many years; that the process is a success and the plant in running order. The cars of ore are dumped in large masses into crushers, the process being entirely automatic. The crushed rock and ore are carried from one set of crushers to another by endless belts and bucket elevators, till the material is reduced to the requisite fineness, and then another series of belts and elevators carry it to the separating house, where the material falls in a fine stream across a field of large electro-magnets, which divert the iron from the direct line of fall and drop it in one receptacle, while the refuse and rock fall into another. This process is repeated a number of times, till at last the resultant product is pure magnetic oxide of iron. "Automatic carriers take the iron ore thence to the bricking plant, where, by mechanism on which the inventor has spent thousands of dollars, the ore is mixed with a binding material and pressed into bricks for convenience of handling. These are then baked and are ready for the market. The sole remaining work of construction yet to be done is the building of rotary furnaces, which shall bake the bricks as they are delivered and turn them out automatically. There are no mechanical or scientific difficulties connected with this part of the process, and these furnaces are to be built as soon as the frost is out of the ground in the spring."

### AUSTRALIA.

Australian mining in its various forms continues to prosper. The production of gold in almost every colony is increasing, and in Victoria, Queensland and Tasmania, owing to improved processes, the net profits upon the operations are larger than formerly. The Western Australian yield does not yet answer to expectations, averaging at present between 20,000 and 25,000 ounces per month. That there is plenty of gold in Western Australia has been placed beyond all doubt: but the country is almost a rainless desert, and the water difficulty makes mining very expensive, as well as retards settlement. Some millions sterling of British and French money have been invested in Western Australian mining enterprises, but no return has as yet been made, and none appears to be probable for a long time to to come. There are only three Western Australian mines in the dividend-paying list. One of these (Bayley's Reward) distributed 4d. per £ share (480,000 shares in all) on December 31, 1894; the second (Great Boulder, paid a dividend of 2s. per £ share (175,000 shares) on October 5th last, and the third (Lake View) paid 6d. per 10s. share (80,000 shares) on 1st instant. Results to shareholders have thus been exceedingly meager, but the colony, with its 70,000 inhabitants, is enjoying the luxury of a boom at the expense of the foreigner.

Silver and lead mining in the Broken Hill district has received great encouragement from the success now attending efforts to treat the enormous quantities of sulphide ores available. Two large companies have been formed for the purpose, and one of these companies (having the right to the Ashworth patents) is largely American, London capitalists (including the Rothschilds) co-operating with New York shareholders. The market in Broken Hill mines has advanced all along the line, although several of them have not yet commenced to pay dividends. The successful treatment of the sulphide ores is likely to add very considerably to the world's annual supplies of lead and zinc. The net addition to the supplies of silver will be insignificant, for in the first place, the sulphides are not rich in silver, and, in the second place, carbonate ores, which are extremely productive, are being exhausted. From an American point of view, the subject is interesting principally in connection with the future of the lead market.

The Mount Lyell mine in Tasmania is distinctly different from the Broken Hill mines in New South Wales. In the latter case the silver is found with lead, in the former with copper, the vein being described as one of argentiferous copper pyrites, which occasionally yields a little gold. Mount Lyell has recently been visited by two experts, viz., Mr. T. A. Allan, late general manager of the Tharzis mine in Spain, who estimates the quantity of ore in situ at 5,287,702 tons, of which he states that 3,539,687 tons are rich, and Dr. E. D. Peters, Jr., who estimates the profitable ore at 4,600,000 tons, with the following average contents per ton, viz., gold, 2¾ dwts.; silver, 3 ounces; copper, 100 pounds. A specially rich patch gave 851,192 ounces of fine silver and 184 tons of copper out of 930 tons of ore. The company owning the mine is at present establishing its plans, setting up machinery, and constructing a short railway to the coast, going to a great expense. When it has perfected its arrangements it will commence paying dividends, say in about twelve months. The par value (largely written up) of its share capital is £900,000, and today's market value is about £1,200,000.

Great as has been the reward to mining enterprise in Australia in the past, experts believe that there are greater things ahead, and that Australia will yet assume a much higher position in the world as a producer of gold, silver, lead and copper. When it is remembered that the principal Broken Hill mine (silver and lead) has paid nearly £6,000,000 in dividends, and that the Mount Morgan gold mine has paid about £4,000,000, it is not surprising that the public impressed by the possibilities of mining in Australia.


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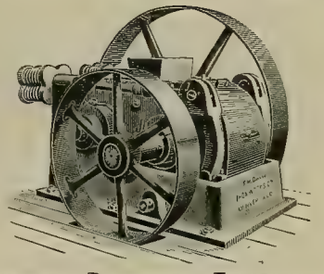
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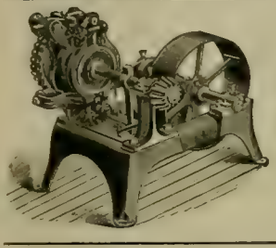
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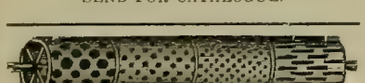


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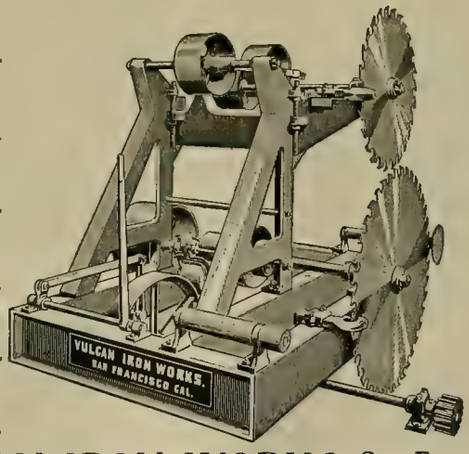


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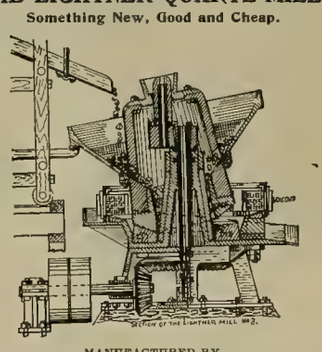
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## Coast Industrial Notes.

—The Judson Iron Works at Emeryville is experimenting with crude petroleum as a substitute for coal in the blast furnaces.

—The El Completo Coffee and Commercial Co. has incorporated here—capital stock $75,000—to raise and market coffee in Mexico and Central America.

—The Crystal Rock Salt Mining Co. has incorporated here; capital stock, $500,000, of which $227,000 has been subscribed; directors, C. J. Ahlborn, S. Bennett, M. Lewis, J. Reimer, B. Lewis.

—The Bridgeport Travertine Company has received an order from London for 20 columns, each 14 feet long and 2 feet in diameter, with caps and bases, for a Catholic cathedral now in course of erection in that city.

—The Rix Compressed Air Machinery Co. has incorporated in this city; capital stock, $50,000, all of which has been subscribed; directors, E. A. Rix, A. R. B. Rix, W. A. Hewitt, P. H. Reardon, A. Barnard.

—The California wool crop for '95 was 35,856,690 pounds, against 36,968,400 pounds in '94. Spring clip, 24,018,110 pounds; fall clip, 10,080,580 pounds; pulled wool, 1,758,600 pounds. The exports during the year were 26,356,000 pounds, exclusively by rail, and were valued at $3,500,000. The stock on hand Dec. 31, '95, was 6,000,000 pounds, including scoured wool.

—During the week, tests of powder for the 13-inch guns for use on board the battleships of the navy have been in progress at the Indian Head proving-grounds. Among the samples fired are two lots manufactured by the California Powder Works. The result obtained from these samples is reported satisfactory, a maximum velocity of 2080 feet per second having been obtained with a pressure in the neighborhood of fifteen tons.

—Following is a comparative statement of coal imports at San Francisco in 1895 and 1894:

| | *Tons in 1895.* | *Tons in 1894.* |
|---|---|---|
| Australia | 220,800 | 177,200 |
| Great Britain | 203,800 | 174,000 |
| British Columbia | 507,300 | 487,600 |
| Eastern | 21,500 | 19,200 |
| Seattle | 137,900 | 157,700 |
| Tacoma | 272,200 | 257,300 |
| Coos Bay | 44,700 | 41,600 |
| Other Mines | 7,000 | 14,500 |
| Totals | 1,415,200 | 1,329,100 |

—The Butte county Board of Supervisors have contracted with W. W. Montague & Co. to furnish 26,000 feet of steel pipe—19,000 feet eight-inch and 7000 six-inch—for road sprinkling. This pipe is to be made in Chico, where the contractors have fitted up a shop. The first consignment of steel plates, from which the pipes will be made, has arrived from Philadelphia. The work of bending and riveting the plates will take about sixty days, employing ten men. Marysville being a terminal freight shipping point the only excess freight rates are from Marysville to Chico, so by having the plates shipped there the contractors save the rates on the pipe from San Francisco to Marysville.

—Lacy & Rowland, who have been sinking oil wells at Puente, propose to build a refinery at Chino to convert the crude petroleum of Puente into illuminating oil and by-products. This refinery will be of 600 barrels daily capacity. It includes two 250-barrel stills and one 100-barrel still. The machinery will not be grouped in one large building, but will be in a number of buildings. The different stills, tanks, warehouses, shops, office, etc., will cover about four acres of ground. There will be three 45,000-barrel tanks and a number of smaller ones. The product of this refinery will at first be illuminating oil, naphtha and gasoline, though as soon as it is in operation experiments will be made to ascertain what other products can be profitably derived.

—A twelve-mule team left Fresno on the 11th with two wagons and 18,000 pounds of electric plant for the San Joaquin river—the framework and the armature for one of the dynamos which will generate electricity to be transmitted to Fresno. Two of these dynamos have arrived from New York, and another is on the road. Each dynamo weighs 24,000 pounds, but is in three pieces, and each piece can be handled separately. The largest piece weighs 11,000 pounds and is loaded on the front wagon; the next piece, 8000 pounds, is on the trail wagon. The 5000-pound piece will go at another time. The second dynamo remains for the present near the freight depot. The road to the mountains is a fairly good one. The bridge across the San Joaquin, built by the electric company, was designed especially to carry such loads. There is other heavy machinery to go, but not so heavy as these.

—The new oil-tank steamer, George Loomis, is at Ventura. It was built at the Union Iron Works for the Pacific Coast Oil Company, of steel throughout, the material being entirely of American manufacture, part of it having been cast in the East, and the major portion turned out from the Pacific Rolling Mills. The steamer is 196 feet in length; 27.5 feet in breadth of beam; 17 feet depth of hold. There are six tanks amidships, or one immense tank divided into compartments by a bulkhead running fore and aft, and two transverse bulkheads. Each separate tank will hold 1000 barrels of oil, and the vessel can be loaded or discharged in eight hours. Steam is generated by coal oil supplied from the refinery of the Pacific Coast Oil Company, and the steamer will be the means of furnishing oil for fuel to the various points around the bay. The Loomis will probably average five round trips a month, bringing to San Francisco 30,000 barrels of oil in that time. At present there are 400,000 barrels of oil awaiting shipment at Ventura, transportation by railroad being prohibitive on account of the excessive rates.

## Personal.

JOHN MCMURRAY of Trinity Co. has returned from a month's sojourn on the Atlantic coast.

GOV. J. E. JONES of Nevada is reported dying at the Palace Hotel, this city, of cancer of the stomach.

J. W. SHERER succeeds J. E. Loomis as superintendent of the Rocky Gulch mine, Galice creek, Or.

S. MORRELL, of Portland, Me., succeeds S. E. Bretherton as superintendent of the Ivanhoe, New Mexico, smelter.

EDOUARD SALADIN, general manager of the Cis Fse mines, Junction City, Cal., has returned from a trip to Paris.

CHAS. HOFER, of Carson, Nevada, left this week for Douglass Island, Alaska, to do assay work for the Alaska-Treadwell Co.

J. H. PORTER of Montana has recently invested considerable money in quicksilver properties near Redding, Shasta Co.

CLARENCE E. STUMP has been appointed general manager of the electrical exposition to be held in New York City from May 4th to June 1st.

EDMUND HARVEY, who recently assumed the management of the Golden Gate, Rock River and other Butte county mines, has returned to England.

GEO. A. RICE, a Salt Lake banker, has been examining mining properties in Calaveras county, and it is thought the Sevier, Utah, Mining Co. will shortly secure an option on some mines therein.

ARTHUR WOOD has resigned the superintendency of the Camas No. 2 mine and mill, of the Fortuna Mining Company, at Hailey, Idaho; M. Flynn, superintendent of the G. V. B. Mining Company, succeeds him.

THE Angels *Voice* says that T. T. Lane has severed his connection with the Utica mine as assistant superintendent, and in the future will devote his attention to his interests in the Plymouth Rock mine at Jenny Lind.

T. H. LEGGETT, late superintendent of the Standard mine at Bodie, Cal., with his wife and brother-in-law, George W. Burrows, was obliged to flee from Johannesburg, South Africa, to Cape Town to escape the arrest that overtook Messrs. Hammond, Butters and Mein.

RUSSELL L. DUNN, a well-known mining engineer of Placer county, has in preparation a description of the mineral resources of that county, an authentic, conservative statement of facts, that he is about to publish in a volume of some 200 pages, giving up-to-date information of practical value.

EDWIN FIELDS, who at one time owned a large part of the city of Tombstone, Arizona, and a mine worth more than half a million, was last week taken to the Chicago hospital in the police ambulance. From the hospital he was taken to the poorhouse at Dunning, to spend his few remaining years.

## Commercial Paragraphs.

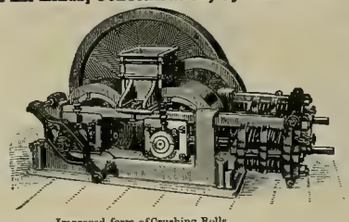
ESTABLISHED in 1864, the school of practical, civil, mechanical, electrical and mining engineering at 723 Market street, this city, of which A. Van Der Naillen is president, enjoys a deserved reputation for reliability. There are no vacations, and students are admitted at any time.

CHAS. C. MOORE, the manager, has a working model of the new wrought-steel sectional Babcock & Wilcox water-tube safety steam boiler on exhibition at the Pacific coast branch of the Babcock & Wilcox Co., 32 First street, this city. The model is a complete working boiler in detail, with all parts, fittings and appliances. This type of boiler has been brought into use by the growing demand for increased steam pressure, and the need for an economical safety steam generator for the advanced conditions of the present time. From a mechanical standpoint alone, one would be well repaid by an inspection of this model; and the company has at its office, in addition to the model, full-size sample pressure parts, the workmanship of which would certainly surprise any one who has not given special attention to the advancement in this class of boiler construction. The steel forgings differ from anything ever shown here before, and are simple and ingenious. From an inspection of the exhibits, it is easy to believe that the most efficient results can be secured; and the company's representative claims that the new construction possesses the following advantages: Freedom from strains due to expansion, perfect accessibility for inspection and cleaning in every part, thorough and efficient circulation, thin heating surface in furnaces, all straight tubes, no flat surfaces, stay bolts nor gaskets, joints removed from the fire, large draft area, complete combustion, thorough absorption of heat, quick steaming, dryness of steam, steadiness of water level, safety from explosion, great capacity for forcing, ease of transportation, being sectional, freedom from expense of repairs. It seems that a good deal is claimed for the boiler, but from what is shown at the office of the Babcock & Wilcox Co. it is not difficult to believe that the claims can be verified. This company has recently put in boilers of the wrought-steel construction for the Sutro Railroad Co., Commercial Steam Power Works and Pacific Power Co. of this city, and for the Giant Powder Co., Consolidated, Giant station. A new circular, entitled "High Pressure," is issued by the Babcock & Wilcox Co., giving a special description of the new wrought-steel boiler. This circular, also the well-known book "Steam," will be mailed free on application to Chas. C. Moore, Pacific coast agent, at 32 First street.


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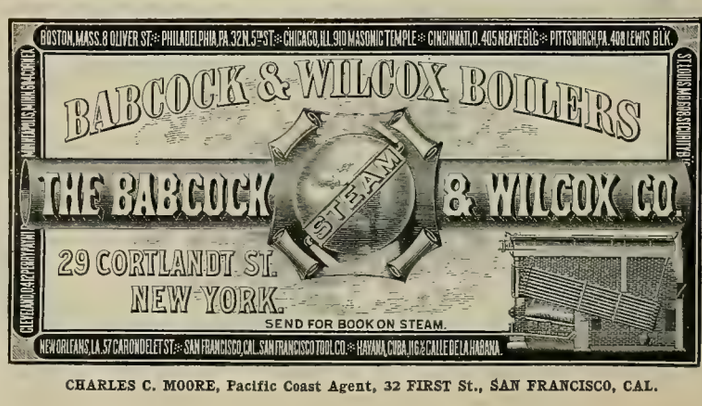
WESLEY T. GORHAM. HADWEN SWAIN.

Hadwen Swain Manufacturing Company.
Gas and Gasoline Engines
For operating irrigation and drainage pumps, hoisting works and stamp mills, etc.
The strongest, most economical and most durable engines made.
Highest award at Mechanics' Fair, San Francisco, 1895.
215 and 217 Spear St., San Francisco.

ESTABLISHED 1860. COLORADO IRON WORKS INCORPORATED 1876.
MANUFACTURERS AND BUILDERS OF
Smelting Plants of All Kinds, Concentration, Cyanide and Chlorination Plants.
Stamp Mills, Cornish Rolls, Roasting Furnaces, Hydraulic Sizers, Etc.
WESTERN AGENTS FOR ERIE CITY IRON WORKS ENGINES AND BOILERS.

Improved form of Crushing Rolls.
Crushers, Sampling Mills, Screens and Elevators, Sample Grinders, Etc.
WESTERN AGENTS FOR SMITH-VAILE STEAM PUMPS
For all kinds of service.
Our stock of supplies for Mines, Mills and Smelters is complete and we are prepared to fill orders on shortest possible notice.
We have an ore testing plant in connection with our works and we test ore in car lots for concentration and amalgamation, and build mills to successfully treat all classes of ores by latest known methods.
OFFICE AND WORKS, 33D AND WYNKOOP STS., DENVER, COLO.


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90,000 in Use in the United States.
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MANUFACTURERS OF
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FOR THE TRANSMISSION AND DISTRIBUTION OF POWER.
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For QUARTZ MILLS, HOISTING, PUMPING, DRILLING, and all Mining Work where Long Distance Transmission is required, a Specialty.
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HIGH GRADE STEEL




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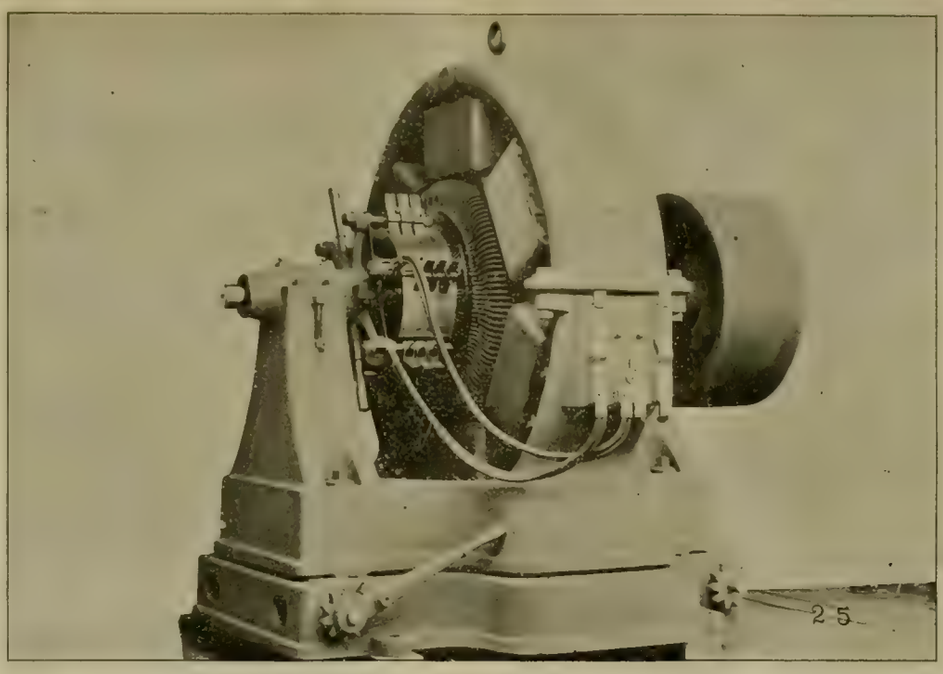
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## Mining Machinery.

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Write for estimates on complete Milling, Mining and Reduction Plants.




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★

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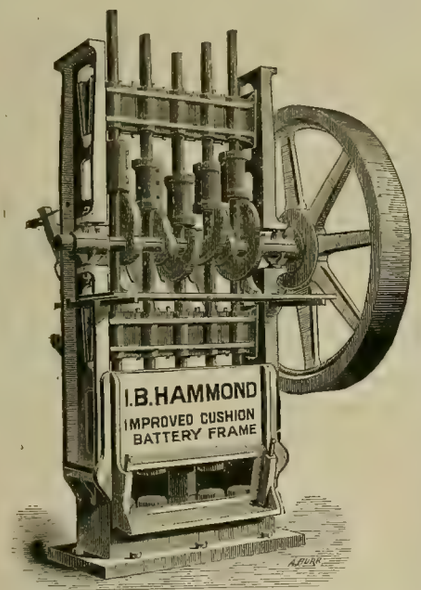
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MANUFACTURERS OF

## Stamp Mills, Ore Feeders

DETACHABLE BUCKET WIRE-ROPE TRAMWAYS,

Roller Grinding Pans, Desulphurizing Furnaces, Etc.




Improved Self-Contained Cushion-Frame Five-Stamp Mill.

Patented in the United States and Foreign Countries.

**The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Self-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill.**

**FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.**

**SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.**

**THIRD: The Large Amount of Space Saved.**

We refer by permission to Mr. N. A. McMillan, Haines, Oregon, manager of the Blue Mountain Mining Co., at Rock Creek, Or., where ten of our stamp mills are in operation; also to Mr. John S. Miller, Helena, Montana, manager of the Diamond Hill Mining Co., operating one of our forty-stamp mills at their mines at Townsend, Montana.

Send for Catalogue and Price List.

CORRESPONDENCE SOLICITED.

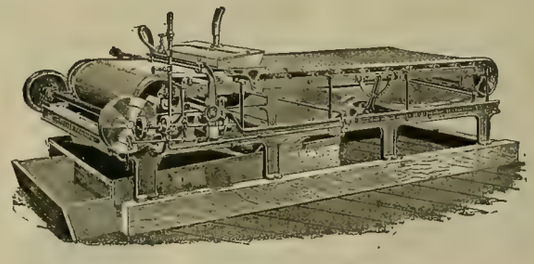
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# MINING AND MILLING MACHINERY.



The Hendy Improved Triumph Concentrator.

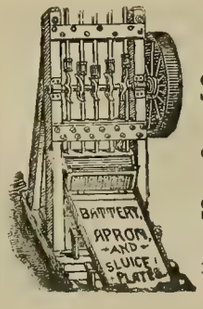
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Triumph Concentrators, Hendy-Norbom Concentrators, Rock Breakers, Hydraulic Mining Machinery, Challenge Ore Feeders, Steam Engines and Boilers, Hoisting and Pumping Machinery, Water Wheels.

# MINE BELL SIGNALS.

Adopted, Used and In Force in Accordance with State Law.

FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.




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Represents the highest development yet attained in water wheel practice and affords the most simple, efficient and economical means of utilizing water for power purposes.

## Six Thousand Wheels Now Running,

Aggregating over 400,000 horse power. Adaptation made to all conditions and every variety of service.

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PELTON WHEELS are the recognized standard for electrical work and are running a majority of the stations of this character in all parts of the world.

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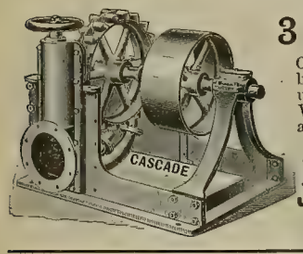
## THE PELTON WATER WHEEL CO.,

121 MAIN STREET, SAN FRANCISCO, CAL.

# TURBINE AND CASCADE WATER WHEEL

*Adapted to all Heads from*

## 3 Feet to 2000 Feet.





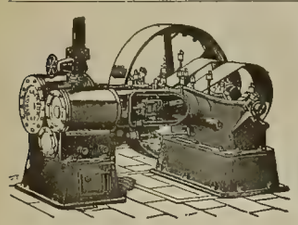


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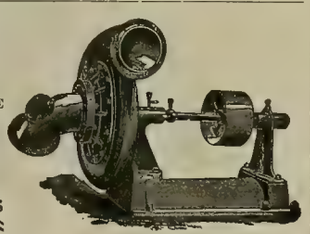
Send for a Pamphlet of either Wheel and write full particulars.

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## Cross-Compound Engines and "Whirlpool" Centrifugal Pumps

FOR EVERY DUTY AND CAPACITY.

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Rock Drilling, Air Compressing, Mining and Quarrying

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# GATES ROCK AND ORE BREAKER




PRODUCES A MORE PERFECT CUBIFORM MATERIAL AND A GREATER QUANTITY IN A GIVEN TIME PER HORSE POWER USED THAN ANY OTHER CRUSHER ON EARTH.

CAPACITIES UP TO 150 TONS PER HOUR. NINE DIFFERENT SIZES.

WE HAVE BUILT THE LARGEST STONE CRUSHING PLANTS IN EXISTENCE

## GENERAL MINING MACHINERY

OF EVERY DESCRIPTION.

## TREMAIN STEAM STAMPS

Connorsville Blowers, King-Darragh Concentrators, Stamps, Hoists, Rolls, Pans, Settlers, Smelters, Metallurgical Appliances, Etc.

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—MANUFACTURERS OF—

# SHEET IRON & STEEL PIPE

FOR TOWN WATER WORKS.

Hydraulic, Irrigation and Power Plants, Well Pipe, Etc., all sizes.

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Iron cut, punched and formed, for making pipe on ground where required. All kinds of Tools supplied for making Pipe. Estimates given when required. Are prepared or coating all sizes of Pipes with Asphaltum.

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—AND—

CHROME CAST STEEL

## Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.



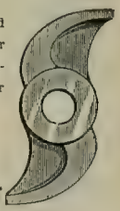
STAMP DIES.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

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Special attention given to the purchase of Mine and Mill Supplies.



Stamp Cam.

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MANHATTAN RUBBER BELTING, PACKING AND HOSE,
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LIGHT STEEL RAIL.

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The Largest and Most Completely Equipped Electrical Manufacturing Establishment in the World.

POWER, INCANDESCENT AND ARC LIGHTING, FROM THE SAME CIRCUITS.

We have purchased and are the SOLE OWNERS of the patents issued to Nikola Tesla for the POLYPHASE ALTERNATING SYSTEM, now recognized to be the most successful system for lighting and power purposes.

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STANDARD SYSTEMS

for distribution of light and power in LARGE MANUFACTURING ESTABLISHMENTS, MILLS and MINES.

WESTINGHOUSE ELECTRIC RAILWAY SYSTEM,

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## MINING AND MILLING MACHINERY,

Automatic Cut-Off Engines, High-Speed Engines, Hoisting Engines, Quartz Mills,
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PUMPS--Cornish and Other, Copper and Lead Furnaces, All Classes of Marine Work.

SHIP BUILDERS. ★ BUILDERS OF U. S. WAR SHIPS. ★ HYDRAULIC LIFT DOCK.

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# The Edward P. Allis Company, Milwaukee, Wis.

Established 1860. Reliance Works.

MINING, MILLING AND SMELTING MACHINERY.

Crushers, Rolls, Jigs, Concentrators,
Screens, Stamps, Pumps,
Compressors, Hoists, Boilers, Etc., Etc.

Reynolds Corliss Engines.

WORK THE BEST. PRICES THE LOWEST.

The Reliance Crushing Rolls.



The Best in the World.

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WRITE FOR OUR NEW CATALOGUE.

# The McGlew Ore Concentrator Company.

PATENTED SEPTEMBER 19, 1893. CHEAPEST, SIMPLEST, MOST DURABLE AND CLOSEST SAVING CONCENTRATOR IN USE. FRANK BARRERE, Secretary and Manager.

Can be seen in operation at the Company's works, 132 Main Street, San Francisco.

Office, 116 Davis Street.

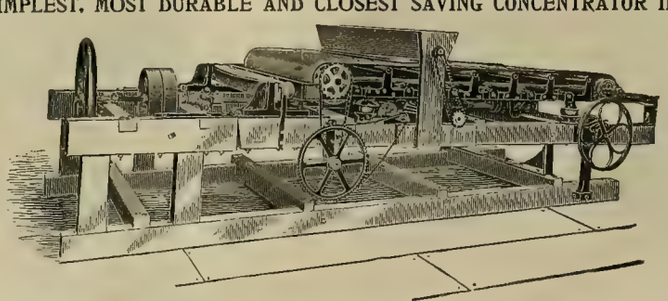
NINETY-FOUR AND ONE-HALF PER CENT
—SAVED—
ON ORES DIFFICULT TO CONCENTRATE.

A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.

SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION.

CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
Including prepared canvas belt 4 ft. 6 ins. wide.

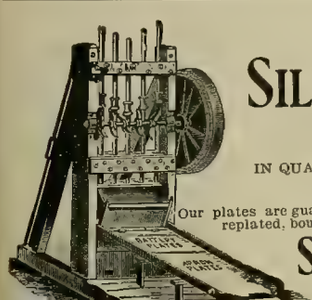


FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.
THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,
E. L. BALLOU, Propr. Ballou Reduction Works.



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# SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

## San Francisco Novelty and Plating Works

Incorporated.

Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH

—AGENT FOR—

# Market Reports.

## The Markets.

SAN FRANCISCO, Jan. 16, 1896.

Dull and depressed, small sales and weak prices characterized the metal market of the week. There is, however, a hopeful feeling in the trade, and an expectancy of active business, but the outlook is as foggy as the present weather. Cleveland, O., announces the price of Bessemer in '96 will be $4 per ton, an advance of $1.20 over last spring's quotations.

Silver shows an advance. London authorities on the movement of bullion estimate that shipments of silver to Asia in 1895 amounted to £6,000,000, a falling off as compared with recent years. On the other hand exports to the continent of Europe increased £2,500,000 over the previous year. Mexican dollars have been in good demand all over the East and the price has closely followed that of bar silver, with a premium of about 1½ per cent in favor of the coin. The imports of gold at London were large, amounting to £36,000,000, including £11,450,000 from the United States (to which, however, £3,275,000 was shipped) £8,200,000 from South Africa and £6,250,000 from Australia, while India and China shipped £3,300,000 to London.

### New York Metal Market.

NEW YORK, Jan. 16.—PIG IRON—Southern, 11@12.00; Northern, 12@12.50.

COPPER — Brokers', 10.00c; exchange, 9.80c.

LEAD—Brokers', $2.90; exchange, $3.00.

TIN—Straits, 13c@13.20c.

SPELTER—Domestic, $3.00.

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.87 |
| London Merchants | $4.84½ |
| London Sight Bankers | $4.89 |
| Refined Silver, per oz., 1000 fine | 67½c |
| Mexican Dollars | 54c |

### New York Silver Prices.

NEW YORK, Jan. 16. — Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 30⅝ | 66¾ | 10 00 | ..... |
| Saturday | 30½ | 66¾ | 9 90 | 3 00 |
| Monday | 30⅝ | 67 | ..... | 2 95 |
| Tuesday | 30⅝ | 67⅛ | 9 90 | ..... |
| Wednesday | 30⅞ | 67½ | ..... | 3 00 |
| Thursday | 30¾ | 67¼ | 10 00 | ..... |

### San Francisco Metal Market.

COPPER.

| | | | |
|---|---|---|---|
| Bolt | ¼ & 5-16, 21c; ⅜ and larger, 22c | | |
| Lake Superior Sheathing | 23 | @ | — |
| Ingot, jobbing | — | @ | 19 |
| Ingot, wholesale | 18 | @ | — |
| Sheet copper | — | @ | 22 |

ZINC.

| | | | |
|---|---|---|---|
| Sheet | 9½@ | | |

LEAD.

| | | | |
|---|---|---|---|
| Pig | — | @ | 3 85 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.

| | | | |
|---|---|---|---|
| Drop, sizes *smaller* than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and *larger* sizes, " | " | ... | 1 65 |
| Buck, Balls and Chilled, do, " | " | ... | 1 65 |

IRON.

| | | | |
|---|---|---|---|
| American Soft | 22 00 | @ | 26 00 |
| Pig, per ton | 18 00 | @ | 20 00 |

STEEL.

| | | | |
|---|---|---|---|
| English, lb | 16 | @ | 19 |

COKE.

| | | | |
|---|---|---|---|
| Gas Companies' | 75c ₱ bbl. | | |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 13 00 |
| " in sacks | — — | @ | 15 00 |
| Cumberland | 9 00 | @ | — — |

ANTIMONY.

| | | | |
|---|---|---|---|
| Per lb | — | @ | 10 |

PIG TIN.

| | | | |
|---|---|---|---|
| Per lb | 15 | @ | 16 00 |

QUICKSILVER.

| | | | |
|---|---|---|---|
| Home trade, per flask | 39 00 | @ | 40 — |

BORAX.

| | | | |
|---|---|---|---|
| Refined, in car lots | — | @ | 5⅛ |
| Refined, in sacks and barrels | — | @ | 5⅜ |
| Powdered, in car lots | — | @ | 5⅜ |
| Concentrated, " | — | @ | 4⅞ |

TIN PLATE.

| | | | |
|---|---|---|---|
| Per bx | 4 75 | @ | 5 00 |

ZINC.

| | | | |
|---|---|---|---|
| Sheet | 8½@ | | |

NAILS.

| | | | |
|---|---|---|---|
| Wire | | | $1 75 |
| Cut | | | 1 50 |

LUMBER.

SAN FRANCISCO—WHOLESALE.

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

COAL.

SPOT FROM YARD—PER TON.

| | |
|---|---|
| Wellington | $ 8 00 |
| Greta | 7 50 |
| Nanaimo | 7 00 |
| Gilman | 6 50 |
| Seattle | 6 00 |
| Coos Bay | 5 00 |
| Cannel | 8 50 |
| Egg, hard | 10 00 |
| Wallsend | 7 50 |
| Scotch Splint | 6 50 |
| Brymbo | 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 35 |
| Liverpool Steam | 5 87 |
| Scotch Splint | 6 50 |
| Cardiff | 6 00 |
| Lehigh Lump | 9 00 |
| Cumberland | 8 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

# MINING SHAREHOLDERS' DIRECTORY.

### ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied, Delinq't and Sale. | Secretary. |
|---|---|---|---|---|
| Alta S M Co, Nev | 51 | 10c | Jan 13. Feb 17. Mar 9 | J E Jacobus, 309 Montgomery |
| Anita G M Co, Cal | 7 | 8c | Dec 7. Jan 18. Feb 4 | L F Reichling, 404 Montgomery |
| Challenge Bend M Co, Cal | 1 | 35c | Jan 13. Feb 21. Mar 13 | W E Davis, 39 Sutter |
| Challenge Con M Co, Nev | 20 | 5c | Dec 20. Jan 22. Feb 12 | C L M'Coy, Mills Building |
| Clara G M Co, Cal | 1 | 3c | Dec 17. Jan 30. Feb 20 | C M Cross, Chronicle Building |
| Con New York M Co, Nev | 14 | 5c | Dec 10. Jan 15. Feb 6 | C E Elliot, 309 Montgomery |
| Crown Point G & S M Co, Nev | 66 | 25c | Jan 16. Feb 20. Mar 12 | Jas Newlands, Mills Building |
| Evening Star M Co, Cal | 2 | 1c | Dec 14. Jan 22. Feb 15 | M G Loefler, 137 Montgomery |
| Gray Eagle M Co, Cal | 42 | 5c | Jan 6. Feb 7. Mar 3 | W J Gurnett, 308 Pine |
| Hale & Norcross S M Co, Nev | 108 | 15c | Dec 10. Jan 15. Feb 7 | A B Thompson, 309 Montgomery |
| Haskell G M Co, Cal | 1 | 1c | Dec 11. Jan 18. Feb 8 | G W Osborn, 309 Montgomery |
| Hite G M Co, Cal | 2 | 10c | Dec 17. Jan 30. Feb 10 | H E Mathews, 120 Sutter |
| Home G M Co, Cal | 9 | 5c | Dec 24. Feb 1. Feb 19 | O E Johnson, 315 Front |
| Justice M Co, Nev | 60 | 10c | Jan 13. Feb 17. Mar 9 | R E Kelly, 309 Montgomery |
| Lady Wash'ton Con M Co, Nev | 11 | 5c | Jan 16. Feb 17. Mar 10 | J E Jacobus, 309 Montgomery |
| Mono G M Co, Cal | 36 | 10c | Dec 30. Feb 2. Feb 25 | M E Willis, 309 Montgomery |
| Occidental Con M Co, Nev | 21 | 15c | Dec 17. Jan 20. Feb 10 | Alfred K Durbrow, 309 Montgomery |
| Overman S M Co, Nevada | 74 | 10c | Dec 2. Jan 6. Jan 27 | G D Edwards, 414 California |
| Red J cket Con M Co, Nev | 3 | 1½c | Dec 18. Jan 27. Feb 17 | S M Capp, 413 Montgomery |
| Savage M Co, Nev | 88 | 20c | Jan 4. Feb 6. Feb 26 | E B Holmes, 309 Montgomery |
| Union Con M Co, Nev | 52 | 20c | Jan 14. Feb 17. Mar 17 | A P Swain, 309 Montgomery |
| Ybarra Gold M Co, Lower Cal | 3 | 50c | Dec 26. Jan 27. Feb 12 | T G Cantrell, 132 Market |
| Yellow Jacket M Co, Nev | 60 | 25c | Nov 12. Dec 17. Jan 22 | W H Blauvelt |

### MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Belcher S M Co, Nev | C L Perkins, Mills Building | Jan 28 |
| Lone Star Q & G M Co, Cal | A W Blundell, 508 California | Jan 18 |
| Utah Con M Co. | A W Havens, 309 Montgomery | Jan 29 |

## Mining Share Market.

SAN FRANCISCO, Jan. 16, 1896.

Occidental has been the most active stock. It moved up to $1.20, then broke to nearly 90 cents, and recovered slightly; but it looks as if it had seen its best for a short time at least. The Comstocks moved up slightly, with Hale & Norcross scoring the best advance, and then began to shade off. The strong tone to the market and slightly higher prices as usual brought in a few outside buyers, who found that the long-promised deal had set in. They also caused a few of the more timid shorts to fill. While the market acts as if a lower range of values will obtain, still there seems to be evidence that much better things are in the near future for weary assessment-racked shareholders. This opinion is grounded largely on the way in which the market is handled by the manipulators. The backing and filling at this season of the year are generally accepted as evidence that outside operators are to be made more tired and disgusted, so as to cause them to unload their holdings. Then, heavy sums of money are being disbursed by incorporated companies in dividends, which heavy sums are being paid out on interest accounts by government, State and county. This money will be seeking investment, and it is not at all unreasonable to conclude that persons largely interested in mining shares may give them a chance to put a few of the dollars into their rat-holes. To do this successfully values must be advanced and the market made attractive by lively fluctuations. This can be done on the showing already made in the mines, which can be magnified in the usual way by street points, vague hints and rumors. It may even be done on the election of A. G. Garnett, president of the San Francisco Stock Board, for he is well known to be an active and wide-awake broker of considerable means, and nothing offers him greater pleasure than to be in an active market. Perhaps he may be induced to join the bulls; at any rate, it looks as if a livelier market and higher prices will be seen shortly, but how high the market can be sent successfully time alone will tell.

The news from the Comstocks grows more interesting. The work under way and that outlined in the different groups ought to result in better things than has been seen for some time, but unless there is money or backing to any move that may be made on the showing in the mines, the market will not be sustained at any advance. In the Alta group an assessment of 10 cents has been levied in Alta so as to help in paying expenses incurred in exploiting the mine. The work seems to be largely of a kill-time character, yet they may accidentally run into ore. In the Gold Hill group the work is essentially unchanged from that reported in last week's PRESS. Those in position to know look for better things before the end of February in one or two of the mines. The work started on the east on the 1100-foot level of Crown Point is being watched, but if it was on a much lower level than that much better results would be looked for. On that level and several below considerable good to high grade ore was taken out in years gone by. It was good bearing ore too. It is thought that this work to the east may eventuate by running into old workings. In Belcher the work is to the west. From Yellow Jacket no news that comes is allowed to leak out, which causes many to be suspicious that something of importance is under way. But this kind of drawing on the imagination always obtains when the managers of a mine do not have much to report. It is queer people, these outside share operators; like a drowning man they catch at straws. In Confidence, Challenge, Con. Imperial and Alpha the usual reports come to hand. The managers of these mines are slower than death in relieving the sufferings of a consumptive. It is hope deferred that makes the heart sick. In the middle group they are still following stringers and prospects with the hope that better things may result from following them up, but this has been the order for months past and no great things have resulted from it. In Bullion and Gould & Curry the long winded west drifts are still being run, but as yet nothing of value has been struck. In Best & Belcher there is no change to report. In Con. Virginia active and seemingly energetic work is the order on several levels. It would seem as if by March, at the farthest, they ought to find something of importance. The prospecting work is said to be in the right quarter for finding something. It is not at all unlikely that the Jim Rule ore body may be found before the spring months pass. In Ophir and Mexican there is nothing new to report. Work is being prosecuted, as it has been for many months, in the right direction, yet nothing has so far come out of it except assessments. This kind of a strike is where shareholders draw the line. In Union and Sierra Nevada there is nothing new to report. Experienced miners watch the work with so much interest as to cause dealers to look for an ore strike. This may come in the course of human events. Andes is not mentioned nowadays.

On the Brunswick lode work is being vigorously prosecuted, but as yet without any exciting result. In Occidental the work done caused a slight flurry in the shares, but the good things reported either gave out or else the backers lack money to keep the values up. The work being done on the lode by the Comstock companies is reported as being actively pushed, but it is expected that more time will be required before anything tangible can be discovered.

In the Bodie district there is nothing of importance being done. They are still using up money trying to find ore on the upper levels of Bodie. Work will have to be done on still lower levels before it can be expected that much of importance will be found.

The following illustrates the changes of the week:

| Mines. | Jan. 9. | Jan. 16. |
|---|---|---|
| Alpha | $ 23 | $ 22 |
| Alta Consolidated | 12 | ..... |
| Andes | 26 | 21 |
| Belcher | ..... | 25 |
| Best & Belcher | 95 | 91 |
| Bodie | ..... | 41 |
| Bullion | 18 | ..... |
| Challenge | 30 | ..... |
| Chollar | 73 | 63 |
| Confidence | 1 20 | ..... |
| Consolidated California and Virginia | 2 55 | 2 50 |
| Consolidated New York | ..... | ..... |
| Crown Point | ..... | 23 |
| Exchequer | ..... | ..... |
| Gould & Curry | 54 | 56 |
| Hale & Norcross | 1 20 | 1 35 |
| Justice | ..... | 03 |
| Mexican | 65 | ..... |
| Ophir | 1 50 | ..... |
| Overman | 20 | 19 |
| Potosi | 60 | 53 |
| Savage | 32 | 29 |
| Sierra Nevada | 61 | 44 |
| Union | 48 | ..... |
| Utah | 07 | ..... |
| Yellow Jacket | 46 | 42 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, Jan. 16, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 100 Alpha | 22 | 350 Hale & Norcross | 1 35 |
| 100 Andes | 21 | 900 Occidental | 65 |
| 500 Best & Belcher | 91 | 1200 | 63 |
| 500 Chollar | 63 | 300 Overman | 19 |
| 300 C. C. & Va | 2 50 | 250 Potosi | 53 |
| 100 Crown Point | 23 | 100 Savage | 29 |
| 500 Gould & Curry | 56 | 400 | 28 |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 200 Gould & Curry | 55 | 200 Overman | 17 |
| 50 Crown Point | 20 | 200 Justice | 03 |
| 800 | 19 | 300 Scorpion | 02 |
| 100 Yellow Jacket | 42 | 500 Occidental | 66 |
| 500 Con. Imperial | 02 | 900 | 65 |
| 600 Alpha | 20 | 100 | 64 |
| 300 Belcher | 25 | 50 Bodie | 40 |
| 100 Sierra Nevada | 44 | 200 | 41 |
| 100 S Belcher | 09 | | |

THE CALIFORNIA DEBRIS COMMISSION having received applications to mine by the hydraulic process from John Spaulding in the Polar Star mine near Dutch Flat, Placer Co., and T. G. Phel s in the Liberty Hill mine, Nevada Co., to impound tailings in Bear River, and from Olonzo Engle in the Adkins mine near Ono, Shasta Co., to impound tailings in a ravine, gives notice that a meeting will be held at room 32, Flood Building, San Francisco, Cal., on Jan. 20th, 1896, at 1:30 P. M.


## WANTED!

### A COMPETENT ASSAYER AND ACCOUNTANT

IS OPEN FOR ENGAGEMENT.

Situation in some California mine preferred.

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**Wanted—Position as Amalgamator.**

Have a practical knowledge of how to work all free milling gold rock. Fifteen years experience in Australia and California. T. L. ANDREW, Grass Valley, Nevada Co., Cal.


# Assessment Notices.

JUSTICE MINING COMPANY. — Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of January, 1896, an assessment (No. 60) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 309 Montgomery street, Room 23, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 9th day of March, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. E. KELLY, Secretary.

Office—No. 309 Montgomery street, Room 23, San Francisco, California.

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ALTA SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Gold Hill Mining District, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of January, 1896, an assessment (No. 51) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 33, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 9th day of March, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. E. JACOBUS, Secretary.

Office Room 33, Nevada Block, No. 309 Montgomery street, San Francisco, California.

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SAVAGE MINING COMPANY.—Location of principal place of business, San Francisco, California. location of works, Virginia Mining District, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors held on the fourth (4th) day of January, 1896, an assessment (No. 88) of twenty cents (20c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 50, Nevada Block, No. 309 Montgomery str. et, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the sixth (6th) day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 26th day of February, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. B HOLMES, Secretary.

Office—Room 50, Nevada Block, No. 309 Montgomery street, San Francisco, California.

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WEST SIDE CANAL AND LAND COMPANY.—Location of principal place of business, San Francisco, California. Location of Works, Fresno and Kings counties, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 30th day of December, 1895, an assessment (No. 3) of one (1c) cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 8, Floor 8, Mills Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of February, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 27th day of February, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. E. NAYLOR, Secretary.

Office, Room 8, Floor 8, Mills Building, San Francisco, California.

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ANCHOR COAL AND DEVELOPMENT COMPANY.—Location of principal place of business, San Francisco, California. Location of Works, Kelso, Cowlitz county, Washington.

Notice is hereby given, that at a meeting of the Board of Directors held on the second (2d) day of January, 1896, an assessment (No. 6) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 632 Market street, Room 5, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the third (3d) day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the fifth (5th) day of March, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. D. FARISH, Secretary.

Office, No. 632 Market street, Room 5, San Francisco, California.

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OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of December, 1895, an assessment (No. 21), of fifteen (15) cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 68, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assess ent shall remain unpaid on the 20th day of January, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 10th day of February, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 68, Nevada Block, No. 309 Montgomery street, San Francisco, California.

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HITE GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Mariposa County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the seventeenth day of December, 1895, an assessment (No. 2) of fifteen (fifteen cents) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 120 Sutter street, Room 27, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of January, 1896, will be delinquent, and advertised for sale at public auction; and, unless payment is made before, will be sold on MONDAY, the 10th day of February, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

H. E. MATHEWS, Secretary.

Office—Room 27, 120 Sutter street, San Francisco California.

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR WEEK ENDING JANUARY 7, 1896.

552,685.—CALF WEANER—B. W. Bussell, Walla Walla, Wash.
552,704.—GAS COCK—Jos. Clark, S. F.
552,824.—BRAKE ROD—Cook & Scott, Woodburn, Or.
552,519.—CONCENTRATOR—H. R. Ellis, S. F.
552,750.—SLIDE CLAMP—M. J. Hawley, S. F.
552,769.—BELL RINGER—T. W. Heintzelman, Sacramento, Cal.
552,581.—FIRE ESCAPE—J. Knapke, New Pine Creek, Or.
552,870.—CURTAIN FIXTURE—J. W. Lang, Los Angeles, Cal.
552,633.—MOUTH MIRROR SUPPORT—O. P. Myers, S. F.
552,667.—EVAPORATOR—J. W. Mote, Wilbur, Or.
552,668.—FIRE ENGINE HARNESS—Thos. Murphy, S. F.
552,751.—TYPE WRITER—H. G. Perry, Suisun, Cal.
552,782.—BOX MACHINE—O. A. Sanford, Newcastle, Cal.
552,872.—FLUID MOTOR—J. Schade, Los Angeles, Cal.
552,624.—LEAD BATH APPARATUS—A. M. Shields, Oakland, Cal.
552,672.—INVALID BED—E. C. & T. D. Souney, Sacramento, Cal.
552,733.—ANGLE COCK—E. B. Stoner, Seaside, Or.
552,675.—VOTING MACHINE—G. J. Sweeney, Petaluma, Cal.
552,651.—SHIRT SLEEVE—W. F. Williams, Bishop, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FIRE ENGINE HARNESS.—Thomas Murphy, San Francisco, Cal. No. 552,668. Dated Jan. 7, 1896. This invention relates to a harness, a mechanism connected therewith whereby the harness is rapidly disengaged from suspending devices, and is automatically secured upon the horses. It consists of two-part collars hinged together at the top, adapted to close and lock at the bottom, mechanism for holding them in a normally open position, mechanism for disengaging the holding device and closing and locking the collars, a suspending yoke with an elastic retracting device, and pins by which the breeching is held up; a pulley with a cord having one end attached to one side of the collar, passing thence over the pulley and connected with a disengaging latch mechanism; a rod or bar fixed to the movable part of the collar upon which the latch mechanism is slidable so as to move from one end to the other when the collar is opened or closed; a spring suspending device acting to draw the front yoke upward when the collar has been disengaged, and thus tilt it until the breeching slips off, and the counterbalance acting to return the yoke to an approximately horizontal position when freed from the harness.

LEAD BATH APPARATUS FOR WORKING ORES.—Andrew M. Shields, Oakland, Cal., assignor to the Morosco, Shields & Bishop Fusion Co., San Francisco, Cal. No. 552,624. Dated Jan. 7, 1896. This invention relates to an apparatus in which molten lead is employed as a bath, and finely pulverized ore or sand bearing the precious metals is forced through the bath for the purpose of extracting the metal therefrom. It consists essentially of a pan having an inclined bottom, a chamber connected with the lower and deeper part of the pan adapted to contain molten lead, a channel carrier having a central shaft by which it is turnable, an annular groove or channel around its upper periphery, said carrier being adapted to receive the ore at the upper and shallower side of the pan and deliver it within the bottom portion of the chamber at the opposite side, hinged gates adapted to swing across the channel to carry the ore from its point of reception to its point of delivery and to be then turned out of the channel to allow the ore to be discharged, and means at the point of delivery for moving the gate out of the channel and lifting the ore therefrom so as to deliver it to the molten metal above.

VOTING MACHINE.—George Jay Sweeney, Petaluma, Cal. No. 522,675. Dated Jan. 7, 1896. This machine consists of a casing, which is preferably a transparent one, as of glass, said casing having within it one or more rotable cylinders, to the peripheries of which is secured a voting, or, as it may be termed, a "tally" sheet, the spaces upon which are adapted to be successively brought into alignment with an overlying slot, or opening, in the casing; a sliding stamp, mounted upon the casing beside said slot and adapted to operate through it to leave its impression upon the underlying tally sheet; means for intermittently rotating the cylinder to present fresh spaces of the tally sheet to the action of the stamp and other details of construction to complete the perfect operation. The object of the invention is to provide a machine by which the voter is enabled to register his vote for each candidate directly upon the tally sheet, thereby saving the time used in reading out the votes after the election is over and tallying them by hand; also, to provide for avoiding mistakes of carelessness, ignorance or dishonesty; to minimize the time of voting and to economize in the cost, generally, of holding an election, as well as to enable returns to be made in the shortest possible time and subsequent recounts to be had.

INVALID BED.—Edward C. Souney and Thomas D. Souney, Sacramento, Cal. No. 552,672. Dated Jan. 7, 1896. The object of this invention is to provide a bed in which a perfectly helpless patient may be turned from his back to his face and vice versa, and the mattress on which he has been lying removed for the substitution of another mattress to receive him in his changed position, thus not only relieving the invalid by a change of position, but also affording opportunity to change and freshen the bed. The bed consists of a frame having circular ends so supported that said frame may be invertibly rotated; and independent detachable mattresses to alternately support the patient. The detachable connection between the mattress and frame consists of a duplex twisted bar or hanger-screw which is provided with means for holding and relieving it, to keep it from or to permit it to axially rotate.

## New California Mining Companies Incorporated This Week.

The Jennie Gold Mining Company has incorporated in this city; directors, T. G. Flagg, W. Rutledge, J. J. Higgins, C. Johnson and S. Wilson; capital stock, $300,000, $250 subscribed.

The Charleston Gold and Silver Mining Company; principal place of business, Bodie; capital stock, $1,000,000; F. M. Jones, W. H. Netherton, N. J. Salisbury, M. Salisbury of Bodie and C. M. Buel of San Francisco, directors.

The Tuolumne County Mining and Development Company; principal place of business, Fresno; capital stock, $18,000; N. W. Moodey, T. R. Brown, J. Scott, J. L. Marble and H. E. Barnum of Fresno directors.


DIVIDEND NOTICE.

The German Savings and Loan Society,
326 California Street.

For the half year ending December 31, 1895, a dividend has been declared at the rate of four and twenty-six hundredths (4 26-100) per cent per annum on Term deposits, and three and fifty-five hundredths (3 55-100) per cent per annum on Ordinary deposits, free of taxes, payable on and after THURSDAY, January 2, 1896.
GEO. TOURNY, Secretary.

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By J. S. PHILLIPS, M. E.
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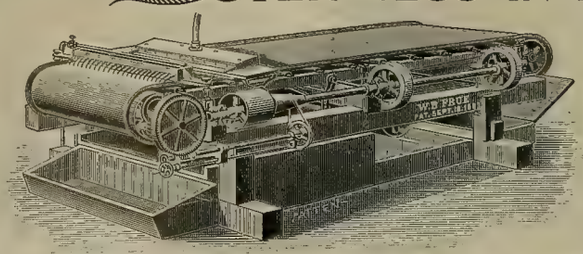
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# RISDON IRON WORKS,

SAN FRANCISCO, CAL.

## READ WHAT MINERS THINK OF THE BRYAN IMPROVED ROLLER QUARTZ MILL AND JOHNSTON CONCENTRATOR.

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.

The mills require very little attention. At our mill an ordinary "peon," earning one dollar per day, has complete charge.

In regard to slimes, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.
SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY,
S. BAMBERGER, President and Manager.
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,
[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO,
C. C. MCIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. MCIVER, President.

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MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

VOLUME LXXII. Number 4.

SAN FRANCISCO, SATURDAY, JANUARY 25, 1896.

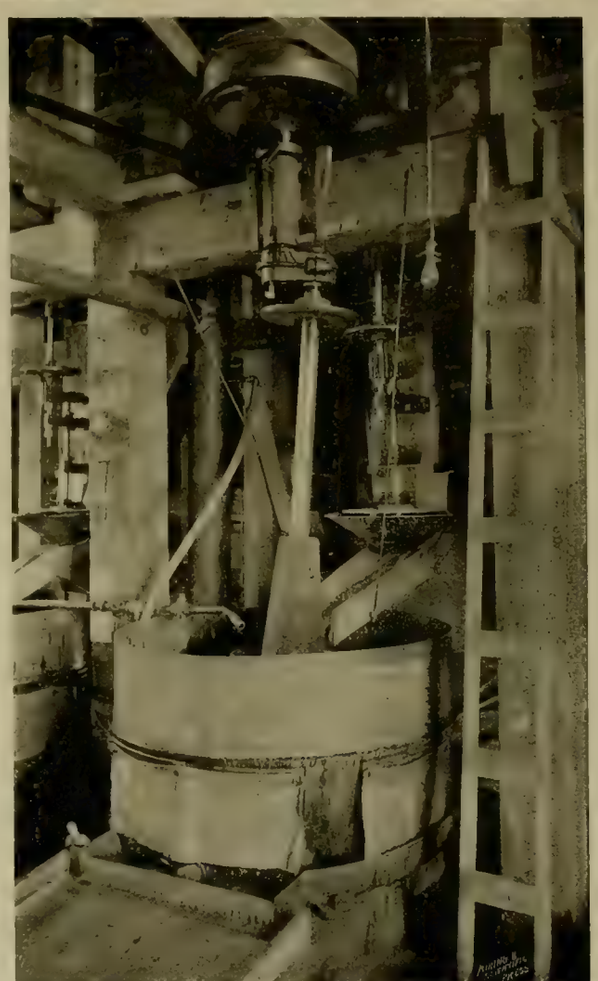
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## The Kinkead Waste Rock Experiment.

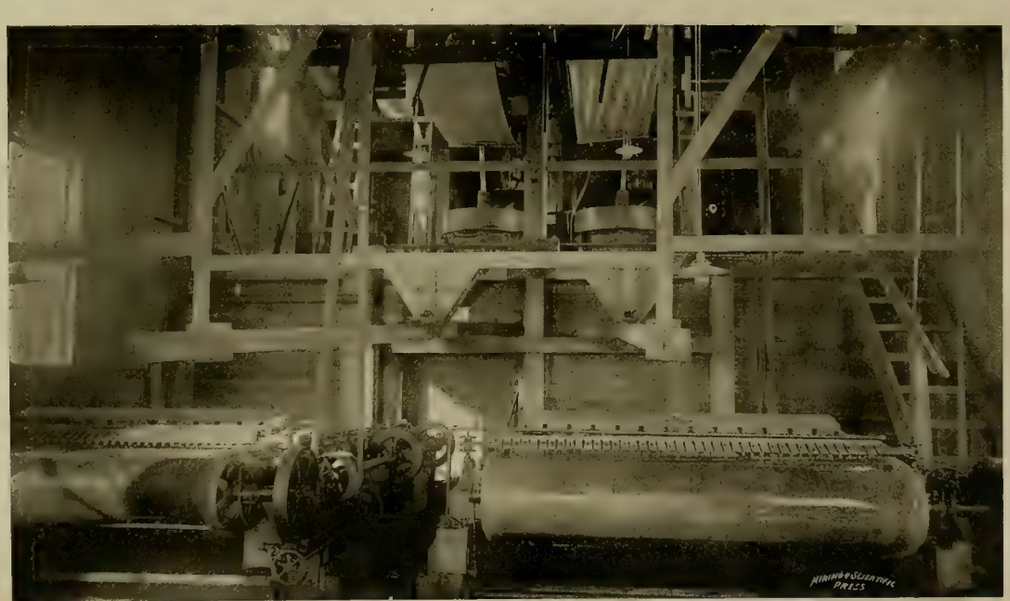
Had any one in the bonanza days of '74-5-6 at Virginia, Nevada, prophesied that twenty years after effort would be made to extract profit from the waste dumps of the C. & C., he would have been laughed at. Yet this is just what is now being done, and, it would seem, with good promise of permanence. About a year ago Supt. Jas. H. Kinkead, an old and experienced Comstock miner, organized the Kinkead Mill and Mining Co., and since then he has been busy getting the proposed plant into practical shape. The MINING AND SCIENTIFIC PRESS has had photographs taken of the plant just as it began to be put into operation on the 4th inst., engravings from which appear on this page. On page 67 appears a sectional view of Supt. Kinkead's newly patented crusher. The matter is of considerable importance to every mining region on the coast where waste dumps of any magnitude have accumulated. Already the Kinkead plant is being visited by mining men from Bodie and elsewhere, and the project has attracted unusual interest.

The Kinkead Mill and Mining Co. was organized to work the Comstock waste dumps especially and any custom ores that may come to the mill. The mill is a concentrating plant, and there is nothing new about it except in lieu of stamps the Kinkead mill is used for crushing the ore.

This mill is the invention of Mr. Jas. H. Kinkead, superintendent of the Occidental and other mines, and letters patent were secured for him by Dewey & Co. The mill consists of a pan five feet radius on the inside, having a convex bottom declining outwardly from the center, with sides six inches high extending upwardly at right angles with the bottom. A false bottom or die is dropped into the pan and is held in place by wooden wedges. The crushing device is a muller weighing 2000 pounds, to which is bolted a shoe having a conical bottom with diverging sides, the concavity of the bottom being slightly less than the convexity of the pan bottom. A shaft six feet long is attached to the muller and is made to gyrate by a crank attached to a vertical shaft, which is secured to the timbers above the pan. The crank has a ten-inch throw; and when in motion, brings the surfaces of the shoe and die into contact and produces a gyrating motion, which crushes and grinds the ore. The crank runs loosely on the pan shaft, which allows the muller to raise in case too much ore is fed into the pan. The ore is fed into the machine automatically through the openings around the cone at the center, and the coarse rock is broken up by a ring having corrugated steps; and when broken to the size of a walnut, works out between the shoes and dies and is ground up and discharged through the screens which surround the pan.



THE KINKEAD MILL.



INTERIOR OF PLANT, SHOWING MILLS AND VANNERS.

The inventor claims for this mill that it will do the work of a five-stamp battery, with less than half the power required to run five stamps, and can be built and put in operation for less than half the cost of stamps. The only wear is the shoe and die, which is less than one stamp. Having what they conceive to be a cheaper device for crushing ore than in ordinary mills, the Kinkead Co. believe it possible to make money out of ore so low in value that it has been treated as waste and thrown away. The material taken from the dump is run out in cars and dumped onto a half-inch grizzly, experiments having shown that the fine or decomposed material was the best. All that passes through the screen is treated as pay ore and is run to the mill. The coarser rock is run to a dump to be picked over by boys, who sell their pickings to the company on a percentage of the assay. About 5000 tons of the screenings have been run out and piled up at the mill. The assay value is about $4, and the company expects to recover about seventy-five per cent of the assay. It is estimated that there is at least 200,000 tons of material in the Con. Va. dumps that will average $4 per ton coin value. There is considerable waste rock adjacent to the Con. Va. susceptible of the same general treatment, rich in pyrites and containing gold which, if this idea be successful, can be recovered. The present plant is experimental and consists of two Kinkead mills and two six-foot plain belt Frue vanners. Each mill will crush fifteen tons in twenty-four hours through a forty-mesh screen. The pulp passes over amalgamated plates into sizing boxes, and thence to the vanners. A No. 2 Pelton motor (twelve-inch), with a quarter-inch nozzle under a water pressure of 220 pounds, runs the whole mill.

The concentrates will be shipped and sold, for the present, but later on, when the plant is enlarged, they will be worked by the company on the ground.

# MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

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J. F. HALLORAN.....General Manager

San Francisco, January 25, 1896.


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WITHOUT desiring to enter in any way into the present political discussion regarding recent sensational occurrences in the Transvaal, it is in order to suggest to some who lay stress on the unwarranted action of the "Uitlanders" that the principle opposed by the English and Americans in South Africa is precisely that objected to by the American colonists in revolutionary days—taxation without representation. In the case of the Rand residents, it is not only taxation, but extortion. True, "if they don't like it, they can leave," but human nature is the same the world over and the Kruger-Jameson-Hammond-Rhodes trouble will ultimately result in proper representative government and the triumph of what may be styled the American idea.

THE present activity in electrical progress is shown in the fact that in 1894 there were 1704 patents issued in this country on devices wherein electrical power is to be applied, in Great Britain 1130, in Germany 481. Of this total of 3315 there were 365 for improvements in dynamos, motors, armatures, field cores, etc.; 450 related to the distribution of electrical power, apart from its generation or transmission; 395 applied to electric lighting, and a lesser proportion to electric haulage in mines, electric welding, and electrolytic devices; telegraph patents numbered 103, telephone patents 220, and signalling by sound 457. Electric meters called forth 158 patents.

FROM New York City is wired the absurd statement that Nicola Tesla, the great electrician, has invented an electrical contrivance to cure consumption of the lungs. It may be that some empiric has what he imagines to be a consumption cure, but it is ridiculous to associate Tesla's name with any alleged therapeutical application of electric force. The method claimed is "to kill by vibration the bacteria." It is probable that if applied in the manner indicated the vitality of the unfortunate patient would be overcome before that of the bacteria. A good many widely advertised "electrical" remedies are weekly exploited, but till now the names of leaders in electrical science have not been used in the attempt to create confidence in statements that justly arouse distrust.

THE Denver, Colorado, *Republican* is doing good work in showing up some of the attempted Eastern mining swindles in connection with the Cripple Creek district. Every reputable paper in the country is interested in exposing and denouncing the wildcat schemes that the present mining activity is sure to produce. There are at present appearing in some Boston and New York journals alluring prospectuses that are fraudulent throughout. The people who are deceived thereby are the very ones who can least afford to lose their earnings, and since the proprietors of those papers admit such advertisements and statements so palpably false to the speculator, investor and capitalist, it is a duty that every other journal owes to itself and its constituency to head off and expose the fraud as fully as possible. To the credit of most of the Pacific coast papers be it said the proffered advertisements of these bunco men are flung in the waste basket. They should be exposed and their trade destroyed wherever practicable.

SENATOR DUBOIS' bill has passed the Senate, and, it is thought, will pass the House and become a law. It is represented to prescribe that twenty-five per cent of the purchase price of mineral lands shall be given to the several States for the creation and maintenance of schools of mines, but that is not exact, for, ordinarily, there is no regular "purchase," as the ground is taken up, held by annual assessment work, and when U. S. patent is finally secured the fees are but $5 an acre, one fourth of which would not be more than $20 in any individual case. However, whatever the accruing amount, it will not be declined. It is probable the disposition of the fund will come within the province of the Legislature. It is believed that in this State such amount, whatever it may be, could best be utilized by turning it over to the State University at Berkeley, which already has a finely equipped mining department, and which has turned out some creditable graduates. To attempt an independent mining school on the pittance to be derived from any operation of the Dubois bill would be a waste of time and effort. Congressman Johnson of North Dakota introduced a bill in Congress December 16th providing for a federal appropriation of $25,000 to each State and Territory for the establishment and maintenance of schools of mines or of mining departments in State Universities already established. The bill is now in the hands of the Committee on Mines and Mining. The bill provides for the first payment to be made June 30, 1897. It is not likely that the North Dakota bill will prevail. At every session of Congress for the last ten years such a bill has been introduced, but the one championed by Senator Dubois of Idaho is now nearer than any of its predecessors to becoming a law.

THE last issue of the Creede, Colorado, *News* to hand says the paper has stopped, and gives as a reason that the business men of Creede didn't appreciate it. That is nonsense. A publication of any kind lives because there is reason for its existence, and it dies when such reason ceases. So long as it is of use it will live; when its patrons realize that it is of no use to them it will die, unless in the rare case of some rich man publishing a paper or magazine for personal gratification. Probably the Creede business men did "appreciate" the *News* in the true sense of the word; hence its demise. When the *Alta*, the oldest newspaper in the State or on the coast, died some years ago, its editor, the versatile Mr. Irish, wrote a touching tribute to its own worth, saying, virtually, that the paper was too good to live. As a matter of fact, it died because the Southern Pacific had tired of carrying it and concluded to stop that source of loss. Very different is the suspension this week of one of the most honored of our exchanges. Reference is made to *Industry*, a monthly devoted to science, engineering, and mechanic arts, and edited by John Richards, a man of ability and practical experience. In the current issue Mr. Richards, with honorable frankness and in a spirit of good-humored candor, briefly says that he cannot afford to continue the publication of *Industry* on its present lines; that the patronage does not warrant the expense, and implies that he does not choose to change the original purpose or policy of the journal, even were such change to possibly result in its continuance. Between the lines he simply says some high ideals were not realized, and retires. Such retirement is honorable alike to Mr. Richards and the cause he has represented, and is in marked contrast to the pitiful plea of the Creede *News* publisher, who expires with a plaint of non-"appreciation."

A RECENT Washington press dispatch represented a California congressman as saying that two lawyers —Ford and Devlin—were responsible for considerable of the antagonism between miners and farmers, that each got $250 per month to keep up the agitation, and that it was to their interest to stir up strife. It is very unlikely that any man with intelligence enough to form an honest opinion on anything, whether in or out of Congress, made such remark, and its publication requires notice. So far as Mr. Devlin is concerned, he is a member of the Anti-Debris Association, an organization that mistakenly, but doubtless honestly, opposes the efforts of the hydraulic miners. He is its attorney, is in receipt of a good salary, paid by the counties in which the Association is strongest. It is fair to assume that he earns his money and is not averse to the continuance of the unwarranted antagonism that retards the proper development of the State. Regarding Mr. Ford, he is a prominent member of the California State Miners' Association, an organization that is working for the public good, trying to aid the hydraulic, quartz and drift miners of California, without other present or future promise of reward than the consciousness of being of some practical benefit to the mining interests of this State. Neither Mr. Ford, nor any other member of the Association with the exception of the secretary, has ever been proffered or has ever received one dollar of salary. The only salaried office in the Association is that of secretary. The incumbent is paid the munificent salary of $50 a month; he, like the other officers and members, practically works for the common good, without any compensation. Mr. Ralston, upon retiring from the secretaryship last November, donated nine months' salary—$450—to the Association. It probably costs Mr. Sonntag, the present secretary, more than the nominal salary received to attend to the requirements of the position, and the same might have been said of his predecessors. There is little enough encouragement at best to men who are working for the public good, without having such ungracious slurs wired from Washington, intimating that they are simply "in the thing for what is in it." It is on a par with that other despicable assumption that "every man has his price." There is enough of that feeling in this State now, without further promulgation of it from the seat of our national Government. It is but due to the California Miners' Association and all connected with it to say that so far as that organization is concerned the statement is false.

IN self-defense and as a measure due to its own dignity, the Manufacturers' and Producers' Association some time ago issued a notice that in no way was it connected with any assumed "organ," and that no publication was in any way authorized to represent itself as being under its patronage or auspices. All great movements have their parasites, and from the inception of the Manufacturers' and Producers' Association there has been manifested a desire in some quarters to make personal profit by representing that the prestige of the Association is applied to sundry publications. The officers and members of the Association thoroughly understand this and rightly regard any effort on the part of such publications to secure business by claiming such authorization or official representation as a case of attempting to obtain money under false pretences.

## Concentrates.

WITH Utah in the firmament, Arizona is now the rising star.

THE Mountain Mines Co., Shasta Co., is reducing its building force.

THE Sierra County Miners' Association has sent $50 to the State Association

THE electric plant at the Rawhide mine, Tuolumne Co., will be ready about March 1.

COCHITI, New Mexico, confidently announces that nothing can prevent a "boom" there this year.

IN '95 the Witwatersrand, South Africa, gold product was 2,295,207 ounces; in '94, 2,024,159 ounces.

SIXTY new mining locations were filed in the Shasta county recorder's office for the week ending Jan. 18th.

ROCK CRUSHING at the Clover mine, Amador Co., has been resumed. The mill has been rebuilt throughout.

THE *Transcript* reports the sale of the Constitution, Mammoth and Siam quartz mines, adjoining claims, Willow Valley district, Nevada Co., to P. Tautphaus of this city for $10,000 cash

SUPERINTENDENT E. A. FRENZEL, Dover mine, Humbug Canyon, Placer Co., has twenty men at work. The 10-stamp mill is running.

THE Maxwell mine, in Big Cottonwood canyon, near Salt Lake, is the first mine in Utah to be operated entirely by electricity.

THE Washington State board of examiners of applicants for the position of mine inspectors have examined D. Edmonds of Seattle, J. James of Tacoma and J. Chapman of Burnett for the position.

THE Hall Mines smelter, Nelson, B. C., has begun operations. It is a water-jacket stack of latest style, with a daily capacity of 100 tons.

THE Northwestern Miners' Association now has 4000 members. At the Spokane, Wash., meeting on the 22nd prox., an "official organ" may be selected.

THE photographs from which the engravings illustrating the Kinkead mill articles in this issue were made were taken by E. B. Yerington, Virginia, Nevada.

COLLERVILLE, Mariposa county, is a prosperous mining town. During the past year it has doubled in population, and 132 new buildings have been erected.

N. B. CASSIDAY, a Colorado miner, has patented a combination dinner bucket and lantern, which, in certain cases, might be a handy arrangement.

"GOLD is at a premium of one per cent." So says the Wall Street *News*. It's been at a bigger premium than that for the past three years, though not noted in that particular form.

THE Marysville *Democrat*, whose editor was a prominent member of the convention, says the Johnson bill for river improvement was not indorsed by the River Improvement Convention.

THE Setting Sun Gold Mining Company has been incorporated in Oakland to dig for gold in California and Nevada. The capital stock is $100,000, of which $99,930 remains to be subscribed.

SENATOR TELLER is reported in Denver to have telegraphed to a Colorado mine owner: "Hold on to your silver properties. The price of the white metal will reach 85 cents by April 1, 1896."

AT the Gold Valley mine, near Downieville, fifty men are employed, the daily product being about 45 tons ore. There is a 25-stamp mill and chlorination plant. The mill and hoisting works are lit and operated by electricity.

A DISPATCH from Pierre, S. D., says that within a few months there have been organized twenty new companies, with a combined capital stock of $20,000,000, for the purpose of developing the Black Hills gold-mining properties.

THOUGH there was a little too much of a good thing in some parts of the upper Sacramento valley and foothills, last week's rain means to the mining industry of the State an increase of nearly half a million dollars a month in the gold output.

CONGRESSMAN SHAFROTH'S bill regarding the practical fencing in of mining claims has not yet passed either house. In the improbable likelihood of it becoming a law it will be rough on the prospector, who hasn't generally got a lumber yard at his command.

THE output of the De Lamar, Idaho, mine for 1895 is given out as follows: Tons of ore crushed, 43,680; amount of bullion sold, $827,472.27; value of ore shipped, $106,622.30; revenue from other sources, $1805; total receipts, $835,899.57; expenses incurred, $469,807.85; net profits, $466,091.72.

IN Butte county the Magalia property, formerly known as the Pershbacker, is proving satisfactory, pay gravel having been struck in the new shaft this week. The owners of the Princess, on the ridge adjoining, are putting in steam pumps and expect golden returns the coming season.

IN Shasta, Mariposa and Nevada counties over one million dollars is being invested in mining properties and improvements, each project—the Iron Mountain, Merced G. M. and North Star—involving preparation and appliance that require new methods which have passed the experimental stage.

IT is unfortunate that Speaker Reed saw fit to ignore California, which has no member on the House Committee on Mines and Mining. Any recognition of mining requirements in this State during this Congress, manifest though they may be, can only be secured by constant representation and hard work.

THE statement of Receiver C. P. Mason of the Salt Lake, Utah, Copper Manufacturing Company, for the quarter ending December 31st, shows receipts $29,077.19, disbursements $17,697.48, balance on hand $11,379.71. The smelter will shortly resume operations. Utah can furnish 1000 tons per day of $6 average value.

LAST Monday the Debris Commissioners granted permits to the following mines at their meeting: Manzanita, near Sweetland, Nevada county; Jay Bird, near Camptonville, Yuba county; Atkins mine, near Ono, Shasta county; Kanaka Flat, near Spanish Ranch, Plumas county. The Goyan mine, near Diamond Springs, El Dorado county, was given permission to build a dam.

STATISTICIAN YALE of the U. S. Mint is sending blank statements to mining superintendents throughout the State asking that they be filled out and returned. The information thus received is always of a confidential nature, the purpose being to secure correct official record of the gold output of the State as far as possible. The result inures to the general benefit of the mining industry.

AT the De Lamar, Idaho, mine the Pelatan-Clerici process is used. The ore, being first reduced in the ordinary way, is placed in a tank and reduced to a pulp. The chief dissolving agency is cyanide of potassium, the values being precipitated by electrolysis and deposited in a bed of quicksilver at the bottom of the tank, from which the contents of the ore are taken in the form of an amalgam.

FROM Grant's Pass, Oregon, J. E. Spires writes that he wants to sell asbestos, that he has a two-foot vein of fine fiber. If Mr. Spires is correct in his statements he has a good thing. There is a great and growing demand for asbestos, nearly 90 per cent of the country's supply being imported from Canada. In '94 San Diego county, this State, produced fifty tons of this fibrous talc, worth $2250.

TRACKLAYING at the Mountain mines, Shasta county, has been resumed. The company has begun work on the ditch to take water out of the Pit river about a mile above its junction with the Sacramento. The water will be piped across the Sacramento and the railroad and brought on down to Keswick, a distance of seventeen miles. A foundry and machine works will be erected at Keswick, where the company will make their own cars, etc.

THINKING that it was the Idaho-Montana mineral land bill as applicable to California that Congressman Johnson introduced, the Sacramento *Record-Union* editorially "pitched into it," but since it found out its mistake and that the bill introduced is acceptable to the railroad company, it has withdrawn all opposition and contents itself with decrying hydraulic mining and the earnest efforts of the miners to secure justice in the national legislature.

AN avalanche on Dec. 28 totally destroyed the stamp mill and entire surface plant of the Ebner Gold M. Co. in Upper Silver Basin, Alaska, and killed the watchman, J. F. Pearl. Wm. Ebner estimates his loss at $40,000. A. Sutherland, the watchman of the Juneau Mining Co.'s mill, adjoining, saw the avalanche descend, but said nothing of it and made no effort to find Pearl's body, or save him. The accident was not discovered till ten days after.

THE report of Surveyor-General Straughan, of Idaho, shows that eighty-three mining claims were surveyed for patent in Idaho during 1895. The applications for patent increased nearly 300 per cent over the previous year. The Surveyor-General states the operations are especially large in the gold-producing properties, although silver mines of known value and those of promising character are either being worked or placed in condition for renewed activity.

AMUSING things are sometimes noticed in the business office of this journal. Mention was made at the time of the man who insisted on paying his subscription in advance to the end of the century—Dec. 31st, 1900. Last week a Montana man, renewing his subscription, said he thought it was only fair to add a dollar—sending four dollars—and was further prompted to say that he would not be without the paper if it cost $20 a year. There are a good many like him, and such feelings are most cordially appreciated.

THAT the Virtue is a good mine, and deserves all the good things that can be said about it, does not justify the following from an exchange:

> An eighteen-inch streak of quartz in the Virtue mine near Baker City is so near pure gold that San Francisco jewelers pay $22 an ounce for it as it comes from the mine. The gold is so thick that it will not go through the screens in the stamp mill, which has to be stopped in order that the gold may be gouged out.

Such silly lies should be left to balloon promoters of wildcat schemes. No miner would take any stock in such stuff.

WASHINGTON, D. C., reports that the fact that the rich gold region on Forty Mile creek, Alaska, belongs to the United States has been accurately determined by an employe of the British Government, and General Duffield, Chief of the Coast Survey, says the survey shows but sixteen miles of the creek as the bird flies, and twenty-three miles as the water flows is in British territory; and in this portion no gold has been discovered. All the remaining of the creek is in Alaska and belongs to the United States. A bill has been introduced in Congress providing for the appointment of commissioners to fix the boundary.

ON Wednesday last Judge Seawell rendered a decision of interest to holders of stock in mining companies. Theodore Fox had brought suit to have the recent election of Con. Va. directors set aside because one of the trustees had voted stock which did not appear on the books in the name of the real owner. Under Section 3 of the act of April 23, 1880, relating to mining corporations, the name of the real owner must appear on the face of the stock or from the books of the corporation. Judge Seawell held that section is unconstitutional, being special legislation, and confirmed the election of the defendants as directors.

WORK is being pushed on the Goleta mine at Copper mountain, Mono county. Ore running from $8 to $10 a ton in gold has been struck, and preparations are being made for working the mine on a large scale as soon as the weather permits. A flume, ditch and pipe line will be built from a point on Mill creek, two miles distant from the mill site; these can supply 600 inches of water, with a fall of 300 feet. A forty-stamp mill will be erected as soon thereafter as practicable. The superintendent writes that the men are now working in an ore body over 100 feet in width, and that there is abundant ore uncovered to keep the mill employed for some years.

THE recuperative power of the American miner is well illustrated in Colorado. Two years ago the culmination of the silver depression left many of the Colorado miners apparently with occupation gone. They immediately began developing that State's gold resources, with the result that last year's gold output in that State exceeded the value of the silver yield, and it is thought that this year's aggregate of gold production in Colorado will exceed $16,000,000. The same thing applies to Utah. Mercur, in the Camp Floyd district, was one of Utah's great silver camps. With the slump in silver came ephemeral depression, quickly followed by gold discoveries; and to-day Mercur is such a promising gold producer that a local paper calls it "the Johannesburg of America."

A SOUTHERN CALIFORNIA summary says that there are in Los Angeles about 175 people who are operating mines in southern California, with a capital of over $2,000,000 invested. There are in Los Angeles county seven mills and about 275 miners working. Kern county has 25 mills, with 500 miners; Riverside county 28 mills, with 900 miners; two of the mills are twenty-stamp, and in one district; at Perris there are 175 miners earning $3.50 per day. San Bernardino county has 35 mills and 950 miners; it has the Gold Cross in the county with 110 stamps and 950 men working for good wages. The total number of mills in southern California is 120; number of stamps, 840; total number of men working for wages at mines, 1500; total miners and prospectors not working for wages, 2000; total capital invested in mines in southern California, $10,500,000.

RECENT minining decisions, in brief, are to the effect that "the Government is always a party in interest and may insist on a judgment of cancellation if the evidence clearly shows a failure to comply with the law, whether the protestant is entitled to such action or not;" "where an entry is thus canceled the right of the protestant as a preferred entryman will not be determined until such time as he seeks to exercise the same;" "where the plat of survey does not correspond with the field notes it should be corrected so as to exhibit the subdivisions called for by the field notes;" "a hearing as to the agricultural or mineral character of a number of tracts of land claimed under a railroad grant, and a judgment thereon that specific tract included thereunder is not agricultural, will not preclude a subsequent inquiry as to the character of such tract on the protest of a mineral claimant prior to the issuance of a patent therefor, if the showing made is clear and convincing."

THE famous Dred Scott decision of forty years ago figured in a U. S. Land Office decision in El Dorado county last week. Near Greenwood, Thomas Bolton, a colored man, claimed some land under pre-emption. The railroad company claimed it was within their grant. The corporation acknowledged that Bolton had settled upon the land before the grant was made to them, but held that he so settled on the 26th day of March, 1864, which was prior to the passage of the Fourteenth Amendment, and he could not, therefore, have been a citizen. In giving his opinion, Assistant Commissioner E. F. Best says: "I am constrained to hold in the light of the doctrine announced by the Supreme Court in the Dred Scott case, that at the date when the railroad grant attached to lands in the vicinity of the tracts in controversy, Bolton was not a citizen of the United States, and, accordingly, that he was not a qualified claimant under the public land laws."

REGARDING pending mining legislation by Congress for this State, Congressman Barham says: "I have the honor and distinction of having lived in California since September, 1849, and am fully in accord with the great mining interests of your State. I shall support measures which tend toward permitting the miner to work his mine, at the same time guarding the rights of the farmer and preserving navigable streams. I think it is the duty of the Government to construct dams, impound debris and do all things necessary to allow mines to be fully operated. This work should be done by the Government, so as to protect the farmer in carrying on his farm and so as to preserve navigable waters of California. There is not the slightest reason for a conflict between the farmer and miner on this subject. It is of the utmost importance to the farmer that the mining interest of our State should be fully developed. It produces a home market for much of the products of his farm and puts in circulation millions of dollars of gold."

COLORADO STATE COMMISSIONER OF MINES LEE has prepared a set of rigid rules for the protection of miners against accident and death, which rules will hereafter govern mine operators, and heavy penalties are prescribed for their violation. They revolutionize metalliferous mining in Colorado. In brief, the regulations require that explosives must be stored in magazines prepared for that purpose alone, far enough from the workings to prevent accident in case of explosion. Not more explosives than necessary for one day's operations shall be kept in a mine where work is going on. Under no condition will powder be allowed stored underground where men are working. Steam or water baths must be used for thawing powder; no miner may carry powder about his person. All boiler plants must be provided with a hose for emergencies. A uniform code of signals is established, violation of which will entail discharge of employes from service, on penalty to the employer; no man may use the shaft cage or bucket "at his own risk" as heretofore. Daily inspection of machinery and workings in mines where machinery is employed is required. Reports to the mine superintendent are to be made daily. Other important regulations are prescribed. This action on the part of the commissioner is the result of the terrible loss of life occasioned by the recent mine disasters in that State.

THE receipt of the *Inter-Mountain Mining Review*, a new publication just started at Salt Lake City, Utah, brings to mind the enormous increase in mining papers in the last year or two. Perhaps nothing better illustrates the great activity in the mining industry in this west half of America than the recent journalistic efforts in that line. Among the many new mining publications that have begun coming weekly and monthly to this office are the one just mentioned, the *Western Mining World*, published at Butte, Montana, the Grants Pass, Oregon, *Mining Journal*, the Gold Hill, Oregon, *Gold Miner*, *The Bullion*, Los Angeles, Cal., the Spokane, Wash., *Northwestern Miner*, the Baker City, Oregon, *Gold and Silver*, the Fort Jones, Cal., *Reporter*, the Sierra, Cal., *Leader*, the Black Hills, South Dakota, *Mining Review*, the Cripple Creek, Colorado, *Prospector*, the Cripple Creek *Mail*, the Jerome, Arizona, *News*, and others. Besides these there are three or four new publications with indirect reference to mining and industrial interests recently started in this city, Los Angeles and Portland, Oregon. Probably no department of business exhibits such activity. Of course the projectors of all of these enterprises figure on the laws of supply and demand and the fact of investing their money and effort show their faith in the matter. This is said solely with reference to this part of the world; elsewhere throughout the world is exhibited the same activity, though in a lesser degree. Every week comes a new mining publication just started somewhere, showing more or less merit and destined to live or languish according to its merits, and the amount of legitimate patronage bestowed upon it.

## Mines, Miners and Monopolies.

Written by J. A. EDMAN.

NUMBER II.

The mineral lands of California are chiefly represented in the gold belts of the Sierra Nevada and Coast Ranges, and may be defined as follows: The Main Gold Belt, the Southern Belt and the Northern Belt. For the first division I quote the general description by the U. S. Geological Survey: "The gold belt of California includes that portion of the Sierra Nevada lying between the parallels of 37 deg. 30 min. and 40 sec. This area is bounded on the west by the great valley of California, comprising about 17,000 square miles. The Sierra Nevada here forms a single range, sloping somewhat abruptly towards the great basin, and gradually towards the great valley of California. Within this area lie the chief gold deposits of the State, though by no means all of the area is auriferous.

"At the northern limit the deposits are scattered over nearly the entire width of the range, while to the south the productive region narrows down to small dimensions. The mass of the range north of Alpine county is comparatively barren. North of the 40th parallel the range is probably not without deposits, but the country is flooded with lavas which effectually bury them."

For the general geology I quote also from the Geological Survey:

"The southern portion of the range is composed of granite. The central and northern part west of longitude 120 deg. 30 min. consists prevailingly of schists, which have been produced by intense metamorphism of both ancient sediments and igneous rocks, and it is chiefly, but not solely, in these schists that the auriferous veins occur. The trend of the bands of altered sediments and of the schistose structure is generally from northwest to southeast, parallel to the trend of the range; but great masses of granite and other igneous rocks have been intruded among these schists, forming irregular bodies which interrupt the regular structure and which are generally bordered each by a zone of greater metamorphism. These schists, with their associated igneous masses, form the older of two great groups of rocks recognized in the Sierra Nevada. This group is generally called the 'Bedrock Series.'

"Streams flowing down the western slope of the Sierra Nevada in the past distributed another formation of great importance—the auriferous gravels. The valleys of these streams served also as channels for the descent of lavas which poured out from volcanoes near the summit. Occupying the valleys, the lavas buried gold-bearing gravels and forced the streams to seek new channels. These have been sunk below the levels of the old valleys, and the lava beds with the gravels which they protect have been isolated on the summits of ridges. Thus the auriferous gravels are preserved in association with lavas along lines which descend from northeast towards southwest across the trend of the range. The nearly horizontal strata, together with the auriferous gravels and later lavas, constitute the second group of rocks recognized in the Sierra Nevada. Compared with the first group—the Bedrock Series—these may be called the 'Superjacent Series.'"

The above geological features, while distinctive of the main belt, apply also in varying degrees to the other belts. Actually, the main belt continues southward from latitude 37 deg. 30 min. through the counties of Fresno, Tulare and Kern, gradually turning southward, then southwesterly, and becoming narrower until it may be said to cease somewhat west of Tejon Pass in the Tehachapi Range.

The Southern Gold Belt starting at the junction of the Sierra Nevada, with the Coast Ranges in the northeastern part of Ventura county, extends through the center of Los Angeles county, thence through Riverside county into San Bernardino, and finally through San Diego county to the Mexican boundary line. This belt, narrow in its northern part, gradually widens and at the center of San Diego county attains a width of about forty miles. It consists essentially of granite, with small bodies of crystalline schists, and it contains also old gold-bearing channels, which so far have been but slightly explored. Gold mining in this belt has not been extensive, chiefly from climatic causes, but also from the existence here of land grants. The most important gold mines are found in the Julian district in San Diego county.

East of the Sierra Nevada, and within the great interior basin, a mineral region but little known and explored extends from the northern part of Mono county, through Inyo, San Bernardino and San Diego counties southeasterly for a distance of 470 miles to the Colorado river and Mexico, and from the Sierra Nevada to the eastern boundary of California. Within this vast region, irregular mountain ranges appear wherein numerous gold and silver mines have been opened and profitably worked, and a large portion of these elevations will prove to be mineral land. Their geology is yet obscure, but presents some features in common with the Sierra Nevada. This region may be designated as the Great Basin Mineral Belt of California.

In the northwestern part of Plumas county the auriferous rocks of the Sierra Nevada are covered by the recent volcanic deposits which, radiating from Lassen's Peak, have extended not less than fifty miles on each side and even into the Sacramento valley, thus forming the northern boundary of the main belt. This volcanic region is generally devoid of useful minerals except on its eastern confines, at Hayden Hill in Lassen county, and contains desert, agricultural and timber lands. Its geology, topography and scenery have been most graphically described by Mr. J. S. Dreer of the U. S. Geological Survey.

The auriferous rocks emerging from the western edge of the volcanic deposits form the Northern Gold Belt, extending thence to the Pacific ocean. Its eastern boundary up to the Oregon line is marked by the non-auriferous volcanic rocks of the Mount Shasta and Lassen Peak flows, along a line but little eastward of the Oregon division of the Southern Pacific railroad; its southern limit may roughly be marked by a straight line drawn from Red Bluff to Trinidad Head on the coast. It covers an area of 10,000 square miles, and in its geological features is closely related to the main belt, being in fact the continuation of the Sierra Nevada, which already in Sierra county had lost its distinction of a well-defined mountain range, and within the northern belt broadens and divides into many irregular ridges. Placer mining has flourished here for many years, as well as vein mining. Ancient auriferous gravel channels occur at many points, as well as gold-bearing beaches, and a notable auriferous conglomerate deposit has been explored in its northeastern corner, but these latter classes of mines have not here been as fully developed as in the Main Gold Belt.

As a typical exposition of the gold rocks of California; as covering the first gold discoveries in the State; as the field for the most extensive, thorough and well-conducted gold mining of the Pacific coast; and last, but not least, as being the territory covered by the first railroad land grant in this State, the mineral lands of the Main Gold Belt should receive our first study, as from the testimony here to be obtained, and the conclusions to be drawn therefrom, an inquiry into the mineral characters of the other gold belts will become much simplified.

The center of this gold belt, and largely within the Central Pacific land grant, has also been the field of the most thorough work of the United States Geological Survey, as shown by the three folios now published of the Sacramento, Placerville and Jackson sheets, on all of which topography, as well as economic and structural geology, have been carefully delineated.

From the inception of the State Geological Survey of California under Professor Whitney, and to its untimely close, a large part of the territory within the Central Pacific land grant was mapped and thoroughly explored, and specially the auriferous gravels fully described, chiefly within the counties of El Dorado, Placer, Nevada and Yuba, and the experience then gained of the geology and economic conditions of the gravel deposits of this region were given to the public in Prof. Whitney's great work, "The Auriferous Gravels of the Sierra Nevada of California," and became a household word since 1880.

From the day of Marshall's discovery of gold at Coloma, hundreds and thousands of miners have been at work on the rivers, creeks, gulches and flats. Later these indomitable men pierced the holes, seeking for the deep gravel channels, while others found the quartz veins and followed them to the depths for hidden treasures. The hydraulic miner brought the streams from the snows of the high Sierra, and with infinite patience, labor, skill and expense carried them for many miles to the deep gravel beds to produce an annual revenue of more than ten million dollars. And the chief field of this activity was within the counties of El Dorado, Placer, Nevada and Yuba, and within the limits of the now vastly expanded C. P. land grant.

From the earliest days of gold discovery in California the U. S. Government had freely offered the occupation and use of mining land to its citizens under simple regulations, chiefly made by themselves, and it was in reliance on the premises thus made that California developed into a great State and more than a thousand millions of dollars were added to the wealth of the United States.

Much of the land thus open for mining was not surveyed until later years. The distinction between odd and even numbered sections did not exist, or had no practical significance to the miner, relying on the honor and justice of the Government.

Meanwhile, in the hour of our country's peril, a horde of shrewd speculators conceived the project of Pacific railroads, and by a combination of political forces succeeded in obtaining government aid in bonds fully equal to the cost of the roads, and to perpetuate their power revived in full perfection the odious and dangerous system of land grants—first on a small scale and later in enormous proportions. However, the enabling acts of Congress exempted mineral land from the operations of the grants, which allayed the fears of the miners that their possessions would be absorbed. How hollow this defense was, how soon it was undermined and finally set at defiance by the combined monopolies, the sequel shows, as well as the page of history.

Meadow Valley, Cal., Jan. 18, '96.

*(To be Continued.)*

## Notes on Gold Milling in California.

NUMBER XI.

By E. B. PRESTON, M. E., Field Assistant State Mining Bureau.*

GRINDING AND AMALGAMATING MACHINES.

*Arrastras.*—Although the arrastra has been largely superseded by the stamp-mill, the fact remains that it is the best and cheapest all-round gold-saving appliance we have. Hence, its use is always indicated where small, rich veins are worked in the higher mountain regions, but it is also found valuable placed below the present quartz mill, where the waste waters from the mill can be picked up and used over again for power on horizontal or overshot wheels. In these cases, it handles the tailings from the mill after they have passed over the concentrators and canvas-plants. This part of the milling is usually leased to parties who pay the mine a fixed amount per ton for the tailings, the lessees putting up all their own machinery. The arrastras are built of a size to handle at least four tons of tailings in twenty-four hours. Their foundations are either formed of hard rammed clay, concrete, or a plank platform with broken joints, on which a bed of clay is placed. The foundation is always made larger than the circumference of the proposed arrastra. The bed is formed of rocks harder than the substance to be crushed, usually fine-grained basalt, granite, or quartzite. These are picked with a partially level surface, and as near of the same thickness as possible, usually from 1 foot to 2 feet thick. They are built around a center cone, forming an annular ring from 2½ feet to 6 feet wide, and are laid with narrow spaces between each rock, into which dry clay should be tightly rammed to within an inch of the surface. The outer circle is formed of rocks or staves, with rammed earth behind, and built from 2 feet to 4 feet in height. On the central cone, which consists of stone or a block of wood, and which stands somewhat above the paved bottom, a center post is let in, from which project four arms at right angles to each other, and extending nearly to the outer circle. Heavy, hard rock-drags, weighing from 200 to 1000 lbs. each (from 400 to 600 lbs. is the usual weight), are attached to the arms by ropes or chains passing through the eye-bolts secured in the rock-drags. They are placed so that part of them drag near the cone, with the inside corner slightly in advance, while the remainder sweep near the outer circle with the outer corner in advance. The front edge should always be slightly elevated, so as to permit of the particles passing under the drag instead of being pushed ahead.

Where a horizontal wheel is used, the arms are attached to the center post and the wheel encircles the arrastra, the water striking on buckets set to an angle of 45°. With overshot wheels the arrastra may be run by a belt and pulley attached to the center-post, or by a spur gearing. It requries about 6 H. P. to run an average-sized arrastra. Running tailings, a speed of fifteen to thirty revolutions per minute is given; crushing ore, the arrastra should be run slower and the pulp thicker.

For discharging the arrastra, plug-holes at different levels are put into the outer circle, leading the pulp into sluices lined with plates, riffles, and blankets. In some cases the arrastra has been made to work continuously by fitting a screen to a part of the outer circle and letting it discharge into a line of sluices. As the arrastra bottom and drags are extremely uneven and rough when first set up, some coarse sand and water are introduced on first starting and the drags are allowed to run slowly until somewhat smoothed down, before the regular charge is introduced. The machine is usually only cleaned up thoroughly when the bottom is worn away; between times the crevices are picked out for the depth of an inch or two with picks, scrapers, and spoons, and panned out, with what pulp remains on the bottom, after the charges have been successively thinned down and run off through the plug-holes. If crevicing has been done, a little fresh clay can be rammed in to within 1 inch of the top of the bed. During the grinding of the charge, the quicksilver is introduced through a cloth; the amalgam should be kept drier than in the stamp battery, though not sufficiently so as to become "crumbly." Great attention must be paid to tamping the bed in solid, otherwise an excessive loss of quicksilver may occur. Continual horn tests of the pulp furnish a guide for the proper working.

Machines have, from time to time, been introduced in California to replace stamps, claiming to do more effective work, both as regards the crushing as well as the amalgamating. Those mostly seen in operation, and finding the most favor, are the Huntington and the Bryan mills, which may be taken as types, and which reduce the ore by a continuous rolling motion; in the one case the roller acting on a ring on the circumference, and in the other on dies in the bottom.

*The Huntington Mill* consists of a shallow iron pan with a central cone, through which an iron shaft revolves. Bolted on the sides of the pan and inclosing it, are semi-circular iron sections made in two halves and also bolted together; one of these sections con-

* Bulletin No. 6, California State Mining Bureau.

tains an opening about 9 inches deep, divided into three parts, into which curved iron screen-frames are keyed, while the other section contains a feed-trough, attached near the top. Between the bottom of the pan and the lower edge of the screen-frames an iron or steel ring die fits against the sides of the shallow pan, being secured by wooden wedges, against this die, four rollers, suspended from yokes resting on an iron cover, revolve, receiving their motion from the central shaft. These suspended rollers are pressed by centrifugal force against the ring-die. Each roller is encircled by an iron or steel shoe fastened by wooden wedges; this can be renewed when worn too thin, or when it becomes unround—flattened. Means are provided for lubricating the shafts on which the rollers work without permitting the lubricant to come in contact with the pulp. As the rollers hang about ½ inch above the bottom of the pan, scrapers are attached to the revolving cover between the rollers, and reaching to the bottom of the pan, to prevent the baking of the pulp.

The size of the pan most frequently used is 5 feet in diameter, though for prospecting purposes one of 3½ feet is also made; the former is run at a speed of seventy revolutions per minute, the latter at ninety revolutions. They are provided with self-feeders, which introduce the ore at regular intervals—the only way in which they can be operated, though not correct in principle. A 5-foot mill requires about eight H. P., and crushes about twenty tons per day. Before starting up a certain amount of quicksilver, up to fifty lbs., is introduced into the pan with some water and rock. The supply should be regulated to make a stiffer pulp than in a stamp-battery; quicksilver is added from time to time. A groove in the bottom of the pan, connecting with a plug-hole on the outside, permits of the quicksilver and amalgam being drawn off at intervals to recover the latter, after which the former is returned. If the pan is working correctly the bottom around the center remains bare; this can be observed through the cover while running; when not bare, it is a sign that the pan is being overfed. As the machine throws the pulp with considerable violence through the curved screens, a shield is placed outside of them, directing the pulp into a narrow sluiceway with a spout opening on the apron-plate. It is claimed that the percentage of gold amalgamated and saved on the inside is far grater than in the stamp-mortar, going above 80%; all rusty gold being subjected to a heavy scouring action. The Russian-iron screens used are short-lived; they can be made to last somewhat longer by placing a false screen, made from an old worn screen with the openings enlarged, between the pulp and the screen proper.

Great care must be exercised in putting up one of these machines, to get it perfectly level and on a rigid foundation, and to keep all the bolts holding the pan on the foundiation well tightened up; the feed also requires close observation.

When cleaning up or renewing the ring-dies or shoes, the top cover, with the suspended rollers, are lifted out with chain block and tackle, leaving the interior of the pan free for operation.

The mill works well on soft quartz and clayey ores, introduced in pieces not larger than walnuts. A great drawback to the machine is that the rings on the rollers and also the dies become "unround" so that instead of rolling smoothly, they strike in places, necessitating changing the rings before they are worn out; this changing takes up some time.

The opinions of millmen who have handled the Huntington mill, as to its merits, are very diverse. Where the ore produces a large amount of fine stuff, by using a grizzly with closely set bars, the Huntington can be run to advantage on these "smalls" in conjunction with the stamps.

*The Bryan Roller Mill* is a modified form of the Chili mill, built in sizes of 4 feet and 5 feet diameter. It consists of an annular mortar with an outside gutter and spout, cast solid, containing steel dies arranged in the track of three crushing rollers, which in the 5-foot mill have a crushing face of 7 inches, a diameter of 44 inches, and weigh 3,650 lbs. They have fixed axles, "journaled" in a central revolving table, attached to and driven by a belt pulley. This pulley is a cylindrical tank, which, in the smaller pattern, rests immediately on the rollers, and can be made to increase their crushing power by being loaded. The mortar is supplied with curved screen-frames around the entire machine, the pulp being discharged all around into a gutter delivering through a spout, on one side, to an apron-plate.

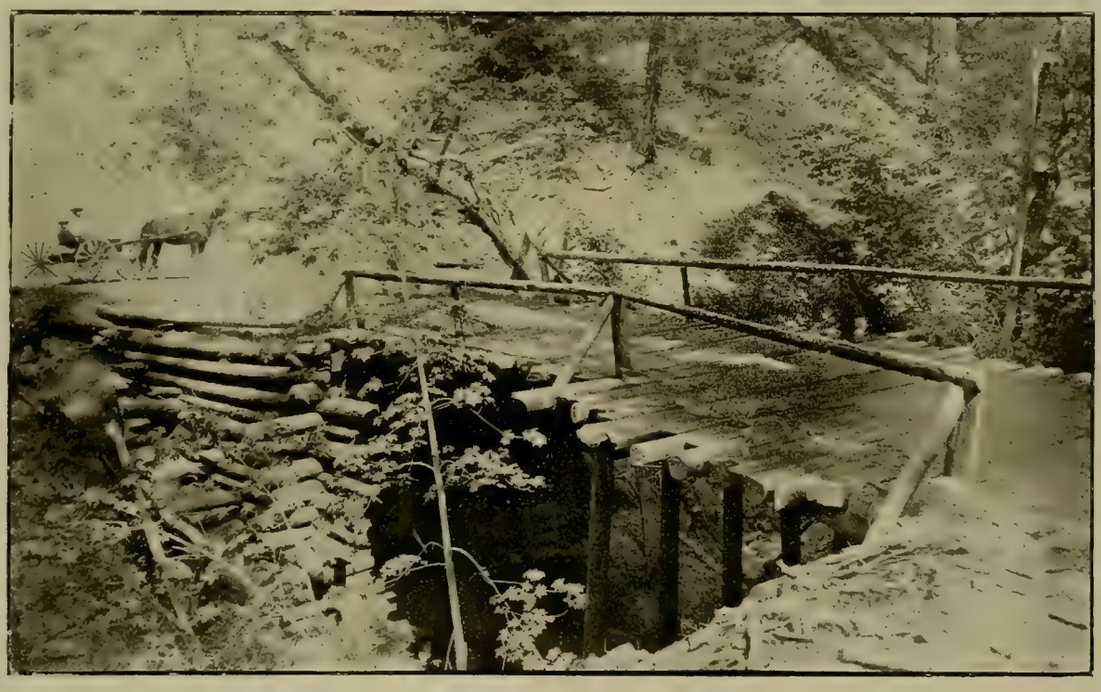
The chief wearing parts are the steel dies and tires on the rollers, these latter are fastened to the rollers by wooden wedges. According to the statement of the manufacturers (Risdon Iron Works, San Francisco), one set of these wearing parts will crush from 4,000 to 8,000 tons of ore in the large size, and 1,500 to 2,000 tons in the smaller size, and at the rate of 25 to 35 tons and 12 to 20 tons per day, with a speed of 30 and 60 revolutions, respectively, per minute, the smaller size requiring from 5 to 6 H. P. The oil channels for lubricating the bearings are arranged to prevent the oil from entering the mortar. To keep the pulp from baking the rollers or dies, and to assist in equalizing the ore received from the feeder, scrapers with adjustable springs follow each roller. They are also provided with self-feeders. In operating the mill, ore, water, and mercury are introduced into the mortar, the pulp passing around next the screens in a current not less than 300 feet per minute, while the motion inside of the rollers is much slower. The amalgam, working its way toward the center cone, is kept from being re-ground, and and can be observed while the mill is in operation; it is claimed to retain 80% of the amalgam in the mortar. To clean it up, the dies between the rollers are removed, the pulp and amalgam taken out, and wooden blocks of the thickness of the die put in their stead, on which the rollers are revolved, when the remaining ones can be taken up. It is claimed for these mills, that they wear smooth, and even while crushing hard quartz, discharge freely (on account of large screen area), avoid sliming and flouring of quicksilver, are good amalgamators, can be cleaned rapidly, are easily put in place, and require small power for amount of work done.

*The Griffin Mill* belongs to that class of mills using a roll running against a ring or die; but instead of several rollers, as in the Huntington, this has one roller only, swinging from a longer shaft, hung from a point in the central axis of the mill, and rotated about its own axis by the power applied at the top. It is run at a speed of 190 to 200 revolutions per minute, crushing from 1½ to 2½ tons per hour, the power being applied to a horizontal pulley above, from which the shaft is suspended with a universal joint, and the roller is rigidly attached to the lower extremity of the shaft. The roller swings in a circular pan supplied with a ring or die against which the roller works; and carries on the under side scrapers or plows to prevent the pulp from baking. A circular screen-frame is fastened on the pan, to the top of which a conical shield is attached at the apex, through which the shaft works. The pulley revolves upon a tapered and adjustable bearing, supported by the frame composed of iron standards, two of which are extended above the pulley to carry the arms in which is secured the hollow journal-pin. The shaft is suspended to a universal joint within the pulley. This joint is composed of the ball or sphere with trunnions attached thereto, which work in half boxes that slide up and down recesses in the pulley-head casting. The lubricant is supplied, for all parts needing it, through the hollow pin. The roll revolves within the ring-die in the same direction that the shaft is driven, but on coming in contact with the die, it travels around the die in the opposite direction from that in which the roll is revolving with the shaft. A pressure, by centrifugal force, of 6,000 lbs. is brought to bear on the material being pulverized between the roll and die. The water is introduced with feed when running, and receives a whirling motion from the roll, which brings the pulp against the screens 9 feet in area. A circular trough on the outside of the pan conducts the pulp to one side, where it discharges over an apron.

(*To be Continued.*)

## A Rustic Bridge.

The bridge structure illustrated herewith is chiefly commendable on the ground of picturesqueness. It has not the durability nor the strength of a well-framed bridge resting upon good abutments, and yet such bridges have served a most excellent purpose and will long continue to do so. They are readily built of material which is just at hand, and their cost is very small. If well located and the underpinning shielded from erosion they may endure for a long time, for logs of coast timber are long-lived. But such bridges are only tolerable on side roads of limited travel. In the natural improvement of our highways such bridges must give way to less picturesque but stronger and safer structures of frame or iron, which do not rest upon midstream posts, but will span the torrent successfully, no matter how swollen or angry the winter storms may make it. In spite of this progress and development, however, those who enjoy the picturesque will probably always be able to find such bridges to exercise their pencils or cameras upon. The form will survive because it is fitting to conditions which will always prevail in retired regions, whose natural beauty is their chief resource.



A PICTURESQUE RUSTIC BRIDGE IN THE FOOTHILLS OF CALIFORNIA.

## Milling in Miniature.

A curio has been presented to the State Mining Bureau which will possess great interest for all who are curious about gold mines. It is a miniature of the ten-stamp quartz mill at the Rising Sun mine in Placer county. Though the scale is only an inch to the foot, every detail has been introduced, so that the mill will possess considerable educational value.

The hoisting works, engine-rooms, stamp mill, concentrators, carpenter shop and blacksmith shop are all in their proper places. Cars, men and the various tools and appliances are put in so that the observer can follow every step in the extracting of the gold from the quartz.

The model is a little over twelve feet in length, the original being 145 feet long. It was made by N. J. Young, the builder of the mill. It became the property of J. Z. Davis, who has presented it to the Mining Bureau.—S. F. Call.

THE following table shows the number of barrels (of forty-two gallons each) of petroleum produced in the United States in 1893 and 1894:

| *Fields.* | *1893.* | *1894.* |
|---|---|---|
| Appalachian | 31,365,890 | 30,783,424 |
| Lima-Indiana | 15,982,097 | 17,296,510 |
| Florence, Colorado | 594,390 | 515,746 |
| Southern California | 466,179 | 705,969 |
| Kansas | ..... | 40,000 |
| Wyoming | ..... | 2,369 |
| Other | 4,110 | 498 |
| Totals | 48,412,666 | 49,344,516 |

PHOTOGRAPHS have recently been taken automatically on kites 3000 feet high.

## Calaveras Co. Mother Lode Region.

For some time a correct and authentic up-to-date map of the Calaveras County Mother Lode Region has been requested, and in compliance with that desire is herewith presented a map engraved in this office last week from the best procurable data.

Following are the names and designation of the mining properties referred to by numbers on the map. The map is drawn on a scale of one-half inch to one mile:

T. 5 N., R. 11 E.

| No. | Sec. | Name of Mine. |
|---|---|---|
| 1 | 26 | McNevin and millsite |
| 2 | 26 | North Extension Quaker City |
| 3 | 14-15 | Finck Gold |
| 4 | 10-15 | Hancock & Tibbitts |
| 5 | 15 | Barattini |
| 6 | 15 | Oneto |
| 7 | 15-22 | White Swan |
| 8 | 22 | Flour Sack |
| 9 | 21-22 | North Paloma |
| 0 | 21-22-27-28 | Gwin |
| 1 | 27-28 | South Extension Gwin No. 1 |
| 2 | 27 | South Extension Gwin No. 2 |
| 11 | 36 | Edna Quartz Mine |

T. 4 N., R. 11 E.

| | | |
|---|---|---|
| 1 | 13 | North Branch |
| 2 | 11-14 | Hudson and millsite |
| 3 | 1 | Golden Hill |
| 9 | 1 | Pocket Hill |

T. 4 N., R. 12 E.

| | | |
|---|---|---|
| 1 | 33 | Union |
| 2 | 33-34 | Ruthgeb |
| 3 | 28 | Ambrosia |
| 4 | 29 | Pioneer Chief |
| 5 | 19-20 | Everlasting |
| 6 | 17 | Fellow Craft |
| 7 | 17 | McFall |
| 8 | 8 | Leonard |
| 9 | 7 | Gottschalk |
| 0 | 7 | Comet |
| 1 | 6-9 | Gospel |

T. 3 N., R. 12 E.

| | | |
|---|---|---|
| 1 | 13 | Maloney |
| 2 | 11 | Thorpe |
| 3 | 10-11 | Bachman |
| 4 | 11 | Midwinter |
| 5 | 11 | Native Son |
| 6 | 11 | Big Four |
| 7 | 3-4 | Burgess |
| 8 | 4 | Pedro |
| 9 | 16 | Demarest |
| 0 | 15-16 | Shot Gun |
| 1 | 16 | Illinois |
| 6 | 3 | Specimen |

T. 3 N., R. 13 E.

| | | |
|---|---|---|
| 21 | 33 | Dr. Hill and millsite |
| 40 | 28-33 | Bovie |
| 44 | 28-33 | Fritz |
| 5 | 29 | Cherokee and millsite |
| 6 | 32 | Blair Consolidated and millsite |
| 7 | 32 | Gold Valley |
| 8 | 32 | Thunderbolt |
| 9 | 32 | Geo Curtis |
| 0 | 31-32 | Collins and Radcliff |
| 1 | 30-31 | Osborn Gold Hill |
| 2 | 30 | No name given |

T. 3 N., R. 13 E.

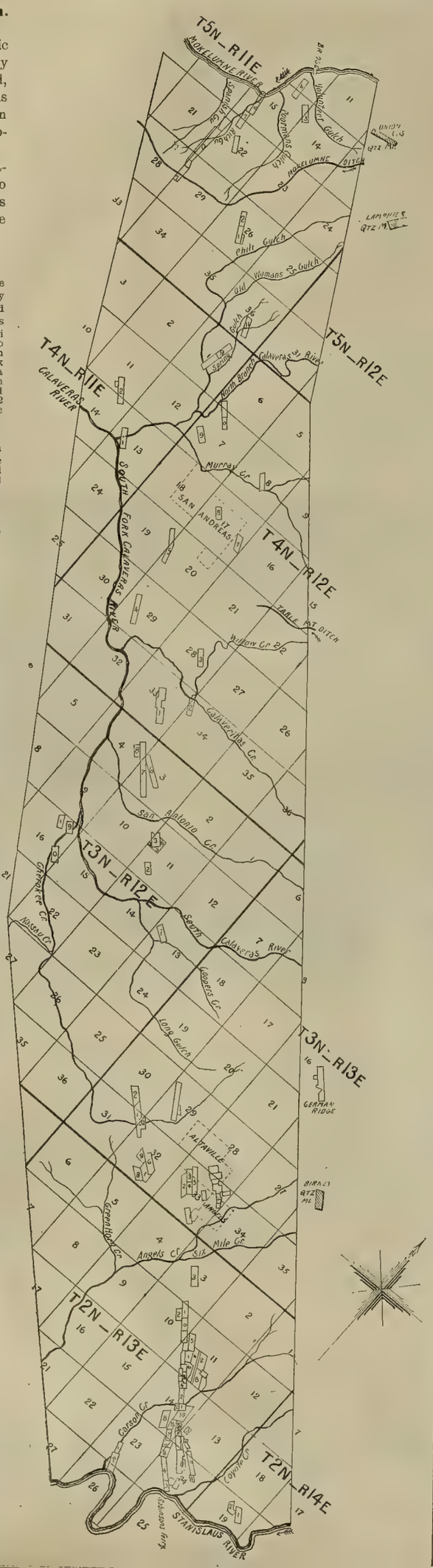
| | | |
|---|---|---|
| 1 | 33 | Gold Cliff and millsite |
| 2 | 33 | Lindsay Gold |
| 3 | 33 | Hale |
| 4 | 33 | Extension Hale |
| 5 | 33 | Suffolk |
| 6 | 33 | Democrat |
| 7 | 33 | Stickles |
| 8 | 33 | Utica |
| 9 | 33 | Lightner |
| 0 | 33 | Dead Horse |
| 11 | 33 | Angels |

T. 2 N., R. 14 E.

| | | |
|---|---|---|
| 1 | 19 | Rising Sun |
| 2 | 19 | Our Flag |

T. 2 N. R. 13 E.

| | | |
|---|---|---|
| 1 | 23 | Carson Creek |
| 2 | 23-26 | Douglass Hill |
| 3 | 24 | Calaveras Gold |
| 1 | 24 | Santa Cruz |
| 5 | 23-24 | Brown and Purcell |
| 6 | 23-24 | Canepa |
| 7-7 | 24 | Stanislaus and millsite |
| 8 | 24 | Mineral Mountain and millsite |
| 9-9 | 13-24 | Carson and millsite |
| 0 | 13-24 | Cordes and Wood |
| 1 | 13-24 | Point Rock |
| 2 | 13 | Enterprise |
| 3-3 | 13 | Reserve and millsite |
| 4 | 13 | Finnegan |
| 5 | 13-14 | Morgan |
| 9 | 14 | Union |
| 6 | 14 | Kentucky |
| 7 | 14-23 | Stephens |
| 8 | 14 | New Year |
| 59 | 14 | Iron Rock |
| 1 | 14 | California Ophir |
| 2-2 | 14 | Vanderbilt and millsite |
| 3 | 14 | Extension |
| 4 | 14 | Rothschild |
| 5-5 | 11-14 | Chaparral Hill and millsite |
| 6 | 11 | Felicie Placer Mine |
| 7 | 14 | McCreight and Reed |
| 8 | 11-14 | Hardy |
| 9 | 11 | Crooks |
| 0 | 11 | Spring Gulch |
| 3 | 11 | Morris |
| 4 | 11 | White Oak |
| 5 | 11 | G. Romaggi |
| 6 | 11 | No name |
| 7 | 11 | Missouri and millsite |
| 8 | 11 | St. Annie and millsite |
| 9 | 10-11 | Romaggi and Costa |
| 0 | 10 | Bald Hill |
| 1 | 3-10 | Marble Springs |
| 2 | 10 | No name given |
| 3 | 3 | Bolitho |




## The World's Greatest Gold Field.

Written by DAN DE QUILLE.

Now that the attention of the majority of the miners and prospectors of the Pacific Coast States is specially directed to the search for and development of veins of gold-bearing quartz, we may very safely predict as the result the discovery and development of thousands and tens of thousands of mines on veins now unknown and in regions at present unexplored. While the majority of the workable mines opened will be such as may be rated as moderately rich, a few wonderful discoveries will doubtless be made here and there in the different mining States. Even in California, the oldest of the coast mining States, there probably remains to be discovered a richer gold mine than any that has yet been found. Undoubtedly, immense deposits of gold are to-day lying hidden in nooks in the hills and mountains of California where their presence is little suspected. These may not be out in the wilds; they are as liable to be under the streets of the oldest of the mining towns as anywhere else.

The local papers of the Pacific coast show that new and valuable finds of gold are being made almost daily in some sections; therefore, in a few years the total number of gold-producing properties must be immense. The area of country in which the finding of paying gold mines is not only possible but also probable, is almost boundless, as all the region lying between the Rocky mountains and the Pacific ocean, and from Mexico to the extreme northern shores of Alaska, may be set down as gold producing. A gold mine that has proved a paying property, is now very seldom permanently abandoned as worked out; work may be suspended for a time, but it is always with the intention of resuming operations at some time in the future. In the early days of quartz mining in California not a few mines were permanently abandoned after working out a single surface deposit or ore chute, and some of these are now the best-paying gold properties in the State. To-day there is probably not to be found in all California a single mine on a vein of gold quartz which once paid a fair profit for working that can be set down as permanently abandoned; some one is holding on to all such mines, and sooner or later work is resumed on all, and with as good results as would be obtained in working new veins showing the same prospects.

At Grass Valley and about Nevada City, where quartz mining first began in California, mines that were opened forty years ago are still paying richly, and at the depth of 2000 feet show no sign of exhaustion. It seems probable that the ore will continue to as great a depth as man is able, with all his inventions and ingenuity, to follow it. It is the same at the other old quartz mining camps in California. Not a mine or vein of gold quartz in California that once paid a fair profit can be set down as worked out. Some may say that this permanence may not be found in the gold-bearing veins of the mining States which lie to the east of the Sierra Nevada range, but actual work shows the same vitality in the mines of the eastern gold belts. In Nevada, where gold quartz mining began at Silver City thirty-five years ago, the mines are still being worked, and are now paying better than ever before. At Pine Grove and one or two other places are mines of gold quartz that have been worked for from twenty-five to thirty years, and they are still paying as well as at first. At all these places new and rich mines are still occasionally being discovered.

There are, of course, in all sections of the Pacific Coast States quartz veins that do not pay for working. Some of these are barren, while others show some metallic value. A man may have a claim on a vein and may do a large amount of work on it, but until he has developed a paying deposit of ore he has not a mine; he has only a prospect, and it may never be anything more. Once a claim is worked to a profit it takes its place in the list of mines, and only such properties are considered—or worthy of being considered—in an examination of our mines in regard to their permanence; we have nothing to do with prospect holes. Counting only the properties that have once been paying, we may consider the gold mines of the Pacific coast as permanent, as very few have been completely abandoned.

Once a mine, always a mine. What is to-day but a prospect hole may to-morrow be a mine. Our prospectors are constantly adding to the list of our mines, and in a few years they will be almost innumerable. Some of these will yield immense profits, a great number will be good paying properties, and they will then taper down in productiveness to such as merely pay fair wages for working. However, we can see that at the rate at which new veins are being discovered and new mines being developed the total yield of the Pacific coast gold regions will be immense. The thousands of little mines will count. Of course, the great yield of a big mine sounds well in a report and attracts great attention, but more gold may be produced by half a dozen small mines about which nothing is said. Another advantage to be derived from the workings of a great number of small mines will be the regularity of the total production. The best of mines are not always in "bonanza," for barren places are to be found in all veins, therefore

while some are out of luck for a time, others will be doing well. The small average run of mines will prove to be the regulators. These are nowhere to be despised; they are as good for the country as the biggest and richest gold mines.

As for the finding of additional paying gold mines, we as yet hardly know what we have got in the region of country we are prospecting. It is only within the past three or four years that miners and prospectors in the States east of the Sierras began a special and earnest search for gold, while in California they are but now awakening and resuming the work of prospecting their immensely rich gold fields, having done next to nothing in that line for several years. To day there are probably as many rich gold discoveries remaining to be made in California as in any region on the Pacific coast, and not up in the mountain wilds, but in the immediate vicinity of some of the oldest and richest mines in the State. The "mother lode" of California is not a single large quartz vein, as many suppose. It is an auriferous belt from twenty-five to thirty miles wide, and over one hundred miles long, in which are many veins of all sizes. It is a great system of parallel veins. Many of these crop out on the surface, but there are also many that do not reach the surface. After some further ages of erosion these latter would show up to the light of day, but at present they are hidden. I think that, without a sign of a vein on the surface, it would be a safe and sensible operation for a man of capital to put down a first-class prospecting shaft in the mineral belt near Grass Valley, Angels, Sonora, or any of the old and rich California camps, taking the chances of finding veins belonging to the system not yet brought to the surface by erosion. The great mineral belt is full of parallel veins and those that do not come to the surface are often as large and rich as those that crop out. There is no better place in which to prospect than immediately about the old and rich California camps. No doubt fifty years hence rich discoveries will still be made about these camps. No man can see into the rock in which he is at work the length of his pick handle, and until every foot of ground in a mineral belt has been cut across, there is always a chance of finding a paying deposit of ore. This being the situation in the oldest mining camps of the coast, the innumerable veins yet to be discovered in the great States lying to the eastward of the Sierra Nevada range may be imagined. In this region new and valuable discoveries are still being made in and about the camps in which are known and paying mines, while outside there are immense regions thus far unprospected and in places almost unexplored; indeed, there are in many places in this great American gold region immense sections that are absolutely unexplored. To exhaust the possibilities of the Pacific coast's gold region will require ages.

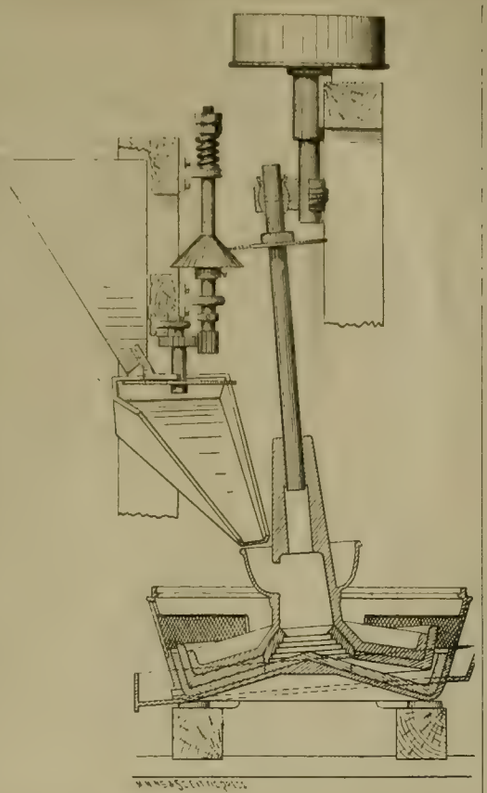
Taking all the Pacific coast States and Territories, the total number of mines being added to the list of paying producers each year is very great, and will continue to be great far into the next century. As the oldest of our gold mines—those opened twenty, thirty and forty years ago—are still being profitably worked, and as there is no reason why the paying mines now being developed should not prove equally permanent, it is evident that in five or ten years there will be in operation in the Pacific coast region an almost incalculable number of mines, great and small. In a few years the production of the yellow metal in the great Pacific coast gold field will far surpass that of South Africa, Australia, or any other gold region in the world.—Denver Mining Industry and Review.

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THE following is a list of the values of foreign coins as proclaimed by the Secretary of the Treasury on January 1st for the quarter. These values are to be taken in ascertaining the dutiable gold value of all foreign merchandise exported to the United States on or after January 1st for the purpose of assessment of duties. Values given in cents. Austria-Hungary, gold, crown, 20.3; Belgium, gold and silver, franc, 19.3; Bolivia, silver, boliviano, 49.1; British Posessions, N. H., gold, dollar, 100; Central American States, silver, peso, 49.1; Chile, gold and silver, peso, 91.2; China, Shanghai, silver, tael, 72.5; Haikwan, (customs), silver, tael, 80.3; Tientsin, silver, tael, 76.9; Cheefoo, silver, tael, 75.9; Colombia, silver, peso, 49.1; Cuba, gold and silver, peso, 92.6; Denmark, gold, crown, 26.3; Ecuador, silver, sucre, 49.1; Egypt, gold, pound, 494.3; France, gold and silver, franc, 19.3; German Empire, gold, mark, 23.8; Great Britain, pound, sterling, 486.65; Greece, gold and silver, drachma, 19.3; India, silver, rupee, 23.3; Italy, gold and silver, lira, 19.3; Japan, yen, gold, 99.7; silver, 52.9; Mexico, silver, dollar, 53.3; Netherlands, gold and silver, florin, 40.2; Norway, crown, 26.8; Peru, silver, sol, 49.1; Spain, gold and silver, peseta, 19.3; Sweden, gold, crown, 26.8; Venezuela, gold and silver, bolivar, 19.3; Switzerland, gold and silver, franc, 19.3.

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IN the United States 3600 persons lost their lives by railroad accidents last year, and 2610 were seriously injured. The fatalities from fires were 1850, explosions 950, falling buildings 730, mines 730, cyclones and storms 410, and lightning 300.



SECTIONAL VIEW OF KINKEAD MILL.

(See page 61.)

## Mines and Mining in Nevada County, Grass Valley District.

NUMBER II.

Written by SAMUEL BUTLER.

Great activity has prevailed in mining in Grass Valley during the past year. This has been noticed more in the extensive preparations for the rehabilitation of abandoned mines that are known to be valuable than in the mines already producing gold. Arrangements have been perfected whereby the gold output of this town will be greatly increased. Internal and external conditions point to this conclusion. The town itself has improved greatly in appearance in recent years, over $135,000 having been expended in real estate and building improvements in the past twelve months, and it now claims a population of 8000 people, which places it in the first rank of interior cities.

In the past two or three years the claims of Grass Valley have been presented to the public notice through the medium of the MINING AND SCIENTIFIC PRESS and the local journals in a manner which its rich and unequaled resources deserve, and the result has been the acquisition of influential capital from foreign sources that has accomplished much good. The advantages for judicious investment in the mines of this district have become recognized in every mining and capitalistic center in the world, which fact has brought the city to an era of prosperity which promises to be unprecedented in its history. The spirit of progress has seized the prominent citizens, and they are more indefatigable in their efforts to advance the legitimate interests of the town than they were heretofore.

During 1895 the greatest interest centered around the Massachusetts Hill group of mines. Preparations were made to develop these mines under one management on an elaborate scale. The group includes the North Star, Rocky Bar, Great Britain, Stockbridge, Massachusetts Hill and several smaller claims. The North Star has been one of the most productive and prosperous mines ever developed in Grass Valley. It has a depth on the incline of 2800 feet, and several miles of drifts have been excavated. Some years ago James D. Hague, a noted geologist and prominent mining engineer, assumed the presidency of the North Star Company. While administering the affairs of his company he became thoroughly conversant with the rich resources of the district adjacent to that mine. He perceived the great advantages and profits to be derived from the development of the veins existing there, by operating the properties conjointly and on an extensive scale, and commenced negotiations for the purchase of all the veins it was possible to secure. He succeeded, and the company which he represents has one of the richest and most extensive mining properties to be found in California. External improvements have been made; a Rix air compressor has been erected on the property by the Fulton Engineering and Shipbuilding Works of San Francisco. The compressor will supply the entire motor power for the immense machinery to be propelled, and is capable of developing 800-horse power. Water will be supplied to a Pelton water wheel, eighteen feet in diameter, through a steel pipe twenty inches in diameter and 8000 feet in length. The enterprise is something of an innovation in the manner of securing motor power, and its operation will be watched with interest by mining men throughout the world. The cost of the entire plant will exceed $150,000, which shows a spirit of enterprise worthy of emulation by other capitalists who are interested in this section. The success of the project is assured, for the mines which it comprises have, in the aggregate, produced several millions of dollars, and the depth to which the veins in the North Star, Omaha and other large mines have attained gives assurance to similar depth here. The mine, when fully developed, will be capable of employing from 200 to 300 men, and its productiveness will be a source of great revenue to the town and will greatly augment the output of gold.

Another abandoned property which has recently been resuscitated is the Bullion consolidated mines, which comprise the John Bright, Galena, Ione and Alaska claims. This property is being operated by a wealthy and influential company, and is under the supervision of George Mainhart, M. E., whose efficient management is synonomous with success. A substantial hoisting and pumping plant has been erected and the property is otherwise supplied with all the modern appliances which are capable of developing it to a depth of 2000 feet. It was formerly one of the great gold producers of the district, but was, like most other valuable properties of that regime, abandoned because of lack of capital, incompetent management and inefficient machinery. Mr. Mainhart is one of the best mining engineers of this county, and it is the belief of competent engineers that under his supervision the Bullion will eventually become one of the great gold producers of Grass Valley and thereby regain its former prestige.

The W. Y. O. D. mine has made marked progress during the past year. Internal and external improvements have been numerous and very substantial. The mine is equipped with complete milling, hoisting and pumping plants which are capable of developing it to a depth of 3000 feet. During 1895 ten stamps were added to the mill, which makes twenty stamps in all. The mill runs night and day on ore which is extracted in quantities large enough during the day to supply it the entire twenty-four hours. The mine is in a very prosperous condition, milling 1200 tons of ore per month, and will undoubtedly greatly increase its product during the present year.

The Pennsylvania mine, which is adjacent to the W. Y. O. D., is rapidly progressing. After some very persistent prospecting the company has discovered a vein which is two feet in width, rich in sulphurets and free gold. The owners are mostly Grass Valley business men and miners.

During the past year the Crown Point mine has exchanged hands, having been purchased by a French syndicate, and the new owners state that the mine will be developed in a manner commensurate with its value. The mill and machinery now on the mine will be superseded by new and modern appliances which will be capable of developing it to a great depth and putting it on a profitable basis, to which we respond, Amen.

The other mines in operation in this district—the Empire, Omaha Con., Maryland, Electric, Orleans, Granite Hill, Independence, Merrimac, Wisconsin, Norambagua and North Star are all in a prosperous condition and daily adding to the output of this district. The prospects in Grass Valley were never brighter, and the present outlook indicates a very prosperous year.

Nevada City, Jan. 13, 1896.

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ACCORDING to *Industries and Iron* the Yarrow aluminum torpedo boat has had but a brief career. Although it is but a short time since the vessel was floated, the metal has corroded to such a degree that it can be penetrated with slight pressure. M. Moissau has found that this pressure is produced by the presence of a certain impurity in aluminum, each of three samples of aluminum examined by him containing a minute percentage of the metal sodium. This may be a discovery of the greatest importance in regard to the commercial development of aluminum, and one which at the same time amply accounts for the deteriorating effects of water upon this material.

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AS NEARLY as can be ascertained, 275,000 lives were lost in 1895 by battle, railroad accidents and various other disasters in this and other countries. The loss of life at sea has been estimated at 4000, and on inland waters at 148. These losses in 1894 reached nearly 7000.

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THE total amount donated to colleges and universities last year was $12,379,820, charities $5,745,670, churches $2,089,150, museums and art galleries $1,724,500, libraries $532,433, and other institutions $6,471,976.

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LOSS OF LIFE by battle last year cannot be closely estimated, but it is believed that it reached 157,986—in Armenia, China, Africa, India, Cuba and South America—during the year.

# Scientific Progress.

### Reversal in Invention.

In line with the recent article of W. H. Smyth of this city, in an article entitled "Is the Inventive Faculty a Myth?," which has received considerable attention, Edward P. Thompson, in an article in the journal of the Franklin Institute, entitled "Reversal in Invention," comments on a topic of importance to inventors, viz., that a large number of important devices may be sorted out into pairs, one of each pair being what he calls a "reversal" of the other. Thus, the dynamo, which transforms mechanical into electric energy, on being reversed becomes the motor, which changes electric energy back again into the mechanical form. Had this principle of reversal been recognized long ago, each of these pairs of inventions would have required but a single inventive act, instead of two entirely independent ones. Both the invention and its reversal would have been devised at once, instead of by different persons going through different trains of thought at widely different periods. Following are a few of Mr. Thompson's illustrations of these "reversed" inventions:

"At the time the microscope was invented the principle of reversal could have been applied by reasoning that, if a distant large object could be made to appear nearer, could not a near object be made to appear larger? Had this idea been created, the mechanical execution could have been carried out by experiments with lenses of different convexities, concavities and numbers.

"A reversal of the telephone, which causes distant sounds to appear near, would be a microphone, but the present instrument is improperly named, as it does not enlarge, but simply creates a sound. When first invented its wonderful power was spoken of as making the walking of a fly sound like thunder, but this is false, because the fly jarred loose carbon electric contacts, thereby causing great fluctuations of current and violent action of the receiving telephone. * * * *

"The present air-brake system is now recognizable as a reversal of the early type, but a long time passed before the change took place. The principle had not been used as a kind of tool, and, therefore, the idea of the new brake did not come by demand of the mind, but by a combination of circumstances—that is to say, accidentally. The two systems of brake referred to are perhaps already conjectured by the reader, the first operating to stop a train by the positive action of compressed air agninst the wheels through the medium of the usual brake shoes, and the second by the negative action of compressed air, which normally holds the shoes away from the wheels in opposition to a spring. The advantages of the second way are apparent as soon as compared as to their main object, safety; for, by the former the train cannot be stopped in the case of a leak or a disordered pump, while with the latter the train stands still as soon as the air leaks out or the pumps refuse to work. * * * *

"The mental process of investigating this subject makes the principle so simple that it is a wonder that inventions existed so long before their opposite phases were thought of. Electricity furnishes several examples besides the dynamo-motor example, where the principle was not applied by a predetermined act. The old form of burglar alarm had an open circuit, and the process of opening the window closed the circuit and rang a bell. The reversal of this is a normally closed circuit. The opening of the window breaks the circuit and the bell rings. The idea once gained, and the advantages are apparent, for an alarm is given if the burglar cuts the wire. * * *

"The storage battery, although condemned for railway traction, is still one of the valuable inventions of the day, and is an exact reversal of the galvanic battery. The reversal is disclosed by stating that the operation of the primary or galvanic battery consisted in placing metal plates into a solution of salt or acid, and carrying off the electric current by a wire. The reverse of this consists in starting with an electric current, after the battery is partly exhausted, and passing the current through the solution in order to restore the chemicals to their original composition, ready to give off current as before the charging."

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THE human skin in a condition of health may be inflamed by light of great intensity, and in smallpox the already inflamed skin seems to be as sensitive to the chemical rays as a photographic plate. This discovery has led to recent experiments in the exclusion of the actinic rays of sunlight from smallpox patients to prevent suppuration and pitting. From an account by Dr. N. R. Pinsen of Copenhagen, it appears that the treatment should be commenced as early as possible, that the chemical rays should be carefully shut out by window glass of a deep red color, or by very thick curtains, that the patient may safely use weak candle light when taking his meals, and that natural daylight must not be admitted until the vesicles have dried up. This treatment does not interfere with any other that may be considered necessary. In several cases of unvaccinated children suffering from smallpox one physician, at first skeptical as to the influence of the red light, was surprised at the favorable course of the disease, as the vesicles did not suppurate, there was no secondary fever, and no permanent pitting resulted.

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A CORRESPONDENT of the *L'Etincelle Electrique* states that the telephone, on account of its marvelous sensitiveness, acts as a sort of barometer in the following manner: Two bars of iron, split and separated at their lower ends in order to increase their surface of contact, are placed in the earth at a distance of five or six yards from each other. Every week or two the earth at the faces of these bars is saturated with a solution of chlorhydrate of ammonium. Each of the bars is connected to a telephone in an adjoining house by a conducting wire. Twelve or fifteen hours before a storm a characteristic chirping sound is heard in the receiver, which increases as the storm approaches—a sound like hail on a metal roof. At each lightning flash a sound like a dull blow is heard. Previous to changes of temperature a sort of murmur is heard like the distant song of birds.

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We may say, then, that the invention of a successful airship will cause an entire revolution in the art of war more stupendous than that caused by any invention since that of gunpowder, and even surpassing that, since it only increased the distance between the lines of the combatants, while the principles of attack and defense, strategy and supply, remained unchanged, or were only slowly modified. A flying machine, however, will nullify strategy, make vital changes in the principles of attack and defense, diminish the importance of navies and seacoast fortifications, and by bringing the theater of operations to the doors of palaces and legislatures, render speedy settlement of national grievances imperative.—From "The Influence of the Airship on War," by Lieut. J. K. Cree, U. S. A., in North American Review for January.

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*Le Naturaliste* announces that a new mineral has been discovered at Allchar, in Macedonia, by Professor Krenner, who named it lorandite. It is found in short prismatic crystals, and more rarely in oblique rhomboidal prisms. Its color varies between cochineal and cardinal red, the crystals are transparent and flexible, like those of gypsum.

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A BORE-HOLE near Port Jackson, New South Wales, has reached a depth of nearly 3000 feet. It shows an increase in the earth's temperature of one degree Fahrenheit in eighty feet, while the average in the northern hemisphere is one degree in sixty feet.

# Mechanical Progress.

### Doctor of Machinery.

Among the multitudinous trades and professions there are many which are entirely unknown, even by name, to the general public. One of the least known and most interesting is that of the expert in machinery. The work of a machinery specialist is far higher than that of a skilled engineer, and many years of experience and special training are necessary to fit the expert for his duties. A New York paper says there are only about half a dozen of these men in the country, one in every large city. When anything goes wrong with a machinery plant of whatever nature, the cause of which the engineer in charge, frequently the builder of the engines, cannot discover, the machinery doctor is called in. Every chief engineer of a big plant may be called a specialist, so far as the machinery under his charge is concerned, but the specialist in machinery is an expert in engines of every description.

Though he has never seen the engine before, he rapidly diagnoses the case and prescribes a remedy, just as a doctor does for a sick patient. The instrument most used by him is a dentophone, which consists of a thin steel rod about a foot long, which he holds between his teeth, and applies to the head of the cylinder. To the practiced ear of the expert every sound transmitted from the cylinder tells a story. The working of the piston in the cylinder, and, indeed, of the whole engine, can be heard distinctly in this manner by anybody, but it takes an expert to tell just what those sounds mean.

In the case of a mysterious knocking which was heard in the cylinder of the big driving engine in a large spinning factory not long ago, an expert was called in to determine the cause. Every method had been tried to discover where the trouble was, but without avail. Bearings were examined, the cylinder was taken apart, and every part well oiled, all to no purpose. When the expert came he traced the mysterious knocking from the cylinder, along the piston rod, crank shaft, and through the main shaft, away off among the looms, where one of the looms was found to be the cause of the trouble.

Often an expert's services are required in the case of synchronizing looms. If all the looms in a big spinning factory happen to beat together, as sometimes happens, the vibration is strong enough to bring the building down. For the same reason soldiers always break step when going over a suspension bridge, for otherwise the measured tramp of the many feet, all striking the ground at the same time, would seriously endanger the structure. The power of sound is also enormous when exerted in a particular way. Every substance in nature has a keynote, and when a sound of the same pitch is caused near it a considerable amount of vibration is produced. When the great tubular bridge was being built across the Menai Straits, which divide England from the island of Anglesea, a traveling violinist nearly caused the collapse of the whole structure. He happened, while playing, to hold for a considerable time a note which chanced to be the keynote of the huge bridge structure. The sound echoed along the vast tube and re-echoed with ever-increasing force until the whole bridge vibrated as if an earthquake were taking place. The bridge engineer, who was near by, instantly divined the cause, and stopped the playing of the violinist.

Part of the business of the machinery doctor consists in so arranging the distribution of looms and other machinery that their working will not endanger the stability of the factory. Defects in a boiler can also be instantly determined by the practiced ear of the specialist. A plate in the boiler is selected which is known to be in good condition, and he takes mental note of the pitch of the sound made when the plate is struck with a hammer. All the other plates are struck in the same way, and any one which does not ring true and conform to the correct pitch is examined and replaced. A case is on record where a machinery specialist was crossing the ocean and detected crystallization in the center of the shaft, thereby averting what might have been a serious accident in mid-ocean. Measures were taken to strengthen the shaft in the place where the quick ear of the expert detected weakness, and when the vessel was docked his suspicions proved correct.

Few men, even with the most exhaustive training, can become experts at this business, as it requires a marvelous quickness of ear and delicate perception of sound with which few men are blessed. Technical knowledge is of little avail in itself, and a fine engineer might be a poor machinery doctor, just as a great musician might make an indifferent piano tuner. Whenever a big mill is erected, a specialist is always consulted as to the placing of the machinery, and his fee is generally well worth the expense and trouble which an injudicious distribution of machines may cause.

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### A New Blasting Method.

During last year blasting tests have been made in several mines of Austria-Hungary according to a charging and firing method invented by the mining counsellor, L. Jaroljmek, which tests are said to have furnished very good results. While so far blasting was connected with the greatest dangers, as for firing the charge by means of fuses or electricity external manipulations producing fire and sparks were required as impulse for the explosion of the charge, Jaroljmek locates the igniting impulse in the interior of the hole. The priming is based upon a chemical reaction, which is produced within the hole by water introduced into a body of caustic lime, which is arranged above the charge. The heat developed by the slacking of the lime is allowed to act from the outside upon a peculiarly constructed cap, which by its detonation explodes the charge within a certain time. By a timing arrangement the operator is enabled to fix the time of the explosion. This arrangement is very simple. The body of lime is covered more or less by a sheet of tin foil. Thus the access of the water is limited to a larger or smaller surface of the lime body, whereby on account of the heat being developed quicker or slower the charge is exploded correspondingly sooner or later. The tests proved the method to be practicable even under the most unfavorable conditions. The difficulty to conduct water to vertical holes is removed by laying wet moss or peat upon the cap. The water used for the charge furnishes in connection with the lime, which inflates very strongly by hydration, a stopping up of the hole, which is extremely effective against the blasting gases. Hereby a fiery blowout of the shot, which used to be so dangerous, is automatically made impossible. As this method further forces the operator to surround the blasting material with water, the developed gases are cooled off below the inflaming temperature of firedamp by their intimate contact with water, and because they lose heat while co-operating in the sprayification of the water. This was the case even when a certain kind of dynamite was used, which otherwise always ignited the firedamp, and for shots highly overcharged, too. In fact, the blasting gases are made entirely harmless, which is of great importance for the indispensable blasting in mines containing methyle ($C^2H^3$) and coal dust.—Organ der Bohrtechniker.

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A TERRESTRIAL GLOBE on a scale of 1 to 100,000 has been projected by M. Elisee Reclus, the French geographer, who believes that such a work would promote geographical discovery and topographic knowledge. The globe would be about 400 feet in diameter, and mountains a mile high would appear as elevations of about half an inch.

# Electrical Progress.

### Electrical Reduction of Colorado Ores.

W. S. Stratton of the Independence mine, Colorado, has contracted for the equipment of a complete electrical reduction plant to be installed at one of his extensive ore mines either at Cripple Creek or Colorado City. The equipment will consist of a direct connected generator having a capacity of 2,000 amperes at twenty-five volts. The ore will first be crushed, then placed in vats to be acted upon electrolytically; the process being similar to that employed at the Anaconada mine. In this plant there are seven generators. Four give a current of 1,200 amperes at a pressure of sixty volts and three give 750 amperes at 140 volts. The tanks each contain 100 plates placed in series. The tanks are connected up in sets of five, and these sets are connected with the feed wires in multiple. The original plates are cast in the shape of a very broad T, the two flanges at the top being the supporting points and the bottom going into the tank. The solution in this tank is made up of copper, gold and silver, mainly copper. While running, the solution is kept up to almost saturation. The action of the plates is for the solution to dissolve copper off the first plate and deposit the same amount on the bottom of the second, and at the same time dissolve off a portion of the face of the second and deposit this on the rear of the third, and so on. The first plate, instead of being copper, is lead and does not contribute to the solution. The backs of all the other plates are blackleaded, so that the copper may strip when wanted. By keeping the copper solution up to its highest point in value, as is readily determined by the use of a hydrometer with frequent assays as a check, the copper dissolves off the face of the plates only in very small proportions, while the amount deposited on the rear is extremely great.

When the solutions are first made up, says *Electricity*, all the metals present are dissolved, and, if they were all deposited on the plate there would be no advantage. As nearly all metals require a slightly different current for plating or depositing, the current is so regulated that the copper only is deposited and the gold and silver are dropped to the bottom of the vat as slime, which is cleaned out frequently and refined. At the same time the solutions themselves grow saturated with these metals, and they are also at long intervals taken out and the contents precipitated and recovered. By the electrolytis process copper of more than 99 per cent fine can be produced.

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A RECENT DECISION in one of the Federal courts has awarded the priority of invention to a naturalized Belgian, who died some years ago, in regard to the little underrunning wheel which makes contact at the end of the long pole with the wire which brings the current from the power house to the cars on the road. Street railway practice has settled down to the use of this device all over the United States, but as a matter of fact many other devices have been tried, and some are in regular use, especially in Europe. In America an early form was a real little "trolley"—hence the present misnomer—which ran along on top of the wire, but was always tumbling off and hitting the roof of the car with a noise like thunder. The scared passengers often thought it was an explosion of electricity, and the car crew often lost their patience putting the device back on the wire with the aid of forked sticks carried for that special purpose. Another method tried in this country with fair success was to run a sort of metal shoe along in sliding contact with the wires. In Europe for many years a split tube sliding over and around the wire has been used with excellent results, but the most popular form is a trolley pole with a cap of bent wire, making it look like an exaggerated letter T; and this is sometimes modified into a triangular shape of wire, supported from the car roof. Both these scrape along under the wire and their width gives them plenty of play. In this country one of the very latest forms has a trolley wheel pressing against the side of the wire, just as though the top of the ordinary trolley pole had been bent over.

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THE works of the Pittsburg Reduction Co. have now been in operation at Niagara Falls for several months. The necessary electric current has hitherto been furnished through four of the General Electric Co.'s 400 K. W. rotary converters, but owing to a considerable increase in the reduction plant they have been found inadequate for the service, and each of these 400 K. W. converters is about to be replaced by one of 600 K. W. capacity. The new machines will be mounted upon the same base frames as the 400 K. W. converters, and thus the converter plant will be increased one-half without any increase in floor space. A fifth converter of 600 K. W. capacity will be installed beside the others and will be similar to them in very respect. The total rotary converter capacity will then be 3000 K. W. Including the transformers installed in the works of the Carborundum Co. and the Calcium Carbide Co. at Niagara Falls, the General Electric Co. will have furnished 5000 K. W. capacity of transformers for operation in connection with the Cataract Construction Co.'s system.

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THE latest in the way of electrical progress is announced by Julius Emmner of Washington City, who says that he has invented a machine which will record a man's thoughts. He states that this machine "receives the magnetic thought waves which stream from the physical brain of the operator, and portrays them with microscopic fidelity, in an imperishable message," which causes the *American Manufacturer* to reflect that the record of some men's thoughts thus shown up would be a sight fearful to look upon.

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THE Westinghouse Electric and Manufacturing Company, which was organized in 1886, has installed upwards up 600 lighting plants in various parts of the world, representing over 2,000,000 sixteen-candle power incandescent lights. This company also manufactures motors and generators, as well as apparatus for the electric transmission of power by the Tesla polyphase system. The capital of the company is $10,000,000; the number of persons employed 4000, and the product in 1895 over $6,000,000.

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THE second direct coupled 800 K. W. monocyclic generator built by the General Electric Co. has been started successfully in the St. Louis station. This machine and its brother, which has been operating for some time in that station, are the largest generators in the world, so large, indeed, that it was impossible to assemble them at the works before shipment. They are now operating successfully incandescent lamps, arc lights and motors in the city of St. Louis.

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OFFICIALS of the New York, New Haven and Hartford road are examining some new electric motors designed for heavy service, which are the joint product of the Baldwin Locomotive Works and the Westinghouse Electric and Manufacturing Company. This road is reported as having in contemplation the equipment of several of its branches for electric service in addition to those already in operation.

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IT is the duty of a trade paper to do all it can for the best interests of the industry it claims to represent, and to foster its honest, stable and sound development; and it is equally the duty of every writer on the subject connected with the technical press of this industry to do likewise. Statements in the columns of the electrical journals of this country, tending to "boom" the industry on unsound lines, are sure to eventually injure the industry; and flowery and fanciful articles in the daily papers, written by persons connected with such journals, and tending to mislead the public concerning the possibilities of utilizing electrical energy, without reference to the commercial or practical results, are to be deprecated and looked upon as a direct and positive injury to the industry.—Electricity.

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A PATENT has just been granted to George Westinghouse, Jr., for the construction of ventilating armatures for dynamos. The armature discs are formed with lips or projections stamped up so as to stand at right angles to the main body of the disc. Any desired number of the lips may be made, and in making the armatures the discs will be inserted with sufficient frequency to obtain satisfactory ventilation, and the screwing up of the armatures will hold them firmly in place.

# Practical Information.

### To Protect Forests from Fires.

Representative Shafroth has introduced a novel bill, which has gone to the House Committee on Public Lands. It is designed to protect forests on the public domain from destruction by fire. It authorizes and directs the Secretary of the Interior to lay out ways 1000 feet in width through such forests on public lands as are liable to destruction by fire, putting them at "intervals of from five to ten miles apart," so that when cleared they may be effective for preventing the spreading of fires. The timber on these roads or ways is to be offered for sale at public auction, on the condition that each purchaser is to clear that part of the way of which the timber is bought by him. As to those parts which cannot be so cleared, bids are to be called for for clearing them. The purchaser or contractor, as the case may be, is to give a bond for the faithful execution of his work. Apparently, it is thought that a good deal of it must be done by contract, as the sum of $500,000 is appropriated by the act.

It is provided that anybody who willfully sets fire or causes setting fire to any timber upon the public domain, or who negligently leaves a fire burning unattended near any such timber, shall, upon conviction, be fined not less than $50 nor more than $5000, or be imprisoned not less than six months nor more than two years, or shall be both imprisoned and fined, as thus provided. Any person who builds a campfire or other fire near timber upon the public domain, and fails to extinguish it before leaving the place, is to be punished by a fine of not less than $25 nor more than $1000, or imprisonment for not less than thirty days nor more than a year, or by both.

It is provided that the Secretary of War shall, at the request of the Interior Department, detail soldiers to patrol the forests, and that they shall have power to make arrests under this act. The Secretary of the Interior is authorized to make other provisions for protection also against fire.

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SOME ancient highways of the Mexican State of Michoacan, according to Baron von Brackel, appear to center toward the Bay of Maruata, on the Pacific coast, and may have been used in the transportation of copper and other minerals from the vicinity of Coalcoman. The roads are straight, six or seven feet wide, and paved with large unhewn stones. Many of the stones have been removed for modern buildings, but enough remain to make it possible to trace out and map the entire system.

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THE explanation of Lord Kelvin's estimate that the "set-back" of the earth in its daily rotation round its axis amounts to twenty-two seconds per century, is reported to be that such retardation is owing to the friction caused by the tides, the latter acting as a brake, and such action is calculated, according to the same authority, to be equal in weight to some 400,000 tons applied on the equator. Other causes, he says, have also to be taken into account, as, for example, the increase in the size of the earth, due to the falling on it of meteoric dust, which, if deposited at the rate of one foot in 4,000 years, would produce the observed retardation by itself. Further, such a phenomenon as the annual growth and melting of snow and ice at the poles, by abstracting water from the other parts of the ocean, introduces irregularities into the problem, the abstraction accelerating the earth's motion, the melting, by restoring the water, retarding it.

### Magnifying Power.

Few persons have a clear notion of the magnifying powers that have been or can be obtained by means of the microscope. The following will be found trustworthy: A common hand magnifier, one-inch focus, magnifies ten times; very strong glasses, twenty times; small globule lenses, such as were sold for twenty-five cents, about fifty to seventy-five times; the most powerful single lenses that can be generally used, 150 times; the most powerful single lenses ever found available, 300 times; ordinary compound microscopes, highest power, from 250 to 500 times; highest power ordinarily obtained with the best microscopes, 1,500 times; highest power yet obtained, giving fair light and definition, 15,000 to 20,000 times. Claims have been made for much higher powers, but such claims are generally ignored by the best microscopists. By times, we mean in all cases, diameters. Sidewalk opticians generally mean areas when they speak of times. Areas are found by multiplying the diameters by themselves. Ten times, mentioned above, is 100 areas. The cheap microscopes, said to magnify 1,000 times, magnify about 33 diameters.

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MR. JOSEPH D. WEEKS reports that the production of manganese ores proper in the United States in 1894 shows a reduction from the previous year, the product being 5308 tons in 1894, as compared with 7718 tons in 1893. The production of 1894 is the smallest of any year since 1884. The production of Arkansas in 1894 was about the same as in 1893; California shows a reduction of 122 tons, Virginia a reduction of about 2300 tons, while Georgia shows an increase of 553 tons, Tennessee an increase of 440 tons, and West Virginia, which does not appear at all in previous years, shows a production of 100 tons. The total value of the 6308 tons produced in 1894 was $53,635, or $8.50 a ton, as compared with a total value in 1893 of $66,614 and an average value of $8.63.

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A NOVEL use of magnetism is reported from a foundry at Sandycroft, England, where electric cranes are operated from the electric power and lighting circuits, together with electromagnets, which permit the ready lifting of pieces of iron or steel weighing up to two tons. The magnets constructed for lifting purposes are attached to a crane. One magnet takes five and one-half amperes at 110 volts to excite it, at which energy it will support a weight of two tons of iron or steel. A switch controls the supply current delivered to the magnet. By the use of this magnet or crane three men do the work in one-quarter of an hour which previously took six men one hour and a half to perform.

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GEORGE B. SPRIGGS of Baltimore, recently, in the presence of several physicians, pushed a car loaded with pig iron, weighing 65,000 pounds, twenty-five feet up grade. Spriggs is a blacksmith, who doesn't seem to know his own strength. He is twenty-five years of age and weighs 172 pounds. He is a mass of muscle. Eight men, aggregating 1500 pounds in weight, made an attempt to move the car, but failed. After the exhibition Spriggs was examined by the physicians. He has a chest expansion of forty-four inches and can lift 750 pounds on his fingers.

# Mining Summary.

## CALIFORNIA.

### Amador.

THE SULPHURETS PLANT. — *Republican:* Messrs. J. W. Dwyer and L. C. Gillian, from Washington State, have nearly completed their sulphurets saving plant below the Zeila mill. It is by far the most elaborate plant of the kind in the county, although it perhaps covers a somewhat less area than the Gates plant at the Kennedy. The building is built exclusively of galvanized iron, and is 160 feet long by about 70 feet wide. Four rows of blankets running the entire length of the building will be arranged for the pulp to run over and deposit the gold-bearing mineral. By machinery the tailings will be elevated at least ten feet, to flow over this series of devices for extracting the sulphurets. Altogether the plant will cost fully $3000. The owners, however, evidently know what they are doing. The precious metal is in the tailings flowing to waste from the mill, and they are confident of their ability to extract a sufficient percentage to make the investment a profitable one. They expect to start the plant early next month.

WORKING SULPHURETS.—The cost of treating sulphurets is a matter of vital importance to the mining industry of this county. The future of gold mining depends largely upon improved methods of saving a larger percentage of the gold-bearing sulphurets from the rock, and also upon the maximum extraction of the precious metal from the sulphurets at the minimum cost. Every step in either of these directions is a permanent benefit to the business of mining. Many a mine, abandoned in early days as unprofitable, would be working to-day had the present facilities of saving and treating sulphurets been known in those days. The difference in the yield would have sufficed to turn the scale, and make the venture a paying one. For many years the sulphurets produced here have been reduced within the county, at a cost—where the mine has no chlorination plant of its own—of from $15 to $20 per ton, and a saving of ninety per cent of the assay value. Latterly keen competition has arisen in the smelting business, inducing some of our mine owners to see what could be done in shipping their concentrates beyond the county. The Bay State Company sent sulphurets to a smelter in the State of Washington, and actually saved money thereby. The Selby Smelting Works at Vallejo Junction has made a reduction. The Wildman and the South Eureka companies have sent ores there, where they were treated at $14 and $15 a ton, the Selby Works paying the cost of transportation from Ione. This is a saving of fully $5 a ton, and amounts to considerable in the course of a year, where the output of a forty-stamp mill averages from two to three tons per day. One reason why ores can be worked to better advantage at the smelter is that they are able to save other metals besides gold, whereas the chlorine process depends entirely upon the gold. Whether our local reduction works can successfully compete with the reduced rates remains to be seen. In any event, however, the outcome cannot prove otherwise than a decided advantage to the leading industry of Amador county.

THE WILDMAN-MAHONEY.—*Record:* At the Wildman-Mahoney mine they have had a large force engaged for some time in laying new pipes and changing and rearranging old pipe. Some 2200 feet of new pipe has been placed in position and 400 feet of the old pipe changed. Both mills are now connected with the same pipe and each hoist is now operated with power from its own pipe. This new arrangement makes the mills and hoisting works separate, and in the future an accident to one will not cause a cessation of work on the other. Twenty more stamps will be put in operation about the first of next month.

GENERAL NOTES.

ARGONAUT.—*Republican:* The shaft is down 1050 feet. Assessment No. 1 on the entire capital stock was levied this week. This means that the $100,000 realized for a working capital by the sale of a portion of the stock has been exhausted. While the sinking has been very expensive owing to the adamantine nature of the rock passed through, still it is right to say that $20,000 has been expended in the purchase of real estate adjoining the mine, namely, the Leonard property, the Volunteer mine and the reservoir site, etc. Also a large sum has been spent in the purchase of machinery and erection of the buildings. Sinking will be continued until 1300 feet is reached, when drifts will be run to the line, where, it is alleged, the Kennedy has trespassed upon the Argonaut ground.

ONEIDA.—The Oneida has started up. Ross Brown has located the point for a new shaft about 500 feet east of the old works. The shaft is already down six or seven feet. A steam boiler and engine are expected from the city shortly. The shaft is to be put down as rapidly as possible to a depth of 1700 feet. The reopening of this property is believed to mark the commencement of a long career of activity. There is an immense quantity of low-grade rock, which it is believed with modern appliances and close management can be worked at a profit, although looked upon as worthless twenty years ago.

SOUTH EUREKA.—The mill of this mine has been in operation for three months. In November 800 tons were crushed, averaging $6 per ton; December, 900 tons, $10 per ton; January, 900 tons, $5 per ton. The result, even of the minimum yield, is more than sufficient to pay expenses, and insures the steady working of the property. The above figures include sulphurets.

ALPINE.—The Bank of California, the owner of this Plymouth mine, has given a London company an option for thirty days, the terms being that the company, on spending $50,000 in development work, is to have a one-half interest in the property. It is thought the English capitalists will take up the proposition.

KENNEDY.—The Kennedy mine keeps up its reputation as away in the lead among the gold producers of the county. We have it on good authority that the November cleanup amounted to $75,000, out of which a dividend of fifty cents per share was declared. In December the output was $54,000, and the dividend thirty cents per share. The new ore body on the east is yielding the bulk of the precious metal.

Several teams are engaged in hauling the old ten-stamp mill of the Hardenburg near Middle Bar to the Mechanics mine, near Sutter Creek. Everything is to be moved—both old timbers and ironwork.

At the Gover mine the shaft is free from water. The shaft itself, however, was in a very bad shape, necessitating the expenditure of a large amount of money in putting it in working condition. The mill is about ready to start.

At the Hazard claim on Rancheria creek the shaft is down 300 feet. The water is troublesome, and militates considerably with the sinking operations.

GWIN MINE.—In running west from the 1000 ft. level a vein of quartz was cut of a fine quality. The south drift has been run a distance of 150 ft. on the east side of the ledge, tapping it in two places, showing an increased thickness going south. The mine is now employing about thirty men. Mr. F. F. Thomas, Supt., has recovered from his late illness.

At the South Poloma, the shaft is nearing the 100-foot level from the tunnel; from this level drifts will be run 100 ft., north and south. The ore from the shaft is of a ribbon character, showing a large percentage of sulphurets.

### Butte.

At Forbestown the ledge in the lower tunnel of the Gold Bank mine which was begun a year ago and is in 1200 feet has cost about $12,000 and taps the ledge at a depth of 2400 feet. It is locally stated that a hundred-stamp mill will be erected in the spring at the mouth of the tunnel.

### Calaveras.

AROUND MURPHYS. — Corr. *Citizen:* The Falcon mine closed down its mill on Monday, as all available ore had been extracted—from the old levels up to the surface. Sinking is now an absolute necessity, and a force will commence this work at once.

The Gum Boot mine, on Indian creek, is reported to have been bonded during the past week. J. Willard is the representative of the company bonding.

The report that the McQuig mine has been sold has gained currency, and it is undoubtedly the fact that the property has changed hands and that the coin was put up.

The confirmation of the sale of the Rose Rock mine has given new encouragement. The deed, which was placed in escrow with Wells, Fargo & Co., at St. Louis, was taken and the price paid. The money arrived in Murphys a few days ago and all has been definitely settled as to the fact of the sale. Operations are proceeding considerately under charge of J. Heinsdorf.

*Chronicle:* Work at the Peek Ranch hydraulic has been suspended; but the tunnel, which is being driven into French Hill for the purpose of tapping the numerous quartz ledges that were uncovered by the surface washing, is being pushed steadily ahead. The rock encountered in the tunnel is extremely hard.

*Dispatch:* The old Hardenburg ten-stamp mill has been taken down and removed to a mine near the town of Sutter Creek, there to be put up on another quartz claim. Everything is gone from this old mine near Middle Bar that Hayward & Lane have been running for the past four to six years.

*Citizen:* All the machinery for the Donnallan mine is now in position and ready to start. The track is being built and will no doubt be completed by Monday. Mr. Hackett says there is now nothing more to do about the grounds except to start the work of development, and this will commence about the middle of next week.

### El Dorado.

(Special Correspondence).—The Bacquette Company of Los Angeles has bonded from D. H. Burlingham and is rapidly pushing development work in the reopening of an abandoned claim, in the neighborhood of the Idlewild.

The Idlewild, commonly known as the Taylor mine, has been run continuously for seven years with the single exception of one day in all these years.

The Melton & Witmer new ten-stamp mill near Grizzly Flat is crushing out medium class ore at a profit to its owners.

St. Louis people have bonded property near Kelsey four miles north of Placerville, and will begin development work at once.

San Francisco people, principal among whom is Mr. Palmer, have begun operations on the south extension of the Big Sandy, which after years of idleness is being taken up by its Toledo owners to be sunk to greater depth. The Kelsey neighborhood is rapidly gaining ground as a good field for deep mining.

The Lady Emma has struck a rich vein of six-foot ore, high grade, at a depth of 275 feet, and is now constructing a ten-stamp mill.

The demand for mining properties in this county is growing quite apace. Purchases are being made and bonds extended in various sections to a gratifying extent, and within the next six months, judging from present indications, El Dorado county will be quite alive in the mining field. Hotels and liveries are beginning to show the influx of mining men. Ranchers are preparing to give way to hammer and drill, and prospects are fair that hoisting works and mills will, ere another year has passed, tower far above the windmill and tank, and the noise of blast and stamp mill supersede the crowing of barnyard fowl and the lowing of cattle on the hillsides in many a section.

### Nevada.

ELECTRIC LIGHT AT THE W. Y. O. D.—*Tidings:* An electric light plant has been put in at the W. Y. O. D. mine, and Mr. Lockwood, the electrician from the Westinghouse Co., San Francisco, is now here to start it going. The dynamo will be run by water power. The grounds surrounding the mill and hoisting works will be lighted with arc lights. Incandescents will light the shaft and the main buildings. There will be 75 lights of this character.

### Plumas.

STRUCK GRAVEL.—*National Bulletin:* The drift from the shaft of the Elizabethtown Channel mine has cut into gravel. As the gravel was struck in the upper part of the drift, and as the bedrock at that point is pitching, it is evident that the bottom of the channel is lower than the drift—miners estimate it to be ten feet. The gravel exposed is reported to be of very nice quality and, at this point even, to yield a fair prospect. Thus far the pump is handling the water with ease. If necessary, it could lift nearly double the present flow.

H. A. Swift, of Oakland, has bought the Pat Malloy mine at Bucks Ranch and will place it in operation.

### San Diego.

THE THOMAS MINES.—Yuma *Sentinel:* There arrived here yesterday from Stockton, Cal., for Supt. R. M. Strauss of the Thomas group of mines, from Mr. Lane, one of the owners of the famous Utica mine at Angels Camp, Cal., and also the principal owner of the above mines, a carload of wagons and two of horses. They will be put in use at once freighting from Blaisdell station to the mine.

Eight carloads of timbers for the contemplated mine are now on the ground. Next Monday the millwright of the Utica mine, with his assistants, is expected to arrive and active operations on the twenty-stamp mill will be commenced.

The machine for the new mill is now being cast and, with some nine miles of water pipe, is expected shortly.

This will, no doubt, be one of the richest mines ever opened up in this locality.

The Young America gold mine in Ogilby district has been located by H. Le Roy. J. Y. Byers has filed upon the Wonder mine in Deer Park district.

The Golden Cross Mining and Milling Company has mortgaged nineteen gold mines at Hedges, to secure the payment to Mary E. Hedges of $19,000 within sixty days.

### Shasta.

*Democrat:* Everything in the shape of mining property in and around Muletown is being bonded.

At the London and Burton mine at Muletown, owned by the California Gold Mining and Milling Company, the assays go from $9 to $18 to the ton. The company has concluded to push development work and open up the mine.

Fred A. Deakin will begin active operations at the Spanish mine in Texas Springs.

The Shasta County Development and Mining Company have begun active work on their group of mines in the Flat Creek district, near Iron Mountain. Twenty men are at work sinking two shafts and a tunnel running now 160 feet. Lumber and machinery are now on the ground for the new hoisting works. There will be three hoisting engines. There are eleven claims in the group, the principal one being the Alta mine. Ore bunkers are being built and filled and the Iron Mountain company are putting in two side-tracks to haul the ore, which they have contracted for, to the smelter at Keswick.

*Searchlight:* The heavy rains of the past week have proven a godsend to placer miners, who have been taking out dirt and awaiting water. E. P. Connor and sons have found a piece of ground at their Salt creek camp, a few miles out of Redding, that was overlooked by the argonauts. The ground is 50x400 feet in area, and evidently was at one time the bed of the creek. Several nuggets weighing a half ounce have been found, and the placer will pay the lucky prospectors good wages all winter.

The expected happened when, during the heavy rains, slide after slide filled the narrow cuts on the Iron Mountain road. The completed furnace will not receive ore for several months yet, although Superintendent Hill hoped to start before the end of January. The loss will be heavy, but as the loose overhanging earth had to be removed at any rate, it will not be as great as at first reported. As soon as the weather will permit the force of workmen will be increased largely.

A. W. Graham is down from the Shasta Development Co.'s property on Flat creek, and states the work there is progressing well. As soon as the buildings are completed the force will be increased and from twenty-five to thirty men will be employed in taking out ore, which will be treated at the Keswick smelter.

The back channel on Dog creek, near Delta, has been found, and the stockholders of the company that has been pushing development work there since last August are correspondingly jubilant. That a covered channel existed in this district, and that from this source came the heavy channel gold, has been recognized from the time that the surface diggings of this section were the richest in Shasta county. Pay was found in gulches from the north and on the main creek to a point about a mile and a half above Delta; here pay suddenly ceased. Many have tried to solve the mystery; shafts have been sunk; tunnels have been run, but mainly above the lava flow, and resulted in disappointment invariably. The attention of C. E. Brown, a local mining engineer, was called to the disappearance of the pay channel, and, after tracing the course, eight claims were located and deeded to C. E. Brown, Murray Brothers and M. E. Dittmar. These gentlemen incorporated the Ancient Channel Drift Gravel Mining Company, with $6,000 capital, made up mainly by local business men, though a few hundred shares of stock are held in San Francisco. Work was commenced on the theory that the channel carrying the pay was under the lava. A bedrock, crosscut tunnel was driven in 200 feet, and on last Thursday the channel was broken on an upraise, and its value was demonstrated from the first shot. Owing to the irregularity of the trains, no news has reached here since Saturday, but there is little doubt that a valuable find has been made. The gravel prospects well; $4 a car, or $10 a day to the man. This prospect is from the rim; when the bed of the channel is reached, much better results can be looked for.

The company is officered at present as follows: Thos. B. Dozier, president; George Deming, vice-president; C. E. Brown, secretary, and M. E. Dittmar, treasurer; these, with Jos. Kahny and Mr. Deistlehorst, make up the directorate.

Plenty of wood can be had on the claims, and Dog creek, a never-failing stream, flows past the tunnel's mouth.

### Siskiyou.

GENERAL MINING NOTES. — *Journal:* The Blue Gravel mine at Greenhorn started up yesterday, and two shifts will be kept constantly at work, as the recent heavy rain has furnished plenty of water, and some good work will now be done on this mine.

The mines on Barkhouse, which have been closed down for a few weeks, will start up again and continue all summer. These mines are expected to produce some very rich quartz this year.

Siskiyou is destined to be one of the greatest gold producing counties in the State. Her rapid strides towards the head of the list of gold producing counties last year has brought her great resources in that line under the eye of the investor, and her advancement this year will be much greater, especially if we have a favorable season for the miners, which means plenty of snow in the mountains. The rains of last week have sent many of our miners to work in a jubilant mood.

Some very favorable reports may be expected this year from Thompson Creek. The Seattle Placer Mining Company is investing a large sum preparatory to working the old Shinar claim on an extensive scale and with plenty of water. This is a fine property, and will fully justify its owners in making these developments.

The Espey, Hunter & Co. mine at Hawkinsville, has been steadily at work since the pumps were repaired. They were compelled to close down a few hours one day last week, owing to the high water in Shasta river.

At Cherry Creek the miners are supplied with an abundance of water from the late continuous rain storms, to carry on ground sluicing with good success. They have no use for the reservoirs at present and will sluice off a great quantity of the top gravel and boulders, which will enable them to wash up the rich bedrock gravel when the water supply is light, aided by the reservoirs in saving water during the night.

Fort Jones *Reporter:* Barton & Co., of Oak Bar, are constructing a mile ditch to bring water onto a high bar near Walkers. The bar is rich, paying from five to ten cents to the pan.

Culver, Humphrey, Hossick, McLeague, Pitts and Wallace have organized at Barkhouse for the purpose of working the creek, which is supposed to be very rich.

The Commodore mine, owned by Humphrey, Quigley & Billups, will start up again in a few days. They have just finished cleaning up from a seventy-ton crushing, which gave them $2560. John Quigley, of Oro Fino, is running the arrastras. He is a first-class mill man and amalgamator and made the rock go better than on any previous test. They are running a tunnel, about 220 feet lower than their present works, which they expect to finish in about six weeks. They have enough ore in sight to run them for years.

*Union:* The miners in all the gulches and small streams leading into Klamath river and its tributaries are now busy at work sluicing since the late rain storms commenced and all appear to be doing well. In the high hill diggings, where there is no water of consequence except from melting snow or while raining, good results are also obtained.

*Journal:* The mines on Barkhouse and in the vicinity of Oak Bar and Scott Bar are still closed down, but it is expected a number of them will be in operation in another month, when everthing along the river will be lively.

### Trinity.

CINNABAR.—A Castella correspondent of the Redding *Free Press* writes: S. Conway has the contract to pack all the quicksilver out this winter from the Altoona mine, and it keeps him busy. He started on the 15th of December and has already more than 400 flasks at the depot. He uses about forty horses, and has been compelled to erect more sheds at Castella, as also sheds at a certain point on the road. The Altoona mine at Cinnabar is turning out from twenty-five to thirty flasks of quicksilver per day. It is one of the richest mines in the world. Professor Noles of the Integral mine has come out for the winter. He says that the company has nine men employed in running tunnels. He believes the Integral to be immensely rich if he can get on the right ledge. The Altoona and Integral are in close proximity to each other, and it appears that the richest pay chute of the former is running direct for the latter.

## NEVADA.

THE DEAL OFF.—From Carson is reported the repudiation of the purchase of the Buckeye placer mines. The sale was made in October, '95, to Messrs. Lane, Hayward and

Hobart for $250,000, the purchasers giving a bond and paying $10,000 cash down. They also purchased from outside parties a water right or reservoir site on the headwaters of Carson river, to bring water through fifty miles of canal, ditch and flume to work the mines. This water right they retain. They started a survey of the ditch, located a large amount of ground adjoining the 1700 acres they bonded and put forty men at work prospecting and developing. The principal work had been done on the Black Horse claim or location in Buckeye canyon, where an open cut developed a bed of fine-looking gravel 12 or 15 feet deep, rich in coarse placer gold which sold at the Carson Mint for $19 per ounce. But what was called the bedrock was not generally considered to be so, and among the first of the new proprietory operations was to sink a shaft down into this bedrock; sunk to the depth of 153 feet through a wash deposit and no true bedrock. Some fair gold prospects were found all the way down, but nothing like that at the surface. Near the bottom of the shaft some beautiful pieces of silicified or agatized wood were found, being sections of the trunk and branches of a good-sized tree, which, judging from the formation and grain, must have been cottonwood. No finer or more beautiful wood petrification was ever found on the Pacific Coast. Its greatest significance, however, is a demonstration of the geological character of the earth at that particular point. Sinking deeper was discontinued by reason of too much water and the necessity of the erection of costly machinery for pumping and hoisting.

Various reasons are assigned for the abandonment of the purchase: that the property does not turn out as valuable or prospectively productive as was anticipated; too much trouble and cost in procuring and introducing the necessary water; big commissions claimed for parties securing the purchase and title; alleged trespasses by locators, etc. Anyhow the whole negotiation is off and the property reverts to its original locators and owners, residents of Ormsby and Douglas counties.

Buckeye is nearly 35 miles southeast from Carson and the mines are a discovery of the last three or four years. The Zirn mine (quartz) is in the direction, at Pinenut, 10 miles nearer. It is also bonded for $70,000, which is expected to be paid in a few days.

THE AURORA TAILINGS.—Bodie *Miner*: Courchaine, Stewart and Cottrell on the first of January located the Aurora tailings, which had been accumulating since the early days of that once famous camp. Owing to the great growth of sagebrush on these tailings no one realized the extent nor the value of them; but Mr. Courchaine, who had known of these for the past twelve years, was on the ground first and located forty acres, one-half of which is covered with rich tailings. These gentlemen have a snug fortune awaiting them in the working of these tailings by the cyanide process. They will begin work on them about the first of April, or as soon thereafter as possible.

STOREY COUNTY.

THE MILL TO BE ENLARGED.—On the front page of this issue is an illustrated description of the Kinkead plant on the Con. Va. waste dump. The *Enterprise* says the plant has been running smoothly for over two weeks. During these two weeks the mill has demonstrated that the undertaking is a success in every sense of the word. The rock from the C. & C. dump, on which the experimental run has been made, has yielded sufficiently to demonstrate that the plant will pay. Mr. Kinkead has let a contract to enlarge his mill to twice its present capacity, and the work on the addition to the present building will be commenced soon. He says that, unless he could make rates with the Selby Company which were entirely satisfactory to himself, he would build a roasting furnace there to treat the concentrates which his plant produces. Sulphur is the only base metal contained in these concentrates and this can be drawn off, Mr. Kinkead estimates, at a cost not exceeding the cost of transportation of the concentrates to the Bay.

LINCOLN COUNTY.

De Lamar *Lode*: Upwards of $200,000 has been expended on developments on the Jim Crow and Monitor, and in the erection of the milling plant, the development of water with which to operate it involving about half of that sum. Nearly 10,000 tons have been put through the mill, however, from which $650,000 has been derived, while with additional stamps that are now being shipped from the East the earnings in 1896 will far exceed those of any period since the purchase of the property by its present owner. Every modern improvement is to be found on the property, the ores being conveyed from the mines to the mill by a tramway, while a coach with three guards is employed to deliver the bullion product at Milford, a distance of 170 miles.

SPRING VALLEY DISCOVERIES.—Concerning recent discoveries near Spring valley, the Pioche *Record* says they are thirty-two miles from Pioche, about twelve miles east of Spring valley, and in a range of mountains suspected for a long time to be valuable for mineral, but on which no particular locations have heretofore been made. The Millett and Rice boys of Spring valley appear so far to have the best locations. The ore is of a quartz character and was first tested and prospected for gold. Returns of about $20 to the ton were the best obtained, until it was suggested that some parts of the stuff looked more like silver than gold ore. It was found then to carry about $50 to the ton in silver.

This discovery brought in parties from the outside, and the location of new ground by all parties, rather than a development of what they already have, has taken up the time since. It is less than four weeks since the general value became known, but in that time the country for a distance of seven miles has been staked off. The result and experience following the location of claims in Ferguson district induces the prospectors of the new camp to look very carefully after their fences before the crowd comes in.

A miners' meeting took place on the 20th inst., to regularly organize a mining district. The mineral belt crosses the State line between Nevada and Utah, running northwesterly and southeasterly, and one of the best claims lies partially in both States, as is seen by one of the boundary-line monuments, which stands out prominently close by.

APRIL FOOL LEASE EXPIRES. The lease held on the April Fool mine by Frank Wilson and W. J. Dooley having expired, the property will be handled by Wilson for the owners, who propose to work it on its merits. The two cars of ore just shipped brought $43,000 in Salt Lake.

EUREKA DISTRICT.

Thos. Wren writes to the *Sentinel* as follows: Few persons who have never resided in Eureka are aware that Eureka has been one of the greatest gold-producing districts on the Pacific coast. Outsiders have known Eureka as a great lead-smelting center in the past, and smelting and gold mining are not associated in the minds of most persons. Nevertheless, Eureka has added to the world's stock of gold, at a very low estimate, ten millions of dollars.

At some future time I propose to give the exact figures as far as they can be ascertained from sworn returns made to the assessor. Some of the gold ores have a quartz gangue and could probably be reduced and the gold saved by mill process. Other gold ores have an iron gangue and the best method of working these ores has not yet been determined by practical tests. There are scores of mines in the district containing gold ores assaying from $60 a ton to $100 and upward. These ores are generally associated with silver and lead ores. The lead rarely carries much gold, but is rich in silver. The gangue of the gold, when not quartz, is iron. Owing to the difference in specific gravity, appearance and hardness, there should be no difficulty in separating the silver-lead ores from the gold ores. The silver-lead ores bear shipment to Salt Lake, where they find a ready market, and the $8 and $10 gold ores should be worked here by some of the many processes for reducing gold ores and saving the gold. The cost of shipment of these ores to a market—$6 a ton and upward—would pay an enormous profit if they were worked here. Our large companies—the Eureka Con. and Richmond—have fine smelting plants lying idle, but they do not seem inclined to try working ores by any process except smelting. Gold ores assaying up into the hundreds have been taken out of the mines of the Eureka Con. and shipped away to find a market elsewhere, while the poorer ores that would not bear shipment went over the dump. In the meantime our people seem almost paralyzed by the adverse silver legislation and the low price of silver, and scarcely an effort is made even to call the attention of investors in gold mines to the value of this district as a gold-mining district. Why not wake up and tell the outside world what we have here, what we have done and what may be done? By a little concert of action, without expending any considerable sum of money, we can attract attention to the district at least.

## OREGON.

GENERAL SOUTHERN OREGON NOTES.—The Ashland mine is preparing to ship a car of ore to the Selby smelter.

H. M. Hicks, in Cottonwood mining district, on south side of Siskiyous, has a force of men in placer operations at the Hicks & May claim there. Placer miners along the smaller water courses are "making hay" now while the water lasts.

A working test of ten tons of ore from a ledge which B. F. Wagner uncovered west of Ashland, near the Ashland mine, was made at the Hicks quartz mill last week, yielding $16.50 per ton.

The sheriff has attached the Hammersly mine for Jones & Otten of Gold Hill.

Over in the Applegate country there is activity in placer mining. The Sterling mine people are confident of cleaning up over $100,000 this winter.

G. Bartlett, McMullan Creek, Deer Creek district, is locally reported to have received $75,000 for his prospect near Preston's peak, about thirty-two miles west of Kerby. This is supposed to be a great strike and Mr. Bartlett demands $100,000 for it. The lowest assay is as follows: Gold, $40; silver, two ounces; copper, 40 per cent, or 800 pounds to the ton. The ledge is twenty-seven feet wide.

THE VICTOR.—W. W. Taylor, of the Victor, has returned from this city where he recently contracted for $150,000 worth of additional pumping machinery. Within the last ten months he has expended nearly $65,000 on the Victor, principally on the present pumping plant which has yielded 52.8 ounces of gold on a ten days' run. When the new pumps are added, the whole plant will run ten 4-inch nozzles the year around—the first instance of hydraulic mining on such a large scale in that section. The water has a 300-foot head and ten 4-inch nozzles under such a pressure will do considerable amount of work. Col. Taylor last week showed the Ashland *Tidings* a letter which he had received from his friend, Lord Stanley, of England, only the previous day stating that he had £50,000 ($250,000) which he desired to invest in gold mines out here, and asking his interest and advice in the matter.

WALDO COPPER MINES.—In the copper mines near Waldo the vein has widened out into a good sized ledge of carbonate of copper and black oxide of copper ore, the former carrying 36 per cent and the latter 54 per cent in copper. The company will at once erect its smelter; within six weeks two smelters will be running in Josephine county. The Elmer Brown Copper Company has had the machinery—save the blower—for this smelter on the ground for several months, partly in place and housed. The mines are about five miles southwest of Waldo, in Page gulch. The main ledge is about 4' feet wide and pitches from west to east. The development work consists of a tunnel on the south side of the creek 120 feet in length, a shaft on the north side of the creek 85 feet in depth, and two tunnels and a shaft a short distance to the southwest and about 900 feet above the creek. The force at the mines will be increased.

*Journal*: Two giants are running night and day at the Hampton & Lewis mine on Grave creek. This is one of the largest placer mines in southern Oregon. It now has a water supply of more than 4500 miners' inches and will next season have 1000 inches additional.

## BRITISH COLUMBIA.

A Vancouver dispatch says: American capitalists have purchased the Best, Idaho and Mountain Chief mines, near New Denver, for $90,000. They have also bought up all the claims for sale in the vicinity.

THE NELSON SMELTER.—*Spokesman-Review*: After numerous delays incident to the starting up of a smelting plant, the Nelson smelter blew in on Wednesday morning, and, much to the surprise of the owners, ran through 120 tons of ore the first day. The plant was purchased with a view of treating only 100 tons daily. The matte is 50 per cent copper, and 10 tons of ore are required to make one ton of matte. The value of the matte is about $250 a ton.

It was confidently expected that work would commence on the first day of January, but there were numerous vexatious delays which prevented. Sir Joseph Trutch was watching everything with a great deal of interest and expressed himself as being more than pleased with the result of the first day's work.

PILOT BAY.

THE BLUE BELL MINE.—During '95, the Blue Bell mine, 10 miles up Kootenay lake from Pilot bay, produced 51,361 tons ore. There was shipped to the works 2994 tons of lime rock. The smelter was put into operation March 16; to December 31 there was produced 6,440,000 pounds. The mine and smelter are owned by the Kootenay Mining and Smelting Company. A. B. Hendricks is general manager.

The Pilot Bay smelter started up last week.

## UTAH.

Capt. DeLamar has bonded the Viking, Mercur district, for $36,000.

An English syndicate has bought a group of properties owned by the Searchlight Mining Company adjoining the Sunshine Mining Company, Camp Floyd district, for $150,000 cash. C. W. Miles will manage the property.

"THE AMERICAN JOHANNESBURG."—Those who have examined the Mercur district and are familiar with the Rand in South Africa point out several similarities. The lodes are not unlike and the same oxidized arsenical ores are to be found in Mercur as in the South African district. The best values are said to be found near the porphyry channels in both instances.

The hanging wall is of shale and the foot wall of lime, but between these are a variety of mineralized bodies, all of which seem to carry gold to a greater or less extent. Half a dozen tunnels have been run into the mountain and by means of upraises and winzes the ore is economically sent to the surface. The ore channels vary from 5 to 25 feet. The ores are of a grayish blue or black color, and in appearance are deceptive. Their values run from $3 to $20 dollars a ton, the average running about $12. The ore can be mined and milled for something under $2 a ton. In the Mercur property the work of breaking ore begins at the terminal wall, and when all has been removed from the chimney the timbering that has been necessary for such work is removed and the walls allowed to collapse, the men meanwhile working towards the outlet or tunnel.

A great deal of prospecting has been done from the various tunnels, and a double compartment shaft is being sunk, to learn what there is further down the mountain.

The Mercur mill has a capacity of 200 tons a day, and the Mercur property keeps it going all the time.

## IDAHO.

The most important feature of the mining development of the State during '95 was the development of the Boise gold belt. It is now known that a gold belt extends from Camas prairie on the southeast in a northerly direction to and beyond the Willow Creek district. In a general way, the mines of Elmore and Ada counties, together with the Willow Creek district in Boise county, are located on this belt, and wherever development work has been prosecuted on this belt, satisfactory results have rewarded the operators.

A company has been organized in Chicago that proposes to operate on gravel bars at the Horseshoe bend of Salmon river. The object of the company is to run a cut through the neck of the bend, a distance of 13,000 feet, and turn the river into a new channel, some feet lower than the original channel, and thus drain 9000 feet of the present bed. It is supposed there are millions of dollars of gold in the bed of the river. The enterprise will require the expenditure of something like $100,000.

Harry Thompson, manager of the Bear creek bedrock flume enterprise, in Elmore county, has gone to Scotland, the home of his company. He will return in the spring with funds to continue operations. The company has already constructed 2220 feet of double flume and is now about ready for productive operations; it has expended $45,000 in prosecuting the work, but much barren ground had to be run through to reach the pay dirt.

The mining exchange recently organized at Boise City is not intended to be a mining stock board, dealing in and listing mining stocks, but rather a bureau of information for collecting and imparting information relating to the mining industry in Idaho.

CAMAS NO. 2.—The Camas No. 2 mine, twelve miles from Hailey, recently purchased by H. K. Thurber and others of New York City for $250,000, paid in December a dividend of $17,000 and in November $15,000. This was the product of an old twenty-stamp mill. Mr. Thurber has decided to build a double-compartment shaft through which to work the property and will put in machinery of sufficient capacity to work the mine at the depth of 1000 feet.

A snowslide near the Star group of mines, near Hailey, on the 17th, carried the blacksmith shop, together with two men, half a mile down the gulch. One of the men, George Hague, is missing, and it is believed he has been killed. A strike of a seven-foot vein of galena was recently made in this group, which belongs to the Vanderbilt Milling Co. of Salt Lake City.

## MONTANA.

*Inter-Mountain*: The Missoula Gold Mining Co. has been organized to operate the San Martina mines in Missoula county; H. S. Corbett, president; H. L. Frank of Butte, treasurer; W. Q. Ranft, secretary. The company is said to have the necessary financial backing.

GILT EDGE MINES.—H. S. Sherard of Gilt Edge has negotiated a deal whereby the New Year and some adjacent mines in the Judith mountains, belonging to W. G. Norman and Adolphus Harmon, have been bonded for $100,000, for one year, to New York capitalists. The first payment, $25,000, is to be made May 1, 1896; the second, $25,000, Sept. 1, 1896, and the third, $50,000, Jan. 1, 1897. There shall be deposited in the Bank of Fergus County, before work commences, a forfeit of $5000.

Basin *Times*: The whole of the Cataract along Cataract creek, including the Eva May, is now under the jurisdiction of the Basin Miners' Union, whose schedule for underground work is $3.50 a shift. President Padden and Secretary Sprout of the Basin Union had an interview, the latter relinquishing their claim, as the mine is adjacent to Basin since the completion of the road, which was built by Butte money.

Butte *Miner*: There is a sure enough boom on in men seeking leases on property. This leasing mania is not confined to copper and gold properties, but silver as well.

## WYOMING.

From Collins comes news of a mining excitement in the mountains about twelve miles west of that place. The new camp is in Independence mountain, and several claims are being operated. Development has not proceeded far enough to justify any opinion regarding the camp, but values have been found in almost every claim, and one claim has been sold for $12,000 cash.

## NEW MEXICO.

The *Miner* of Kingman, N. M., reports the discovery of a gold ledge in that vicinity a few days ago "which assays 105 ounces in gold."

## COLORADO.

LA PLATA COUNTY.—(Special Correspondence).—The heavy snows in November put a stop to most work in these hills. Only a few mines had foresight to put in supplies for winter. The Little Kate mill in Basin gulch had already proved a success. If the mill assayer's report is true, the mill saved all the gold in the ore, tailings not showing more than a trace—a most remarkable showing; and if the ore continues to be so entirely free, the owners certainly have a bonanza. The ore thus treated is surface ore, having a value of $8 per ton.

The Bromination mill in Lewis gulch made a short run on ores from different properties, demonstrating to the satisfaction of all concerned its possibilities in working refractory gold ores. In many instances 90% of the gold value was extracted. This process has the objection that, by using same, the silver is lost; and as most La Plata ores run from two to twenty ounces in that metal, the process is too expensive in its cheapness. Many large bodies of pyritic ore will contain about 0.5 ounces gold and 17 to 20 ounces silver, and that class cannot be handled at this mill.

The Columbus did not get the coal supply up before the storm, so sinking had to be stopped; but a few men are drifting on the vein and on the 100-foot level.

The Small Hope is greatly improving in size and quality as depth is gained.

The Durango Girl is working four men, taking out some very rich tellurium ore. This claim, with 280 feet of development, has shipped $7000 worth of ore, taken out during drifting on the vein with little or no stoping.

Durango, Col., Jan. 14, 1896.

AT WARD.—Col. Brainerd is adding machinery to his mine and mill on Left Hand. Last week he received a 500 horse power Leffel water wheel and three more will follow soon. A company, of which Lyman J. Gage of Chicago is at the head, is backing him. It is claimed that a number of years ago this company set aside a million of dollars, the interest of which is spent annually in development work.

THE GOLDEN FLEECE.—The Golden Fleece Mining Co., at Lake City, Colo., report that from September, 1892, to January 1, 1896, there were 5,772,245 pounds of high-grade ore shipped, having a value of $722,022.78, and 1,979,806 pounds of milling ore treated, valued at $7,229.41, making a total of $729,252.19. The expenditures during that time amounted to $213,830.64, leaving a profit of $515,421.55, of which amount $401,979.85 was paid in dividends, leaving a surplus of $113,441.70 at the beginning of '96.

The Leadville *Herald* says: Twelve months ago the output of the camp was not over 1000 tons per day. To-day it is probably 1300 tons, with every indication of an increase. The de-

mand for iron is steady and all the smelters report an ample supply of ore.

The Victor Mines & Land Co. paid dividend No. 9, of $3000, on the 20th inst., making a total of $27,000, of which $24,000 was paid in '95.

### ARIZONA.

Pearceville is the name given to the new town at the Pearce mine. A stage line has been started connecting the new camp with Fittsburg and Tombstone.

The English company at Harqua Hala have dismantled their mine and leased the property to Arizona miners.

The Congress Mining Company's monthly pay roll amounts to about $400,000.

Globe *Belt:* At the Buffalo smelting works, owned by the United Globe mines, a large force of workmen is getting the plant ready to begin smelting. It has been entirely remodeled, and, while not yet complete, the work is sufficiently advanced to start one furnace. It is a 36-inch jacket with a daily capacity of 45 tons, and another furnace of the same size will be erected and blown in at an early date.

Robert McBroom is superintending the work and will have charge of the plant. Mat. Cavaness is hauling ore from the Buffalo mine and a pack train of 36 burros is delivering about 18,600 pounds of ore daily from the Carrie and Buckeye mines. The rock crusher has been running several days, and the supply of ore will be ample for two furnaces. Coke is arriving freely and the bins are almost full.

At Lost Gulch, eight miles from Globe, the Kasser Gold Mining Company is running ten stamps, with two Frue vanners, and showing good results. Two more Frue vanners will be up inside of a week. They are only running from 14 to 16 tons of ore per day so as not to crowd the vanners too much. Some of the ore is free milling and some concentrating, and the plates and Frue vanners are doing fine work. The concentrates average 40 to 50 per cent lead, and from $80 to $120 per ton gold.

AT JEROME.—*News:* At the United Verde Copper Co.'s works the improving and enlarging of the smelter and mining machinery is being pushed; it is thought that two months more will see all improvements finished and production doubled. The new iron addition to the smelter has been raised. The new electric power engine is in place, and Jerome will have an improved electric light service in a short time. The 500-foot tunnel is being enlarged so that the electric trolley system can be introduced to move cars of ore from the mines to the roasts. When completed, the facilities for the perfect and systematic working of these mines will compare favorably with any in the world.

A LARGE STATEMENT.—Mojave *Miner:* This week a sale of twenty-eight mines in Gold Basin was made to a Scotch syndicate represented by Messrs. Stuart and Orr, of Scotland. The amount paid is stated to be $250,000, and the mines are the Patterson and Schaefer group. Charles Pickenbach, who managed the Harqua Hala mines for Hubbard and Bowers, is the superintendent for the new company. All the water rights in the neighborhood of the mines have been bought up and will be thoroughly developed and brought to a point where they can be used for milling purposes. At least $500,000 will be used in developing the mines and erecting an immense plant for the extraction of the gold and silver in the ores.

YARNELL.—*Journal-Miner:* The Virginia Gold Mining Co is working a force of thirteen men in the Yarnell mine, which consists of three claims. The Juniper has a 700-foot shaft, with levels run every seventy five feet. The Mother Lode claim has a shaft down 375 feet, with levels run at 130, 200 and 260 feet.

### LOWER CALIFORNIA.

TO MINERS.—*Lower Californian:* The Custom House of Todos Santos has given information to the Treasury Department of the City of Mexico that very frequently there arrives at this port *gambusinos* (prospectors), bringing with them small quantities of gold dust, coming from places where no stamp offices exist, whose duty it is to make the invoices provided for by Art. 26 of the Regulations of June 26, 1895, or which are situated within the zone of forty kilometers referred to by Art. 35 of said regulations, and that said custom house further states that those small quantities of gold dust are sold or exchanged for provisions to local merchants, where periodically said gold dust is accumulated in sufficient quantities for exportation, and in order that this mineral shall not be comprised within the penalties established by subdivision 12th of Art. 61 of said regulations, the President of the republic has considered it proper to determine that in the sea ports, where transactions of this kind shall take place, that all merchants or purchasers of those small quantities of gold dust shall be required to keep a memorandum authorized with the seal of the custom house, wherein the said office shall make entries of the value, weight and nature of all said mineral verbally reported to the said office by said merchants, or other persons having so purchased in the locality, to the end that said entries or reports shall be considered as evidence and basis of the invoice required by law to be used upon the exportation of said gold dust. * * The above order was issued in the City of Mexico, Dec. 23, 1895, and is now in effect at the Ensenada Custom House, and the Collector, Don Pedro Victoria, will receive the gratitude of the mining community in having simplified a regulation which prospectors and small miners found great difficulty in complying with.

PROF. GEORGE F. BECKER writes that in regions near the pole, ice is as much a rock as limestone. This may remind some who might not have thought of it otherwise that the essential difference between ice and granite, considered as rocks, is merely a matter of the greater or less degree of heat it takes to "thaw" them.

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING JANUARY 14, 1896.

553,148.—STOVE—C. W. Barzee, Wasco, Ogn.
553,150.—STEERING GEAR—C. E. Bergman, Everett, Wash.
552,952.—CONCENTRATOR BELT—W. F. Bowers S. F.
552,954.—ELECTRIC RELEASE—J. W. Chute, San Jose, Cal.
553,105.—CAN OPENER—W. G. Cogswell, Los Angeles, Cal.
552,995.—CONCENTRATOR—John Frey, Berkeley, Cal.
553,004.—SAW SWAGE—B. LaFleur, Hilgard, Ogn.
552,963.—TREE FELLER, ETC.—J. Lomas, Ashland, Ogn.
553,133.—MAIL DELIVERY FOR BUILDINGS—L. J. Pechner S. F.
552,924.—ELECTRIC RELEASE—S. H. Reynolds, San Jose, Cal.
553,089.—PIPE COUPLING—D. C. Wilgus, Los Angeles, Cal.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

EVAPORATOR.—Jeremiah Wellington Mote, Wilbur, Oregon. No. 552,667. Dated Jan. 7, 1896. This evaporator is especially for drying fruit and consists of an outer shell, an inner wall concentric therewith and forming between itself and the outer shell an annular space, a source of heat communicating with the lower portion of said space, a rotating frame within the upper portion of the space and a tray-carrier mounted upon said frame and independently rotable or adjustable thereon. The object of the invention is to effect a perfect distribution of the heat and an even exposure of the fruit to the heat, so that the drying shall be equable throughout the entire charge.

AUTOMATIC ELECTRIC RELEASING DEVICE.—John W. Chute, San Francisco, Cal., assignor of one-half to James White. No. 552,954. Dated Jan. 14, 1896. This invention relates to an automatically operating release and resetting device which is applicable to open gates or doors, to disengage horses from their fastenings, to release any mechanism, and for other similar purposes. It consists of a swinging, spring-actuated arm and a latch lever therefor, an independent disengaging lever, an electro magnet and an armature-carrying lever by which the disengaging lever is normally held in position, together with a curved attachment carried by the swinging arm, and a lug upon the releasing lever adapted to be engaged by the attachment when the arm is disengaged and moved whereby the releasing lever is returned to its normal position and engaged by the armature lever and set in readiness for the new operation. In conjunction with this is a spring-actuated bell crank lever, fulcrumed with relation to the latching lever so as to strike and disengage it when released, and a catch by which this lever is normally retained out of contact or engagement with the latch.

MAIL DELIVERY FOR BUILDINGS.—Louis J. Pechner, San Francisco, Cal. No. 553,133. Dated Jan. 14, 1896. The object of this invention is to provide a simple and effective means to be set in operation by the postman upon depositing the mail for carrying said mail to the several floors or flats of large buildings, and depositing it at the proper points, giving notice at the same time of the operation. The device consists essentially of a box for the mail, an endless traveling cable connected with said box and adapted to transfer it to an upper floor of the building, and to return it to its initial point, a means for operating said traveling cable, a receiving receptacle at said upper floor, and automatic connections whereby the box, upon reaching the receiving receptacle, automatically discharges its contents into said receptacle. The device is operated by an electric motor, which is provided with means for throwing the circuit into and out of action.

TREE-FELLING AND LOG-SAWING MACHINE.—Joseph Lomas, Ashland, Or. No. 552,963. Dated Jan. 14, 1896. This device, as its name implies, is for sawing trees and logs, and especially for cutting both standing and fallen timber, and is applicable on mountain sides or elsewhere. The object of the invention is to provide a machine for this purpose, the power for which is derived from compressed air or steam, or other suitable medium, which is conducted through a hose or other conduit to any distance desired, whereby the machine, itself, which is firmly attached to the tree or log in any position or on any ground, no matter how steep, rocky, or swampy, may be operated within a given radius without the necessity of moving the source of power. The machine consists of a frame, a cross-beam adapted to slide up and down thereon by means of chains and pulleys, an engine carried by the cross-beam and adapted to be operated by suitable medium, a saw connected with the piston rod of the engine, and suitable dogs for holding the frame to the log.

CONCENTRATOR BELT.—Wm. F. Bowers, San Francisco, Cal. No. 552,952. Dated Jan. 14, 1896. The object of this invention is to provide a simple and practicable removable flange for a concentrator belt. The flange is provided with a flaring wedge-shaped base, and the belt is provided with an under-cut or dove-tailed groove adapted to receive the wedge-shaped base of the independent flange, the walls of said groove being so constructed that they will automatically fold down and clamp the base of the flange, as the belt passes over the terminal drums.


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**References:**
Timothy Dwight, President Yale University, New Haven, Conn.
Henry S. Munroe, Professor, School of Mines, Columbia University, New York City.
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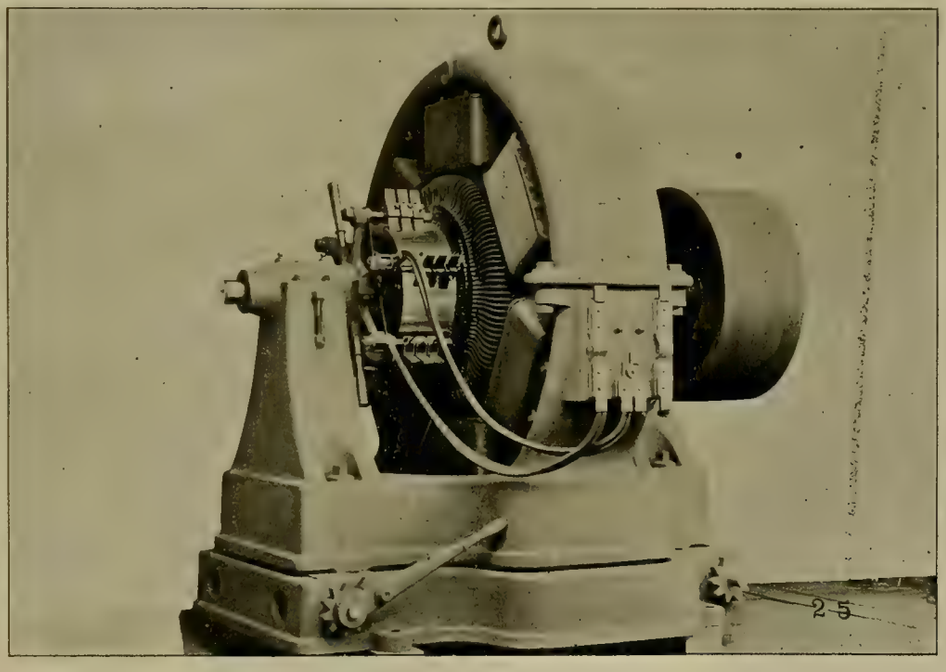
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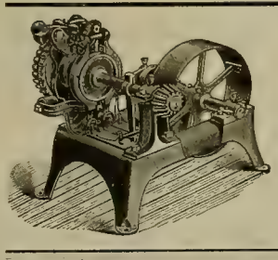
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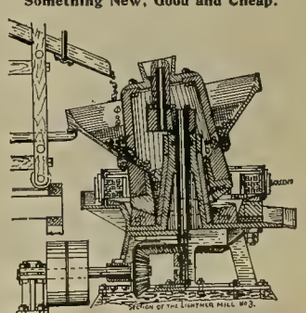
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## Coast Industrial Notes.

—The Port Blakeley, Wash., mills have let a contract for cutting 800,000,000 feet of logs.

—The Oregon census of '95 gives that State a population of 362,000—a gain of 48,000 since '90.

—Last Friday overland freights on borax, canned goods and wines from this State were advanced from 50 to 75 cents per hundred.

—About 400 men are again at work at the Sugar Refinery in this city, which, it is thought, will run continuously through '96.

—During last month there were received here 2904 flasks of quicksilver, making a total for 1895 of 31,024 flasks, against 25,717 in 1894 and 24,227 in 1893.

—Real estate in Fresno is said to have advanced 30 per cent in value as a result of the Valley railroad. The first check the Valley road has received is in that town.

—San Diego's City Council has adopted its City Engineer's plans for the new water works and is about to accept the bid of the Mountain Water Co. for $1,500,000.

—The Northern Pacific Railroad Co. talks of building all its freight and passenger cars at Tacoma, Wash. A large quantity of coast timber is now sent East for car-building purposes.

—It is proposed to begin construction of the Clear Lake and Napa Railway about May. It will be 72 miles long and will cost $700,000. Storage batteries will be established every 15 miles.

—The Manufacturers' and Producers' Association propose to hold an exposition of California products at this city next April. The annual meeting of the stockholders will be on February 5th.

—Oregon and Washington sawmills shipped 29,915,743 feet of lumber here in December, 1895. California mills shipped 12,765,070 feet, making the total receipts at this port 42,680,813, as against 26,494,924 feet in December, 1894.

—The Board of Directors of the Mechanics' Institute has decided that the next annual fair begins on September 1st and closes October 3d, and that it will include a display of the natural products of the State and a complete exhibit of manufactures.

—Bliss & Son of Nevada are having built at the Union Iron Works a steel steamer which is to run on Lake Tahoe at the rate of twenty-three knots an hour. They also propose to build an electric road from Truckee to Lake Tahoe and build a large hotel near the lake.

—This week the Pacific Rolling Mills resumed work, about 700 men on the payroll. During the two weeks the furnaces have been altered to admit the use of oil for fuel. The Mills expect to use about 100,000 barrels per year. This industrial establishment is the first on this coast to make so general a use of oil fuel in blast furnaces.

—Francis Smith & Co. of this city have shipped 312 tons 30-in. steel pipe to the Cariboo, B. C., mine of the Horsefly G. M. Co. It goes by steamer to Victoria, B. C., thence by steamer to Vancouver, B. C., then by rail to Ashcroft 200 miles, then on snow sleds 170 miles north to the gravel ground; the freight bill will be a little over $15,000.

—F. M. Smith, "the borax king," has at last succeeded in his project of placing his product on the European market. His original idea was to ship the crude borax from here to Liverpool, a build a refinery there. Since his recent European trip he figures that he can do about as well by selling the raw material to the Liverpool refiners, and on this basis a large percentage of the borax product of this State will be sent.

—During December, '95, the value of breadstuffs exported from Pacific Coast customs districts was as follows: Oregon, Or., $16,220; Willamette, Or., $681,196; Puget Sound, Wash., $332,433; San Francisco, $1,578,974; total, $2,608,823. The total value for the past twelve months ending December was $22,732,108, against $17,102,595 for the previous year. The exports for 1895 included 3,341,393 bushels barley, value $1,377,050; 30,115,573 bushels wheat, value $16,322,305; and 1,718,089 barrels flour, value $4,905,588.

—In December, '95, the Port Blakeley, Wash., mill beat the mill record of the State by sending out 14,989,512 feet in December: the total shipments from the ten largest mills in the State footed up for that month 47,502,584 feet. The total receipts at San Francisco for that month were 42,680,813 feet as against 26,494,924 feet in December, 1894. The mill at Port Blakeley leads in the total of its shipments for 1895—106,426,403 feet—an average of about 30,000 feet a day the year round.

—Los Angeles oil men have "got together" and combined to stop the cutting in oil rates. There are about 400 of them. Last July, crude oil brought 75 cents a barrel. It has got down to 30 cents, and though of 15 specific gravity and of this 25 per cent asphalt and 6 per cent sand, is susceptible of economical use under large boilers under forced steam draught. So far the freight to San Francisco has been about 60 cents per barrel. Freights went up yesterday and the Los Angeles men are tired of producing for the benefit of the carrier.

—Another phase in the fortunes of the Nevada Southern Railroad is furnished in the incorporation of the Southern California and Salt Lake Railroad Company at Los Angeles last Monday, "to construct and maintain a standard gauge railroad from the Needles, Cal., to Milford, Utah." Connection will be made at Blake with the Atchison, Topeka and Santa Fe Railway, thence running northeasterly through the southern portion of Nevada to Milford, 295 miles, where junction will be made with the Union Pacific system; capital stock, $7,000,000. A. B. Hotchkiss of Los Angeles is one of the trustees of the road and an attorney for the Southern Pacific. He says the road will be commenced within six months.

—Daniel Best, San Leandro, Cal., has built a train of traction engine and wagons for the Crystal Rock Salt Mining Co. for use on the company's road, 32 miles long, from the mine to the A. & P. station. The company produces salt of fine quality, pronounced by assayers equal to the Liverpool imported. It has recently incorporated with $500,000 capital in this city and controls about 1000 acres of "mining ground" in San Bernardino county about 50 miles west of The Needles on the Colorado river, from which the salt is mined in large crystal blocks.

—The *Review* says that a new feature in the flour industry has recently developed in Washington State trade with Guatemala. The flour is packed in 100-pound sacks, which, when thus packed, is admitted free of duty to the ports of that country. The Washington mills have worked up considerable trade with Guatemala and Chile, which is increasing rapidly. Ships load with flour and lumber at Tacoma and Seattle and return with cargoes of coffee and cocoa. The export trade has grown so that sixteen steamships will ply between Puget Sound and the Orient, beginning in April. The trade has hitherto been carried by six steamers. Flour as a staple article of food is rapidly supplanting rice in China and Japan.

## Personal.

Capt. A. H. Ward returns to his Mariposa Co. property next week.

Prof. Thomas Price and Melville Attwood have returned from Grass Valley.

Tirey L. Ford arrived at Washington, D. C., yesterday and is at the Hotel Normandie.

Maj. Frank McLaughlin is at Paso Robles and will return to Butte Co. about Feb. 15.

W. C. Quiney has returned from an extended and successful business trip to Australia.

E. B. Dunham is succeeded by Supt. Ball in the management of the Gold Bar mine at Sawyer's Bar.

J. F. Lansing, of Butte, Montana, has assumed the management of the Trail Creek, B. C., smelter.

Jno. L. Truslow of Santa Barbara is the reputed successor of C. H. Speers as assistant Gen. Pass. Agt. of the Atlantic and Pacific.

John Howell, late manager of the Broken Hill Proprietary, Australia, is at the new works of the smelting company at Illawarra, N. S. W.

G. W. Garside, Fuseter Bay, Alaska, expects to have the new Willoughby mill finished by Feb. 1st. Five tunnels are being driven with satisfactory result.

Dr. Schiedel is visiting the Thames, New Zealand. It is understood that he will fill the position of supervisor of the Waihi, Waite Kauri, Crown and Woodstock mines, recently occupied by the late Richard Spratt.

Geo. B. Milburn, well known at Candelaria, Nev., and Shasta, Cal., was recently killed in a fight with marauders at Selukne, Matabeleland, South Africa, where he was at work for the Dunraven Mining Co.

Capt. Thomas Mein, one of the California miners under arrest in the Transvaal, South Africa, was once a miner in southern Oregon, and was superintendent of the Ennis & Cameron mine on Galice creek. From California he went to Venezuela and then to Alaska, where he was foreman of the Treadwell mine.

Mr. W. S. Keyes was recently elected to the board of trustees of the Academy of Sciences. President Jordan of Stanford University was recently elected to the highest administrative office in the Academy, and the new movement will doubtless add to the practical efficiency of that scientific body.

Prof. Jas. Bryce, the distinguished political economist, has returned to Great Britain from South Africa. In an address last Saturday before the Edinburgh Chamber of Commerce, he estimated that the Transvaal gold mines would produce £700,000 worth of gold. Should this estimate prove correct, he added, the ratio between gold and silver might need altering.

Clarence King is inspecting the Old Dominion mine at Colville, Wash. The owner, G. B. Dennis, contemplates the proposition of putting in a big machinery plant at the mine, and commence shipment of the ore product. The Old Dominion is developed now to a capacity of from fifty to seventy-five tons of ore per day, that will represent a value of $100 per ton.

## Obituary.

"Doc" Shurtleff, a typical '49er and a man who made and lost several fortunes in gold mining, died at Sacramento last Saturday. In Placer county he took out over $100,000 from the Ophir, near Auburn.

Thomas Prosser, senior member of the firm of Thomas Prosser & Son, 15 Gold street, New York, died on the 10th inst. at his home in Brooklyn. Mr. Prosser was for forty years the American representative of the Krupp Works of Germany.

An alleged letter from Mr. J. H. Hammond to the Santa Rosa, Cal., postmaster, dated Mashonaland, S. A., Dec. 16, '95, states the death of Mark Elliott, of Santa Rosa, at Mashonaland, of Asiatic fever. Mr. Elliott was a mining engineer who left this State three years ago to engage in mining. The letter is doubtless a forgery, for Mr. Elliott has been heard from since the date of the communication, and had anything happened him his South African friends would have wired.

## Dividends Declared This Week.

The Homestake Mining Company has declared a monthly dividend of 25 cents per share.

The Highland Mining Company of South Dakota has declared a dividend of 25 cents per share, or $25,000, payable since the 20th.

The Ontario Mining Company of Utah has declared a dividend of 10 cents per share, $15,000 payable January 31st; the first since October, 1892, when a 50-cent dividend was declared.

The trustees of the Boston and Montana Consolidated Copper and Silver Mining Company have declared a dividend of $2 a share, payable February 20th, to stockholders of record at the close of business January 21st. This makes the total dividend to date $3,725,000.

## Commercial Paragraphs.

A Rand compressor and complete drill plant has been sent up by H. D. Morris & Co., 141-143 First street, this city, to the Sierra Buttes Mining Company's Mammoth mine, Tuolumne county.

The Colorado Iron Works has finished the machinery for Taylor Brothers' concentration mill at Russell Gulch, Colorado. This mill will treat the low-grade ore of the Saratoga mine, and has a daily capacity of fifty to seventy-five tons.

The Standard Boiler Co. of Chicago has moved into its new offices, 1120 and 1121 Marquette building. These boilers are built by the Link-Belt Machine Co. of Chicago, who have put in new and improved machinery for their manufacture, reducing the prime cost, as well as making the various parts interchangeable. During the past year a number of fine plants have been installed, among others being 4000 H. P. for the North Chicago Street Railroad Co. at their new power station at Hawthorn avenue; 500 H. P. for the Cincinnati-Edison Co. at Cincinnati, O.; 600 H. P. for the Western Electric Co. at their factory in Chicago, and various others.

## Mining Incorporations This Week.

The Goodtitle Consolidated Mining Company; principal place of business, Nevada City; directors, John J. Dailey, Dobbins Ranch, Yuba county; J. E. Poingdestre, L. M. Hancock, Nevada City; W. Raley, San Jose; W. Meredith, San Francisco; capital stock, $60,000. The Goodtitle mine is near Dobbins Ranch, in Yuba county.

The Mayflower Gold Mining Company has incorporated here; capital stock, $3,000,000, all subscribed by the directors, as follows: Alvinza Hayward, $1,050,000; C. D. Lane, $1,050,000; C. A. Davis, $300,000; C. W. E. Shepman, $300,000; T. M. Lane, $300,000. The principal purpose of the corporation is to develop the Mayflower mine in Nevada county.

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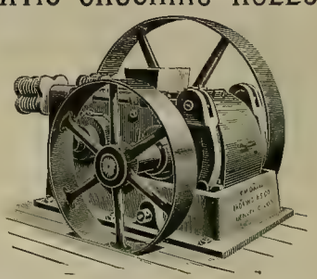
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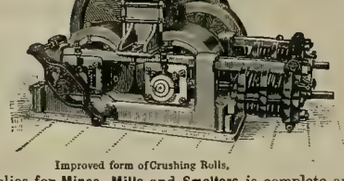
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**FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.**

**SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.**

**THIRD: The Large Amount of Space Saved.**

We refer by permission to Mr. N. A. McMillan, Haines, Oregon, manager of the Blue Mountain Mining Co., at Rock Creek, Or., where ten of our stamp mills are in operation; also to Mr. John S. Miller, Helena, Montana, manager of the Diamond Hill Mining Co., operating one of our forty-stamp mills at their mines at Townsend, Montana.

Send for Catalogue and Price List.

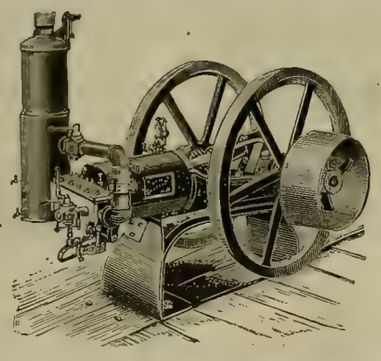
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| | |
|---|---|
| Coal Gas, ten hours' run, 1000 feet | $2 00 |
| Gasoline (74 deg.), ten hours' run, 8½ gallons @ 14c | 1 25 |
| Coal Oil, ten hours' run, 7½ gallons @ 10c | 75 |
| Crude Petroleum, asphaltum base, 16 gallons @ 3c | 48 |
| Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c | 65 |

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon=21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1½c per horse power per hour; and on gasoline, 2½c per horse power per hour.

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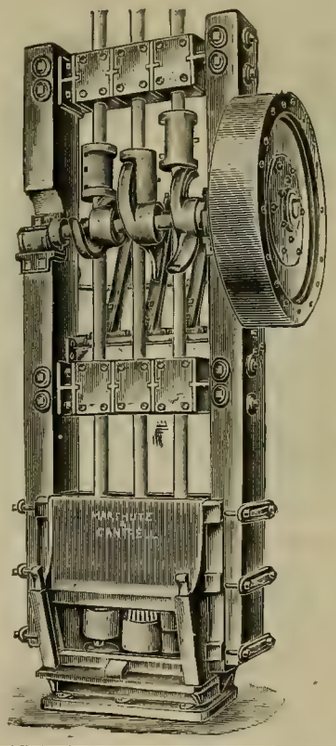
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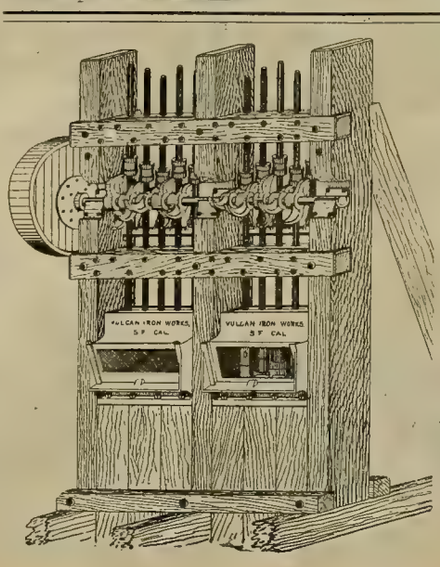
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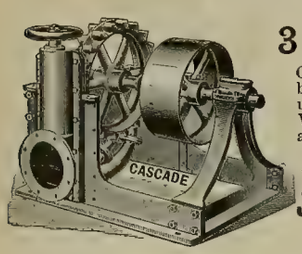
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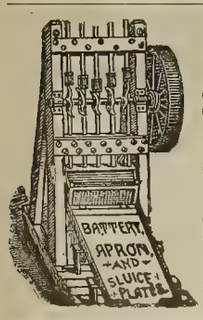
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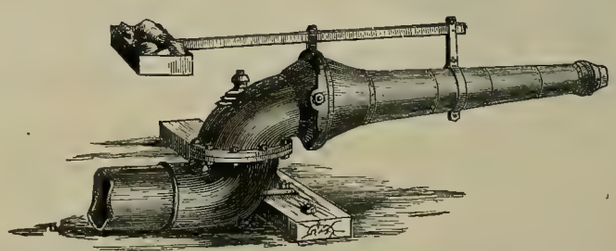
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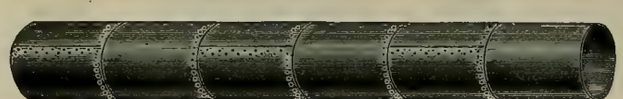
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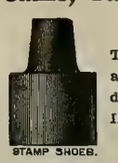
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PITTSBURG, Westinghouse Building.
BUFFALO, Erie County Bank Building.
PHILADELPHIA, Girard Building.
ST. LOUIS, American Central Building.
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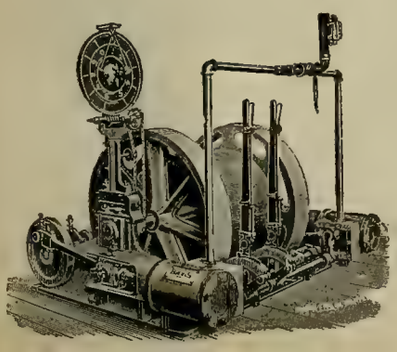
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# Market Reports.

## The Markets.

SAN FRANCISCO, Jan. 23, 1896.

Silver is steady. Of the metal market little new can be said. The outlook has more encouragement in it than in the first weeks of the year, and general activity is predicted.

In his annual trade review of the industries of Pittsburg, Jos. D. Weeks, treating of manufactured iron and steel, says:

Regarding the prices of manufactured iron and steel in 1895, it may be said that, while there have been some decided changes during the past year, the jumps have not been as great as those recorded in other lines. Merchant bar iron for the first four months of the year continued at $1.10@1.15, but in the early summer began to advance. By September 1st the prices quoted were $1.45@1.50, and the highest figures shown were $1.55. In the early fall the reaction came, and the year closed with $1.35@1.40 as the quotations. Structural material made the best showing of the market during the year. Beams and channels which were quoted at $1.25@1.30 at the beginning of the year went down to $1.20, then began to go upward. By June the quotations were $1.33@1.40, and the rise continued until August, when the highest figures of the year—$1.60@1.70—were recorded. But in the last quarter the demand fell off and prices slid downward, closing the record of the year at $1.50@1.55. The sheet-iron trade during the year has shown similar features. Thus No. 24 sheet began the year at $2.25@2.35, dropped as low as $2.05, and then with other branches started upward. The highest prices—$2.50@2.60—were quoted in August, and with a slight change held on for several months. Prices weakened later, but not to the extent shown in other lines, and the closing rates were $2.45@2.50. The demand for plate and tank material during the latter half of the year was extraordinary. In January the prices quoted were $1.15@1.20, and lower values were recorded. Through July, August and September the rise in prices was very rapid. The highest figures were reached in September, when quotations stood at $1.85@2.05. The demand then began to fall off, and the last quotations of the year for plate and tank stood at $1.45@1.50.

Under date of Jan. 2nd, Jas. Lewis & Son, of Liverpool, England, write regarding copper: To-day's closing value is £41 6s 3d for cash (after a fall to £41 3s 9d) and £41 13s 9d for three months. For English refined and manufactured copper the cousumptive demand continues very good, India being a buyer of the latter. The gradual fall in the New York quotation of lake copper from 10.875 to 10 cents per pound, with free offerings on the Continent at the equivalent of the latter price, was the chief cause of the decline in values here. A sale of 5000 to 6000 tons at 10 cents, by the Calumet and Hecla Company to American consumers on the 30th ult. for delivery over the first three months of this year, their previous sale in September having been at 12 cents, has however had a steadying effect on our market, as our company will now have but a limited quantity for sale here and on the Continent. As some of the leading American producers have had a conference to decide upon a definite policy to arrest the decline in values, and the Calumet and Hecla Company have announced their intention to reduce their monthly output after the 1st inst. to their normal monthly quantity of about 2800 tons (2000 pounds), against an average of about 4300 tons during October and November, it is probable that we shall see a considerable reduction in the total American production during the next three or four months. Should this take place, in view of the present large reduction in public and private stocks as compared with what they were twelve months ago, and the large consumption of England and the Continent, we shall probably, ere long, see an improvement in prices. Eleven cents per pound for an output of 40,000 tons per annum would prove considerably more profitable to the Anaconda company than 10 cents on 50,000 tons.

Gold, 77s 9d per oz. standard. Silver fell from 30⅝d to 30d on the 12th ult., advanced to 30⅝d on the 30th, and to-day's quotation is 30½d per oz. standard. Quicksilver from second hands is quoted at £7 4s per bottle. Sulphate of copper is firm at £15 12s 6d to £15 15s per ton. Lead, £11 8s 9d per ton for English; soft Spanish, £11 5s to £11 6s 3d; rich in silver, £11 7s 6d to £11 10s per ton; ore of 70 per cent, £4 15s per ton and fine silver value. Antimony quiet at £30 to £30 10s per ton. Nickel offers at 1s 1d to 1s 2d per lb net. Tin advanced to £63 on the 5th ult., declined to £61 10s on the 11th, recovered to £62 5s on the 13th, and closes at £58 17s 6d, a total fall of £4 per ton during the month.

J. W. Harrison's coal report says: During the week there have been eight arrivals from the coast mines, with 15,379 tons of coal, from Glasgow 1760 tons, from Australia 2400 tons. These arrivals only aggregate about half of our actual consumption, yet there is no visible scarcity of fuel of any grade. Of Swansea anthracite there is a larger quantity in yard than at any period of last year. The recent stormy weather has materially diminished the stocks of domestic coals, insomuch that the dealers take immediate delivery from ship's sides of all British Columbia cargoes now arriving. The general rainfall throughout the interior is certain to induce shipowners to become liberal shippers of coal cargoes in the near future, anticipating an abundant harvest this season. It is true that so far as we are wanting twenty-five per cent of our annual average of rain up to date, still this last storm has been most propitious. The list of coal carriers is decreasing from Swansea and Australia. Latterly there have been over two arrivals here for each new name added there. The last engagement from Swansea was made at 14s. This shows no decline. From Australia rates are merely nominal, but few charters are being made.

### New York Metal Market.

NEW YORK, Jan. 23.—PIG IRON—Southern, 11@12.00; Northern, 12@12.50.
COPPER — Brokers', 9⅞c; exchange, 9.85c.
LEAD—Brokers', $2.90; exchange, $3.00.
TIN—Straits, 13c@13.20c.
SPELTER—Domestic, $3.00.

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.87 |
| London Merchants | $4.81½ |
| London Sight Bankers | $4.89 |
| Refined Silver, per oz., 1000 fine | 67c |
| Mexican Dollars | 54c |

### New York Silver Prices.

NEW YORK, Jan. 23. — Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 30⅝ | 67 | 9 85 | ..... |
| Saturday | 30⅝ | 67⅛ | 9 90 | 2 90 |
| Monday | 30⅝ | 67⅛ | ..... | 2 95 |
| Tuesday | 30⅝ | 67 | 9 90 | ..... |
| Wednesday | 30⅝ | 67 | ..... | 3 00 |
| Thursday | 30⅝ | 67 | 9 85 | ..... |

### San Francisco Metal Market.

| | | | |
|---|---|---|---|
| **COPPER.** | | | |
| Bolt | ½ & 5-16, 21c; ⅜ and larger, | | 22c |
| Lake Superior Sheathing | | 23 @ | — |
| Ingot, jobbing | | — @ | 19 |
| Ingot, wholesale | | 18 @ | — |
| Sheet copper | | — @ | 22 |
| **ZINC.** | | | |
| Sheet | | 9½@ | |
| **LEAD.** | | | |
| Pig | | — @ | 3 85 |
| Bar | | — @ | 4 15 |
| Sheet | | — @ | 5 50 |
| Pipe | | — @ | 4 75 |
| **SHOT.** | | | |
| Drop, sizes *smaller* than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and *larger* sizes, | " | " | 1 65 |
| Buck, Balls and Chilled, do, | " | " | 1 65 |
| **IRON.** | | | |
| American Soft | | 22 00 @ | 26 00 |
| Pig, per ton | | 18 00 @ | 20 00 |
| **STEEL.** | | | |
| English, lb | | 16 @ | 19 |
| **COKE.** | | | |
| Gas Companies' | | 75c ₩ | bbl. |
| English, to load | | 9 00 @ | 10 00 |
| " spot, in bulk | | — — @ | 13 00 |
| " in sacks | | — — @ | 15 00 |
| Cumberland | | 9 00 @ | — — |
| **ANTIMONY.** | | | |
| Per lb | | — @ | 10 |
| **PIG TIN.** | | | |
| Per lb | | 15 @ | 16 00 |
| **QUICKSILVER.** | | | |
| Home trade, per flask | | 39 00 @ | 40 — |
| **BORAX.** | | | |
| Refined, in car lots | | — @ | 5⅛ |
| Refined, in sacks and barrels | | — @ | 5⅝ |
| Powdered, in car lots | | — @ | 5⅝ |
| Concentrated, " | | — @ | 4⅞ |
| **TIN PLATE.** | | | |
| Per bx | | 4 75 @ | 5 00 |
| **ZINC.** | | | |
| Sheet | | 8½@ | |
| **NAILS.** | | | |
| Wire | | | $1 75 |
| Cut | | | 1 50 |
| **LUMBER.** | | | |
| SAN FRANCISCO—WHOLESALE. | | | |
| Redwood, Fluming | | 17 00 @ | — — |
| Pine | | 13 00 @ | 18 00 |
| Spruce | | 25 00 @ | 30 00 |
| **COAL.** | | | |
| SPOT FROM YARD—PER TON. | | | |
| Wellington | | | $ 8 00 |
| Greta | | | 7 50 |
| Nanaimo | | | 7 00 |
| Gilman | | | 6 50 |
| Seattle | | | 6 00 |
| Coos Bay | | | 5 00 |
| Cannel | | | 8 50 |
| Egg, hard | | | 10 00 |
| Wallsend | | | 7 50 |
| Scotch Splint | | | 6 50 |
| Brymbo | | | 7 50 |
| TO ARRIVE—CARGO LOTS. | | | |
| Australian | | | 5 35 |
| Liverpool Steam | | | 5 87 |
| Scotch Splint | | | 6 50 |
| Cardiff | | | 6 00 |
| Lehigh Lump | | | 9 00 |
| Cumberland | | | 8 50 |
| Egg, hard | | | 10 00 |
| West Hartley | | | 6 50 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, Jan. 23, 1896.

9:30 A. M. SESSION.

| | | | | | |
|---|---|---|---|---|---|
| 700 | Chollar | 60 | 50 | Ophir | 1 35 |
| 200 | Con Cal & Va | 2 40 | 200 | Overman | 19 |
| 300 | Gould & Curry | 52 | 200 | Union | 37 |
| 100 | Hale & Norcross | 1 50 | 300 | Savage | 33 |
| 100 | Kentuck | 07 | 800 | | 34 |
| 100 | Mexican | 60 | 100 | Yellow Jacket | 45 |
| 600 | Occidental | 91 | | | |

SECOND SESSION—2:30 P. M.

| | | | | | |
|---|---|---|---|---|---|
| 300 | Ophir | 1 45 | 100 | | 24 |
| 400 | Mexican | | 63 | 100 Alpha | 21 |
| 100 | Gould & Curry | | 55 | 50 Belcher | 28 |
| 500 | | | 54 | 300 | 30 |
| 400 | C. C. & Va | 2 50 | 700 | Sierra Nevada | 46 |
| 300 | Best & Belcher | | 88 | 500 Mono | 06 |
| 400 | | | 89 | 300 S Belcher | 09 |
| 100 | Savage | | 36 | 500 | 08 |
| 600 | | | 38 | 100 Overman | 19 |
| 300 | Chollar | | 83 | 400 | 18 |
| 200 | Potosi | | 56 | 500 Justice | 02 |
| 200 | | | 57 | 100 Union | 41 |
| 400 | H. & N | 1 30 | 700 | Occidental | 95 |
| 100 | Crown Point | | 22 | 200 Iowa | 02 |

# MINING SHAREHOLDERS' DIRECTORY.

### ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alta S M Co, Nev | 51 | 10c | Jan 13. | Feb 17. Mar 9. | J E Jacobus, 309 Montgomery |
| Anita G M Co, Cal | 7 | 8c | Dec 7. | Jan 18. Feb 4. | L F Reichling, 404 Montgomery |
| Challenge Bend M Co, Cal | 1 | 35c | Jan 13. | Feb 21. Mar 13. | W E Davis, 39 Sutter |
| Challenge Con M Co, Nev | 20 | 5c | Dec 20. | Jan 22. Feb 12. | C L M'Coy, Mills Building |
| Clara G M Co, Cal | 1 | 3c | Dec 17. | Jan 30. Feb 20. | C M Cross, Chronicle Building |
| Con New York M Co, Nev | 14 | 5c | Dec 10. | Jan 15. Feb 6. | C E Elliot, 309 Montgomery |
| Crown Point G & S M Co, Nev | 66 | 25c | Jan 16. | Feb 20. Mar 12. | Jas Newlands, Mills Building |
| Evening Star M Co, Cal | 2 | 1c | Dec 14. | Jan 22. Feb 15. | M G Loefler, 137 Montgomery |
| Gray Eagle M Co, Cal | 42 | 5c | Jan 6. | Feb 7. Mar 3. | W J Gurnett, 308 Pine |
| Hale & Norcross S M Co, Nev | 108 | 15c | Dec 10. | Jan 15. Feb 7. | A B Thompson, 309 Montgomery |
| Haskell G M Co, Cal | 1 | 1c | Dec 11. | Jan 18. Feb 8. | G W Osborn, 309 Montgomery |
| Hite G M Co, Cal | 2 | 10c | Dec 17. | Jan 20. Feb 10. | H E Mathews, 120 Sutter |
| Home G M Co, Cal | 9 | 5c | Dec 24. | Feb 1. Feb 19. | O E Johnson, 315 Front |
| Julia Con Co, Nev | 27 | 5c | Jan 17. | Feb 20. Mar 11. | J Stadtfeld, Jr, 309 Montgomery |
| Justice M Co, Nev | 60 | 10c | Jan 13. | Feb 17. Mar 9. | R E Kelly, 309 Montgomery |
| Lady Washington Con Co, Nev | 11 | 5c | Jan 16. | Feb 17. Mar 10. | J E Jacobus, 309 Montgomery |
| Mono G M Co, Cal | 36 | 10c | Dec 30. | Feb 2. Feb 25. | M E Willis, 309 Montgomery |
| Occidental Con M Co, Nev | 21 | 15c | Dec 17. | Jan 20. Feb 10. | Alfred K Durbrow, 309 Montgomery |
| Orleans Mining Co, Cal | 1 | 10c | Jan 21. | Feb 29. Mar 24. | W Olney, 101 Sansome |
| Overman S M Co, Nevada | 74 | 10c | Dec 2. | Jan 6. Jan 27. | G D Edwards, 414 California |
| Red J cket Con M Co, Nev | 3 | 1½c | Dec 18. | Jan 22. Feb 17. | S M Capp, 413 Montgomery |
| Savage M Co, Nev | 88 | 20c | Jan 4. | Feb 6. Feb 26. | E B Holmes, 309 Montgomery |
| Union Con M Co, Nev | 52 | 20c | Jan 14. | Feb 17. Mar 17. | A P Swain, 309 Montgomery |
| Ybarra Gold M Co, Lower Cal | 3 | 50c | Dec 26. | Jan 27. Feb 12. | T G Cantrell, 132 Market |

### MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Belcher S M Co, Nev | C L Perkins, Mills Building | Jan 28 |
| Utah Con M Co | A W Havens, 309 Montgomery | Jan 29 |

## Mining Share Market.

SAN FRANCISCO, Jan. 23, 1896.

The past week under review has been uneventful. Prices shaded off slightly for the Comstocks, then stiffened just enough to encourage hangers-on, but not enough to let others come in as buyers. The market had hardly exhibited a strengthening tone before the bears began to come in, and, under their selling, values weakened again only to pick up under a better demand for Savage. The improved tone in these shares was somewhat of a surprise, yet it has not been, up to this writing, of sufficient moment to induce traders to come in. Operators have been so terribly hurt on the bull side that it will take something more than street points and a sickly movement to bring them in as buyers. Those who do enter are easily satisfied, for when the slightest opportunity presents itself to make a turn it is taken advantage of, but these opportunities have, for some time past, been as scarce as hens' teeth. A person to get them must be very quick, and not hesitate in selling or else the opportunity is lost. The way the market has been handled—if it can be dignified by calling it such—is enough to disgust the most chronic dealer. Notwithstanding the way in which it works, still there are persons who have confidence that a deal is on foot. While these persons believe that we will witness better prices before long, yet they do not look for anything very good. They state that conditions are not such as to expect more than a fair-sized move on the bull side. They contend that one or more outside combinations have good lines of shares on which they are in the hopes of realizing profit by creating the belief that a spring deal is at hand. It may be that they may be rewarded this time and get a large proportion of their holdings out on the more credulous. Heavy disbursements of money are being made, and it is only reasonable to conclude that some of the money can be transferred to their pockets. It is a well-known fact that work in some of the mines is to be pushed, with the expectation that it may result in striking more ore than has as yet been found, when, by methods but too well known to manipulators, the find can be enlarged and put out through the papers and also through cappers on the street in such a way as to attract gudgeons. Occidental has been the most active the past week, but if signs do not fail it looks very much as if the best prices have been seen, for a while at any rate, and that they are working down.

From the Comstock mines the news received the past week is not calculated to inspire confidence or excite buyers who operate on surface reports, but the better informed miners see, or seem to see, much in the reports to encourage them in the belief that better things can be looked for before the spring months pass. In the Alta group the work under way is essentially unchanged, and probably will not be until the assessment on Alta has performed its purpose of causing holders to unload so as to save the ten cents assessment. Why this stock has been so fearfully abused is an enigma and cannot be satisfactory solved except on the theory that there is too much stock out on the public. In the Gold Hill group the work under way should attract more interest, for there is an almost certainty that something of importance will be run into before the end of next month. Of course this assertion is made on the supposition that the powers that be will not stop the work or turn it aside, as was done last year when there was a dispute over the spoils. It is the division of spoils that has worked more injury than all else, in the absence of moneyed men not being in the market. When the latter come in openly, nothing is allowed to interfere with their projects as they are amply able to handle the market in any direction they wish. The skeleton official letters given from these mines are far from satisfactory to outsiders, yet the very disastrous run and direction given, are to the better informed, inspirers of confidence. In the middle group considerable ore is being raised each week, but this very fact with prices ruling low is far from creating faith that things are correctly given. It is argued that with the quantity of ore raised shares should command more money. Probably the reason they do not is due to the fact that the mine managers have very little, if any, faith that the ore will hold out. It would be singular, and yet it should not, if a good body of ore was run into. The Comstock lode has been prolific in surprises, and, as history is said to repeat itself, there is no reason why the Comstock should not also. Some good work is under way in the middle group. In the north ends Con. Virginia continues the attraction. The work in this mine always creates interest owing to its record of always coming to the front when least expected, and it is not at all unlikely but it will again, and perhaps within the next sixty days. Operators, though, look for the shares to sell for less money. The levels on which work is being done ought to show well later on. In Ophir and Mexican the work is attracting attention, but from all the writer can see from official letters it is most too soon to expect much for awhile at any rate. That ore will be found can be confidently asserted, but when is another thing. From Union and Sierra Nevada there is nothing new reported, and nothing expected, for awhile, as the work is too slow.

From the Brunswick lode more or less colored reports through private channels are at hand, yet the public does not bite, which must be quite tiresome to one or two persons who are said to be well loaded up with stocks. While saying this it must be admitted that the work is being pushed with more or less vigor, and if the lode is as good as some assert, it ought to be soon showing up something of value. When ore is found it will take considerable time and money to get it in working condition.

From the Bodie district there is nothing new to report. They are still scratching around on levels from which nothing can be expected to benefit shareholders. In Bodie they ought to go deeper, but this will cost money.

The following illustrates the changes of the week:

| Mines. | Jan. 16. | Jan. 23. |
|---|---|---|
| Alpha | $ 22 | $ 21 |
| Alta Consolidated | ..... | ..... |
| Andes | 21 | ..... |
| Belcher | 25 | 30 |
| Best & Belcher | 91 | 89 |
| Bodie | 41 | ..... |
| Bullion | ..... | ..... |
| Challenge | ..... | ..... |
| Chollar | 63 | 83 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 2 50 | 2 50 |
| Consolidated New York | ..... | ..... |
| Crown Point | 23 | 24 |
| Exchequer | ..... | ..... |
| Gould & Curry | 56 | 55 |
| Hale & Norcross | 1 35 | 1 50 |
| Justice | 03 | 02 |
| Mexican | 91 | 83 |
| Ophir | ..... | 1 35 |
| Overman | 19 | 19 |
| Potosi | 53 | 57 |
| Savage | 29 | 38 |
| Sierra Nevada | 44 | 46 |
| Union | ..... | 41 |
| Utah | ..... | ..... |
| Yellow Jacket | 42 | 45 |

THE CALIFORNIA DEBRIS COMMISSION having received applications to mine by the hydraulic process from G. M. Coney and W. S. Adkins, in the Coney mine, near Ono, Shasta county, to deposit tailings in the ravine below the mine; from H. L. Van Eman, in the Gorman mine, near Michigan Bluff, Placer county, to deposit tailings in Skunk gulch; from O. H. Simons, in the Princess mine, near Redding, Shasta county, to deposit tailings in a ravine and in a dry gulch; from John Sybel, in the Proper mine, near Murphys, Calaveras county, to deposit tailings in a ravine below the mine; from Gianini and Poggi, in the Nigger Ranch mine, near Grizzly Flat, El Dorado county, to deposit tailings in a ravine below the mine; and from E. S. Thompson and G. E. Hill, in the No Chunk mine, near Michigan Bluff, Placer county, to deposit tailings in Skunk gulch, gives notice that a meeting will be held at room No. 92, Flood building, San Francisco, Cal., on February 10th, 1896, at 1:30 P. M.

DEWEY & CO.
SCIENTIFIC PRESS PATENT AGENCY
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LEE D. CRAIG,
Notary Public and Commissioner of Deeds,
316 MONTGOMERY STREET,
Bet. California and Pine, SAN FRANCISCO, CAL

## One Day's Mining Incorporations.

The following named mining companies filed articles of incorporation last Saturday with the Colorado Secretary of State:

The Idaho Placer Mining Company; capital stock, $500,000; to operate in Washington county, Idaho, Malheur and Baker counties, Oregon. offices at Denver; J. D. Parker, J. L. McKeever, W. L. Morrell.

The Whiting Gold Mining Company; capital stock, $1,000,000; Arapahoe and Gilpin counties. offices at Denver. W. J. Barker, E. L. Halleck, T. L. Cathcart.

The Cripple Creek and Clear Creek Mining Company, capital stock, $1,000,000; El Paso and Clear Creek counties. offices at Denver; J. E. Benjamin, W. H. Chittenden, G. G. Newcomb, F. W. Schenk.

The Assayers Gold Mining and Milling Company; capital stock, $1,500,000; Arapahoe and El Paso counties; offices at Denver; E. F. Perry, H. W. Cotton, F. Webb, D. E. Wheeler.

The Bonita Gold Mining and Milling Company; capital stock, $1,000,000; El Paso county; offices at Colorado Springs; E. M. Blair, O. Messinger, J. W. Tibbitts.

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Any stock upon which this assessment shall remain unpaid on the 17th day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 9th day of March, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. E. KELLY, Secretary.

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ALTA SILVER MINING COMPANY. Location of principal place of business, San Francisco, California. location of works, Gold Hill, Gold Hill Mining District, Storey county, Nevada.

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SAVAGE MINING COMPANY.—Location of principal place of business, San Francisco, California. location of works, Virginia Mining District, Storey county, Nevada.

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E. B. HOLMES, Secretary.

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WEST SIDE CANAL AND LAND COMPANY.—Location of principal place of business, San Francisco, California. Location of Works, Fresno and Kings counties, California.

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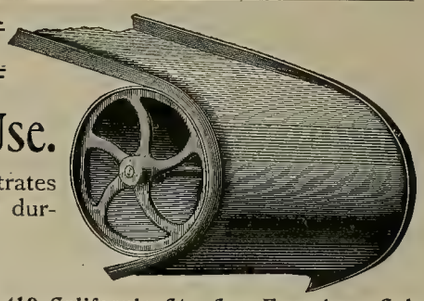
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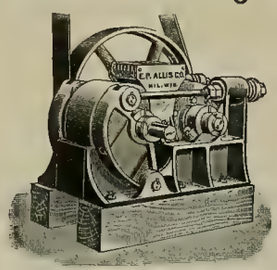
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VOLUME LXXII. Number 5.

SAN FRANCISCO, SATURDAY, FEBRUARY 1, 1896.

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## Hallidie Ropeway at Halls Mines, Nelson, B. C.

A Hallidie wire ropeway has just been finished on the Silver King mine, belonging to the Halls Mines Company, an English corporation, in the Kootenay district, British Columbia. It was constructed by the California Wire Works under Mr. A. S. Hallidie's patents, and all the material for the same was supplied from San Francisco. The ropeway passes over a very rugged country in that mountainous district, and is remarkable for the great length of the line and the difference in the elevation of the two ends. Over 50,000 feet of special steel cable was used, and the distance between the two ends is 23,797 feet—a trifle over four and one-half miles—and in that distance there is a fall of 4100 feet. Snow falls heavily at the upper end, sometimes attaining a depth of sixteen feet, and at times the wind blows at the rate of seventy miles per hour and the cold is intense. Throughout the entire length of the ropeway the timber, which is very dense, was cleared off to the width of 200 feet. The ropeway is a continuous moving rope which measures in place 47,900 feet, and has attached to it 900 ore conveyors which are rectangular in shape, contain 100 pounds of ore each and are self-dumping. The steel rope is made from special material, specified by Mr. Hallidie for the purpose, and passes at each end around patent grip pulleys, ten feet in diameter, to which are attached strong brakes, to control the speed of same. Between the two ends, and located at suitable points, are 126 intermediate supports or stations, having projecting arms with sheaves on which the steel rope rests. The ore conveyors are attached to the steel rope by peculiarly designed clips, which are so shaped and fitted as to pass over the station sheaves and the end grip pulleys. The steel rope runs at a speed of three feet per second, and delivers ten tons of ore per hour. The ore dumps at the mine hold 8000 tons of ore, which contains forty ounces silver and five per cent copper. About 2500 tons have already been transported from the upper to the lower ore bins by this ropeway, and the ore is ready for the smelter which is about completed.



FIG. 1.—ORE BINS AT LOADING STATION, UPPER END OF ROPEWAY, SILVER KING MINE, KOOTENAY, B. C.

Work was commenced on the ropeway last July and progressed well until a forest fire swept through the timber in September and delayed the work very much. A great deal of damage was done and some of the great coils of steel rope were en route to the top of the mountain in the line of the fire. With great forethought the engineer in charge, Mr. E. I. Parsons, had these coils buried in the ground and the fire passed over them.

We show some views of this line, which are reproduced from photographs. Fig. 1 illustrates the ore bins at the mine, and was taken before they were roofed in. The square log structure encloses the upper works and loading station of the ropeway. Fig. 2 shows the interior of the loading station, in which are seen the grip pulley, ten feet in diameter, around which the steel rope, one and one-sixteenth inch in diameter, lays in the grips, also the rope sheave and one ore conveyor, No. 318. Two steel bands, 4½x¼, work on seven-foot brake wheels controlled by hand wheels. Mr. E. I. Parsons, the engineer, is in the foreground and gives a good comparison for dimensions. Fig. 3 is station No. 1, and other stations are seen in the distance. Fig. 4 (on page 85) has station No. 54 in the foreground; this station is eighty feet high. The station on the crest of the hill is three-quarters of a mile distant. The clearing in the woods is 200 feet wide. Fig. 5 (on page 85) shows the lower terminal frame of the ropeway, grip pulley and the ore bins which hold 10,000 tons of ore. From station No. 1 to the lower terminal there is a descent of 4100 feet, and the line of the ropeway passes over several divides and across several valleys.

The California Wire Works has constructed five other Hallidie ropeways the past summer, but this one is the longest unbroken line built under the Hallidie system. The cost of conveying the ore the distance of four and one-half miles will be from 30 cents to 35 cents per ton, and sufficient power is developed by the descending load to convey back free of cost all the usual supplies of such a mine.



FIG. 2.—GRIP PULLEY AND UPPER WORKS OF ROPEWAY, SILVER KING MINE, KOOTENAY, B. C.



FIG. 3.—INTERMEDIATE STATIONS AT THE UPPER END OF ROPEWAY, SILVER KING MINE, KOOTENAY, B. C.

THE series of articles on "Mines, Miners and Monopolies," now appearing in this paper, is of present point and value. In No. 3, in this issue, Mr. Edman directs attention to the language of Commissioner Lamoureux regarding the need of examination and survey before that official allowed himself to be subjected to certain influences not conducive to a judicial aspect of the case.

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SOME time ago *Printers' Ink*, the best authority on advertising in the United States, sent an unsolicited statement to the MINING AND SCIENTIFIC PRESS that this paper had the largest circulation of any paper devoted to mining in the State. It is believed that with one exception it has the largest circulation of any mining paper in the United States. Subsequently *Printers' Ink* sent a similar unsolicited statement relative to electrical matters. More recently the same eminent authority on the science and art of advertising says "character advertising pays the investor best. It is not the extent of the circulation of the paper, but the class of people who read it. Class journals reach a particular set of individuals. If it is a mining and scientific publication its circulation must necessarily be among that class of readers who are engaged in mining and kindred occupations. Advertisers have begun to realize that quality and quantity are co-existent in a good medium; and that a few who are probable buyers are better than the multitude who are not. Any sensible man knows that one gold pin is worth twenty brass ones, but it is only recently that the bulk of advertisers have come to appreciate the same idea as applied to newspaper circulation." All of which is so. It will be observed that while no amount of money proffered the proprietors of *Printers' Ink* would induce them to make any statement not supported by truth, yet the MINING AND SCIENTIFIC PRESS has succeeded in securing from the best authority on advertising in the country three unsolicited testimonials as to its value as an advertising medium. There must be some reason for that. There can be but one real reason, viz., recognition and statement of an unanswerable fact.

CONFLICTING claims regarding the efficiency and cost of acetylene, the new illuminant, lend present interest to the illustrated article on page 87, descriptive of the first plant in the world, just built to manufacture the article on a large commercial scale. Whatever the merits or the ultimate result of the controversy, there is manifestly sufficient practical value in the idea to justify the notice accorded it in former issues and the present number of this journal.

## Proposed Change in the United States Mining Laws.

A committee of the Miners' Association, of which John Hays Hammond and Ross E. Browne were members four years ago, drafted a bill making radical changes in the manner of locating and holding mining claims. The bill was introduced into Congress, but seems to have got no further. The time seems opportune to have it reintroduced, possibly with some changes, as it would not only be as desirable and effective as it then seemed, but has an added value from the assistance it would give to the solution of the railroad mineral land question. To recall the matter to our readers, the bill proposed is, in effect, that a mining claim should be located and claimed by means of a procedure requiring the survey of the claim by a United States mineral district surveyor, at the charge of a Government mineral survey fund formed by the payment of some fixed amount by the mine claimant on making his request to be allotted the claim. His claim surveyed, not appearing in conflict with any allotted claim, it would be allotted to him and his possession would thereafter be maintained by an annual rental to the United States. These rental payments would take the place of the present annual requirement of assessment work. A failure to pay the rental would render the claim forfeit, and it could then be resurveyed and allotted to other parties. The advantages to the mining industry of the proposed law are many. Definiteness to claims would be given by the official record of the surveys; conflicts of locations and the litigation incident to such conflicts would be very largely avoided; there would be no uncertainty as to when a claim became forfeit and open to relocation; records of possession would be much simplified; comparatively little of the existing practice of tying up large areas from exploration by paper locations would be done, the claims representing actual developments of mineral value to a much greater extent than at present. In the matter of the mineral land controversy with the land grant railroads it would be of vast assistance to the miners. The actual allotments of mining claims on the odd sections would withdraw them from being claimed by the railroad, and the maps would be a record from which reasonable deductions could be made as to possible or probable mineral deposits in adjacent odd sections not allotted to mining claims. In short, the areas of odd sections which would have to be examined by commissions to determine as to mineral character would be very much smaller than at present, and the examination required would be exclusively expert, geological and mineralogical. For this last purpose, how is it that the Interior Department fails or neglects to use the evidence of mineral character it has itself collected by the geological survey, in passing on the lists of odd sections? Is it not the object of the geological survey to determine this very fact? And if for the public, why not for the Interior Department? The geological survey has been completed, and many of the sheets published, covering the railroad odd sections in Sierra, Nevada, Yuba, Butte, Placer and El Dorado counties. Not only have all old and existing mining developments been noted by this survey and platted on the maps, but the geological evidence of undeveloped mineral deposits has been collected and platted. This is particularly the case with the old river channels, the deep lava-covered auriferous gravels. The Interior Department has rejected specific protests on odd sections that their own surveys, maps and geological experts designate as conclusively mineral. This suggestion is commended to the attention of the Mineral Lands Committee of the Miners' Association.

COLORADO PAPERS editorially anticipate a "rush" of miners to that State this year as great as the stampede to California forty-six years ago, and point to the present gathering of newspaper correspondents at Cripple Creek as indicative of the coming numbers. There is considerable present activity there and the probabilities are it will continue for some time, but the likelihood of an enormous impetus to mining operations is not confined to Colorado or a little section of that State. The profits of gold mining, as compared with the losses of other business enterprises, impel men everywhere to turn to an industry the product of which brings forty per cent more than it did thirty years ago, while it can be produced at forty per cent less cost; but it is probable that in California will be seen the greatest activity in this direction. It is not an influx of miners, of men with pick and shovel, that is of most probable value, and any journal that looks for a repetition of "the days of '49" here or in Colorado, or anywhere else, will be mistaken. It is not men, but money, that will be the mainspring of the coming activity in gold mining. The days of "ounce diggings" and weekly individual clean-ups on the scale they formerly existed are gone forever. In rich gold fields like California there will of course be room and opportunity for the next half century for the individual miner, but the business of gold mining here or anywhere else is now and will be purely a matter of judgment, of scientific knowledge, intelligent working and judicious investment. Gold mining has become primarily a matter of management and economy and has got down, or up, to the level of all other business. It is the influx of capital, not men, that will be the measure of mining activity in the future. In this regard California can complacently congratulate itself; for, while not unmindful of the great gold wealth of her sister States, it is believed that, as in the past, when the annual gold output is recorded, it will be found that superior conditions will continue its preeminence. There may be more ephemeral activity elsewhere in the organization of mining corporations with one hundred thousand dollars capital stock to one dollar paid in, but that has no more to do with the legitimate business of extracting gold from the ground than the antics of the Chicago bear-pit have with harvesting the wheat.

## The New Photography.

San Francisco newspapers this week have press dispatches and illustrated articles descriptive of the new photography which pictures the bones through flesh and clothes, and practically penetrates all things usually deemed opaque. According to Prof. Rontgen, a German scientist and the alleged discoverer of this new art, coins in closed purses, iron discs in heavy closed wooden boxes, skeletons of living human beings enveloped in customary clothes, etc., are all distinctly and correctly portrayed, the things inside and not the outer coverings being depicted. Prof. Rontgen says he has accomplished this by "radiant heat," and from his description of the process evidently believes he is trending upon a possible discovery of the famous "fourth dimension," the dream of so many. Prof. Rontgen, at Wurzburg, uses a Crooke's tube and an induction coil. In some ways his published statements do not differ materially from accounts of the success achieved on similar lines by Fernando Sanford, at Leland Stanford Jr. University at Palo Alto, in this State, published herein nearly three years ago. Prof. Sanford secured photographic representation of sundry objects, though opaque substances intervened between the camera and the object photographed. He attributed the phenomenon to a form of electric energy known as the "Hertzian wave," so named from H. Hertz of Bonn University, the original producer of this form of sympathetic vibration. Prof. Rontgen uses no lens, as the result of his experiments announces that the "new light" which he utilizes in such extraordinary photography does not travel in waves but in straight lines, and cannot be refracted. At Vienna and Buda-Pesth scientific investigation is reported to have concurred in the success of Prof. Rontgen's experiments and the correctness of his conclusions.

From the standpoint of the practical miner, this scientific "discovery" is of double value, for it is gravely alleged that this "new light" or "radiant heat" is different in some important respects from ordinary light. It is stated that such material as earth, stone or copper is by this new light as transparent as glass to ordinary light, and that the quality of being opaque which has through the ages been so annoying and expensive to the miner will now disappear; that by reason of Prof. Rontgen's discovery the California prospector or miner can see into the dark breast of the drift or look below the surface with as much ease as though dyke rock, hanging wall, footwall, fault, dip, slip or other subterranean question of procedure were plate glass, and can see the gold many feet below or beyond ordinary mortal sight, which can rarely see much farther than the point of the pick.

In matters of faith or matters of fact it is so much easier to believe than to doubt or deny that in the case of this "new light" debate can be deferred pending further investigation. Still it is probable that any present arrangement looking to the development of California gold mines will not be seriously modified or affected by this latest and greatest "discovery."

## Concentrates.

THE Carley mine at Murphys, Cal., is reported closed down.

THREE smelters are now in operation in southern Kootenay with a daily product of $10,000

COLORADO SPRINGS, Colorado, talks of organizing a mining stock exchange "for ladies only."

DURING 1895 Great Britain shipped mining machinery to the value of $720,855, mostly to South Africa.

THE old, reliable Homestake paid its 210th dividend in this city and New York last Monday, making a total of $5,748,000.

COL. DORSEY and J. T. Newcomer are building two stamp mills on the Dorsey and Sublet properties, near Collierville, Cal.

THE Frenchoption on the Champion mine, Nevada Co., expired yesterday. It is understood that it will not be renewed

JOS LAWRENCE of this city is now operating a ten-stamp mill which he recently erected on his mine near Lotus, El Dorado Co.

THE Hope, Montana, mine has two superintendents—Messrs. Balch and Fletcher which makes matters a little awkward for all concerned.

FREE gold is now reported found in the Mercur, Utah, ore, which, if so, will increase the interest now taken in that singular formation.

THE *Free Press* estimates the population of Redding at 4000, and thinks that one thousand persons have been added during the past four months.

THE Ontario, Utah, silver mine paid yesterday a 10-cent per share dividend, amounting to $15,000. Dividend-paying silver mines are very scarce just now.

THE San Francisco Stock and Exchange Board has relisted the Mayflower Gravel Mining Company shares and listed the Eureka Drift Mining Company shares.

THE Morning Star Gravel Mining Company, Placer Co., last Monday declared dividend No. 62 of $5 per share. The mine is looking well and promises to pay many more such dividends.

ASSAYER AUBREY of San Diego, by a recent analysis of dump iron sulphurets from Banner, 60 miles eastward, has aroused hopes that the waste in that district can be profitably worked.

A 10 CENT dividend was paid by the Alaska-Mexican Mining Co. on the 28th ult. When the sixty new stamps now being erected begin operations it is thought the dividends will be increased.

S. S. MOSER has agreed to sell the Moser Co. gravel mines, Mokelumne Hill, Calaveras county, to the Roanoke Mining Co., for $20,943.20, on the installment plan at the rate of $150 per month.

IN parts of Plumas county the total precipitation during the recent storm approximated 30 inches. The rain and snowfall in the foothills and high Sierras afford abundant supply for mining operations.

THE Le Roi Mining and Smelting Company has declared a dividend of $50,000, payable to-day—10 cents a share on the capital stock of the company, 500,000 shares. This makes $75,000 paid within the past few months.

SAYS the Placer *Argus*: "Our people should never forget the merchants of San Francisco, for they have always contributed liberally to the mining cause. They are with us on the hydraulic and every other mining question."

A SNOWSLIDE last Saturday carried away the mill at the Vanderbilt mine, two miles south of Hailey, Idaho. G. Hague was caught in it and killed; the blacksmith was also caught but was rescued in time to save his life.

"BUY 'em on the slumps and sell 'em on the jumps" is the reputed motto of the Colorado Springs Mining Stock Exchange, paraphrasing the famous Daniel Drew motto of "buy when they are cheap and sell when they are dear."

TWELVE years ago Moody's Farm, the present site of Johannesburg, South Africa, was offered to Baron Grant for $250,000. His expert made an adverse report and that settled it. The same ground is now held at a thousand million dollars.

THE extent of the present fever for mining exchanges is illustrated by the simultaneous opening this week in Laramie, Wyoming, and Philadelphia, Pa., two places as widely dissimilar in every respect as it is possible in this nation to be.

A. W. STOTT is suing E. Gilman et al., in Butte Co., for $46,000, alleged to be due him for his services as a "middleman" in selling a mine for them in Mexico. The defendants admit that he made the sale, but think he wants too big a slice.

W. T. PHIPPS, manager of the State Anti-Debris Association, will file a protest against the application of Spaulding and Phelps to be allowed to impound tailings in Bear river at Dutch Flat. Those gentlemen propose to widen and raise the Old Liberty Hill dam.

THE Alaska Treadwell Mining Company paid a quarterly dividend of 37½c per share, amounting to $75,000, on the 28th; the Gold and Globe Hill Company, of Cripple Creek, Col., of 2c per share on the 4th; the Gold Coin mines of Cripple Creek, Col., 1½ per cent on the 30th.

THE Hexter Gold Mining Company incorporated in this city this week with a capital stock of $30,000,000. The stock subscribed for amounts to $1,050,000, as follows: F. W. Page, $250,000; A. B. Moulder, $250,000; J. M. Duke, $250,000; C. T. Hamilton, $250,000; E. C. Jennings, $50,000.

THE latest definition of a promoter is "one who sells nothing for something to a man who thinks he is getting something for nothing." That is tersely clever and often true, yet is not wholly fair, for many instances may be cited where the promoter was a very necessary factor in negotiating a sale.

AT Rocky Bar, Idaho, last week, a snowslide caught and carried down R. Brainard, a miner, down. Fifty men worked for two hours, after finding where he was, and got him out unhurt—the first instance on record in Idaho in which any one escaped after being buried in a snowslide, even a foot or two. Brainard was under six feet of snow.

FROM Havre, France, comes the statement that at Tancarville, near that seaport, are to be built reduction works, to which will be shipped by sailing vessel tailings from California gold mines, to be worked by a process in which "chloride of sulphur" figures largely. The further statement is vouchsafed that the aforesaid tailings go seven and eight ounces to the ton. The whole thing may be true, though it appears to lack certain elements of probability.

THE Executive Committee of the Northwestern Miners' Association has cut out a good deal of work for itself. At this week's meeting in Spokane, Wash., it was decided to promote in every way possible the mining interests of Washington, Oregon, Idaho, Montana and British Columbia, with representatives at Ottawa. In union is strength.

IN an article entitled "the wildest of wild cats," showing up a newly organized local "gold mining company," the Amador, Cal., *Republican* of current issue administers a just rebuke to the unscrupulous scheme. Mining papers throughout the State will do their localities the best service by exposing wherever practicable similar schemes.

THIS week the Consuelo Gold Mining and Milling Co. incorporated in this city, with a capital stock of $500,000, all subscribed, by C. Roberts, Geo. Stone, W. H. H. Hart, A. E. Bull and B. W. Scott. They have bought the Kentuck mine for $30,000, which they propose to reopen and thoroughly develop, putting in machinery sufficient to sink the shaft to a depth of 1700 feet.

SINCE the recent rains, it is a common thing to note in several mountain and foothill exchanges from nearly all parts of the State accounts of coarse gold and nuggets being picked up. Probably nothing better indicates the immense value and extent of this the greatest gold field on earth than that, after nearly half a century of continuous yield, surface gold is still brought to light by the washing of the rain.

LAST week the State Supreme Court hit a hard blow at the practice of electing "dummy" directors in a corporation by deciding in a case where the Rosecrans Mining Co. and H. S. Marey were in litigation, that the election of a non-stockholder as director is not legal. Now if something could be done with "tramp corporations," capital stock $10,000,000, paid up $5.75, much good would be resultant.

THE Pueblo, Colorado, *Chieftain* humorously says: "If lead is going to run down to much lower prices we might start a new industry with it in Colorado—the making of lead shingles. It makes an indestructible roofing, the only question being that of cost. A hundred pounds of lead, worth perhaps $2.65 or $2.70, ought to be made to cover a square of roof as well as $4 worth of wooden shingles."

GEN. TOLMAN, of Alameda, who sometime ago located and recorded claims 72,000 feet in length on the Sacramento and American rivers, has his novel boat, previously described, on the Sacramento near the mouth of the American, and expects to begin dredging as soon as the present flood subsides. He has a dredger, four amalgamators, a 30 H. P. gasoline engine, a crew of five men, and figures on substantial profits in gold and quicksilver.

CONFIRMING previous reports published herein, it is now stated that the purchase of 800 acres of land near Escondido, San Diego Co., Cal., by C. D. Chapman and H. C. Brown, of Colorado, is completed and a company formed to work the low grade ore. The new company talks of building a 200-stamp mill and working on an extensive scale. O. R. Smith of Santa Ana is reported as having bought the Jolly Boy mine, Escondido district, an almost undeveloped property, for $20,000.

COLUMNS of description appear regarding Utah and Nebraska deposits of pumice stone, their great extent and value, all of which is doubtless so. It is however stated that outside of those two States there is only one other pumice producing region—the island of Lipardi, off the Italian coast. This is not so. In Sonoma county, this State, is a pumice deposit, not at present actively worked, because of lack of demand, but capable of supplying local and general requirements.

THE London *Mining Journal* of Jan. 11th publishes the names, situation, number of shares and nominal capital of the mining companies registered in England in '95. In all there were 961; of these, 436 in New Zealand and Australia, with a nominal aggregate capital of $222,386,805; 338 in Africa, $230,437,425; 79 in Great Britain, $17,669,835; 50 in North America, $27,319,250; 25 in South America, $21,286,000; 20 in Europe, $8,497,500, and 13 in Asia, $8,349,390, a total nominal capital of $536,936,205.

IN the case of Stewart et al. vs. Rees et al., Spokane, Wash., Secretary of the Interior Smith this week decided that, under section 2332 R. S., possession of a mining claim with work thereon for a period equal to the time prescribed by the statute of limitations for mining claims in the State wherein such claim is situated, entitles the claimant to a patent thereto in the absence of any intervening adverse claim, even though it may appear that such claimant may have failed, through oversight, in making the requisite statutory expenditure thereon.

TALKING of rich ore, etc., B. S. Kimball, who has recently been at Baker City, Or., says: "I saw at the Virtue mine, which is owned by Grayson of San Francisco, a single slab of gold that had been reduced to bullion by nature herself, and which weighed in at $5,000. It required no handling, but was shipped direct to the mint at San Francisco, and was there registered as bullion. In two days and a half ore that yielded the owner $64,000 was taken out of the mine and shipped as high grade, while the mill every month affords a clean-up of $20,000."

ONE of the questions that seems necessary to answer again and again is regarding the extent of time a locator of a mining claim has to do the required annual assessment work to hold the claim. It is again stated that he has all the remaining part of the year in which the location was made and all the next year: that is, if our inquirer located a claim any time last year—1895—he has till Dec. 31st, 1896, to do the required $100 worth of work or improvement. Probably it would be better for himself and the claim, too, were the law less liberal in this regard, but that is a matter of opinion. The law is as stated.

TALKING of Colorado tellurides, State Geologist Rickard says: "The presence of tellurides is opposed to successful stamp-mill treatment, but cyanide solutions have power to dissolve them and the chlorination process appears capable of dealing with them after very careful roasting. These fortunate results are largely due, in the case of Cripple Creek ores, to the partial decomposition of the telluride into telluric oxide and free gold. In this case Nature has effected what otherwise would be the result obtained by a roasting process, such as frequently carried out by the miner who places a specimen in a blacksmith's fire in order to 'sweat out' the gold. This as a rough test is good enough for very rich specimens, but would prove ineffective for ore containing a telluride in minute quantities. To test such material a careful assayer is the man to go to."

ARTICLE 148 of the Transvaal, South Africa, law says: "Every person residing within the boundaries of a proclaimed field being guilty of rising, rebellion, or any unlawful resistance against the Government, or the lawful authority on the field, shall, over and above the punishment laid down in the law for such offense, forfeit to the State all his right and goods situated on the said field. The person or persons on whose information another person is convicted of one or other of the said offenses, shall be entitled to one-half of the value of the goods thus forfeited." In the unlikely event of the conviction of any resident American of having violated that law, his property would be subject to confiscation.

THE nickel mines at Sudbury, Ontario, raised 112,037 tons of ore last year, of which 87,916 tons were smelted. The ore contains a small percentage of nickel, however, so that the amount of nickel contained in this large quantity of ore was but 2,570 tons, which was accompanied by 2748 tons of copper and some three and one-half tons of cobalt. The cost of producing the nickel matte from the ore is heavy. It is crushed and then roasted, which gets rid of some of the sulphur. Smelting is effected in water-jacket furnaces, the charge containing eight tons of roasted ore to a ton of coke, the result being a matte containing 15 per cent of nickel. This matte is not usually refined in Canada, but is exported as it stands. The Vivians, however, bessemerize the matte, raising the contents to 40 per cent of nickel before exporting it to Swansea, Wales. Other processes of reduction are being experimented with, among them an electrolytic process, which is, however, handicapped by the tariff on the acids required.

IN accordance with the original policy outlined in the matter, another mineral land bill was introduced in Congress this week in lieu of the first one, so objectionable to many who had given the subject considerable thought. The new bill is framed along the lines of the Idaho-Montana bill, passed by Congress at its last session, and so far as applicable to California is almost identical with that measure. The bill introduced last Monday by Congressman Johnson is in the main the same as that published in this journal on page 402 of the issue of Dec. 21, '95. That bill provided for three commissioners. Last Monday's bill provides for the division of the State into four divisions, Redding and Susanville land districts in Division 1; Marysville and Sacramento districts in Division 2; Stockton and San Francisco districts in Division 3, and Visalia, Independence and Los Angeles districts in Division 4, and that for each division a board of three commissioners is to be appointed to examine and classify the lands under discussion. It is to be hoped that a united effort toward satisfactory legislation may result successfully. At best it will, under the circumstances, be extremely difficult to get any measure relative to California through both houses, especially when it carries a dollar of appropriation of public money.

THE Pueblo, Colorado, landoffice has made a decision in the matter of applications for patents in mining cases. In March, 1894, the M. J. T. lode owners posted notice of application for patent on their claim. The claim extends into the suburbs of Cripple Creek, and the notice was posted on one of the houses that was built on the claim and some 300 feet from the discovery shaft. P. J. Baron had located the Herman Strauss mine long prior to the location of the M. J. T., and the two claims conflicted. The owners of the Strauss did not know of the posting of the application for patent by the M. J. T. until the sixty days to adverse had expired, and they at once filed a protest against the M. J. T., and among the grounds of protest was the allegation that the notice was not posted on a conspicuous part of the claim; also that $500 worth of work was not done. After examination of the evidence the register and receiver have rejected the application of the M. J. T. lode application for patent upon the ground that the claimant for the M. J. T. lode mining claim had failed to comply with the mining laws in the matter of posting notice of application in a conspicuous place on the claim and for failure to perform $500 worth of work. Applicants for patent cannot be too careful in making a full compliance with the rules and regulations in applying for patents on mining claims.

PRESENT activity in the matter of gold extraction and processes therefor in South Africa is strikingly exemplified by the following from the *South African Mining Journal* of Dec. 21, '95. The fourteen specified are the report of but one week; they are applicants to the South African Chamber of Mines for patents: No. 902—Applicant, F. Hill: for a means for the treatment of ores and slimes of gold, silver and other metals; to be heard February 14, 1896. No. 1000—Applicant, A. Frank: for treatment for the forming of cyanide combinations; to be heard February 14, 1896. No. 994—Applicant, E. Andreoli: for an improvement in the electro-chemical method of the treatment of gold and other precious metals, more especially in the cathodes and anodes; to be heard February 21, 1896. No. 1009—Applicant, L. de Rigaud: for a new method of getting gold out of its ore; to be heard February 21, 1896. No. 909—Applicant, L. Ehrmann: for improvements in the extraction of gold from metallurgical solutions thereof; to be heard February 21, 1896. No. 918—Applicant, L. Ehrmann: for an improvement in the precipitation of gold by means of zinc; to be heard February 7, 1896. No. 986—Applicant, L. Berichte: for a new method to get gold out of ores; to be heard February 14, 1896. No. 1010—Applicant, H. A. de Neufville: for a process and apparatus for the extraction of gold and silver from quartz, and from other gold-containing and silver-containing materials; to be heard February 21, 1896. No. 1014—Applicants, C. Vautin and H. C. Sulman: for improvements in the extraction of metals from their quartz and in the apparatus for the same; to be heard February 28, 1896. No. 1017—Applicant, Vicomte de Lambilly: for a new method to procure formic salt of ammonium with regard to the production of cyanide-hydrogen acid and cyanides; to be heard March 6, 1896. No. 1012—Applicant, A. de C. Scott: improved operation and apparatus for the treatment of quartz and liquids containing gold and silver; to be heard March 6, 1896. No. 1011—Applicant, B. C. Hinman: process and apparatus for the extraction of gold from quartz and other gold-containing materials; to be heard March 6, 1896. No. 959—Applicant, J. Pfleger: improvements in the manufacture of cyanide; to be heard March 6, 1896. No. 1015—Applicant, M. Crawford: alteration in the precipitating or gaining of gold and other precious metals out of solutions which have been used to separate such metals from their ores.

## Mines, Miners and Monopolies.

Written by J. A. EDMAN.

NUMBER III.

By the act of 1866 the mineral lands of the public domain were declared open to exploration and occupation by all citizens, and by the subsequent acts of 1870 and 1872 (all afterwards included in the Revised Statutes of 1878) laws were passed providing for the occupation, entry and purchase of the mineral lands by actual miners. Even up to 1878 the railroad had made but few claims to the mineral land, and the present land-office definition of such land had not then obtained.

Meanwhile the operations of the hydraulic miners had caused serious injury to the agricultural lands of the Sacramento valley, and the agitation resulted which brought about the decree of 1879 and subsequent injunctions, and practical stoppage of hydraulic mining. What actual injury this was to the State need not here be discussed, but it became evident during the controversy that the railroad power was urging on and assisting the farmers with a view to keep up the animosity engendered and to prevent an equitable settlement of the question. From that day may be traced a conflict of interest and a split among the laboring elements of the State, so much more to be deplored as the contention was almost wholly artificial and uncalled for; but to this day it has been the means of making the people powerless against the common enemy.

From 1880 may be dated the constant and systematic encroachment on the mineral lands of California, chiefly as exemplified in the main gold belt.

From Kern county at its extreme southern end to Butte county on the north a strip of land in the foothills of the Sierras, averaging fifteen miles in width, has been invaded and largely occupied by agricultural claimants under the pre-emption and homestead laws, and the methods of acquisition are now too well known to need description here. Much of this land was old and abandoned mining ground, claimed by the agricultural locators to be useless for mining purposes, but even operating mines were sometimes included, when the prize was great enough to excite the cupidity of the would-be locator. It was during this period that the method of proving-off the mineral was perfected, which later has become the most potent instrument in the hands of the railroad companies. Meanwhile the Southern Pacific Company had been organized and obtained a land grant through the southern gold belt; it had absorbed and begun the wrecking of the Central Pacific Company, and had built the Oregon division of its line, along which it had also come into possession of a land grant penetrating the northern gold belt, which extends into Oregon.

During the period from 1880 to 1890 the wealth and political power of the Southern Pacific Company has constantly increased; it dictated by its corruption fund the municipal affairs of San Francisco; it had control of the State Legislature and the Railroad Commission, and exerted a strong influence in our State courts and the State land office. It virtually directed our internal and much of our interstate and foreign commerce by oppression, arbitrary and discriminating rates of fares and freights. In national politics it had gained a corresponding power by its secret combinations with other land-grant railroads and great banking corporations; it had gradually moulded to its purposes the rules and regulations of the General Land Office; it had placed ts friends in Congress and in lucrative positions in federal offices; it had become universally hated and feared on the Pacific coast, and posed as the great bully of the Pacific States; but yet it was not quite ready to consummate its cherished scheme of becoming the greatest proprietor of mines in California and the undisputed arbiter of the destinies of this State.

At this point it will be proper to inquire into the physical characters which distinguish and define the mineral lands of California, and in this inquiry the main gold belt may well serve as an example. Within this belt the Sierra Nevada presents a high and rugged mountain chain, rising about 14,000 feet in its southern portion and over 8000 feet in the north. Nearly two-thirds of this great area is within the snow belt, and one-half thereof is covered by snow for five months in the year. In its topography the central and eastern parts of the range, or nearly three-fourths of the whole area, consists of high and abrupt mountains, cut into deep canyons by the affluents of the Sacramento and San Joaquin rivers, the foot of the western flank only sloping more gently to the valley and there forming occasionally low and rounded hills. In the high and middle Sierra the soil is thin and scanty, and the bedrock generally crops out to the surface except in the few deep mountain valleys at high elevations, chiefly in the northern counties, and on some of the broad ridges in the middle counties remnants of the lava flows covering the ancient gravel channels which carry such a large portion of the golden wealth of the State.

The climate here is changeable and often severe, with extremes of temperature from + 100° to — 20°; the average annual temperature reaches only 45°, and beneficent Nature, while endowing this region with great resources in mineral and a wealth of timber, with pure flowing streams and magnificent scenery, has done but little to attract the farmer or reward his labor. It is safe to assert that not one per cent of this region is fit for agriculture as a means of support.

The foothills of the Sierra to their junction with the alluvial land of the Sacramento valley enjoy a warmer climate, and owing to less erosion present a deeper soil, generally from the decomposition in place of the underlying bedrock, which frequently appears at the surface, except where the later gravel deposits by the present streams debouching into the valley have formed deep and extensive beds generally auriferous and frequently rich, as at the outlets of Tuolumne, American, Yuba and the Feather rivers. Of this region the gently rolling lands are suitable for fruit culture and to a limited extent for stock-raising and dairying, as is evidenced by the many orchards and gardens that dot the slopes of the foothills near the main roads. Practically the most of the foothill ranches give but a bare subsistence to the owners, many of whom eke out a living by cutting firewood on the public lands; it is chiefly in isolated instances where individual energy, show and capital have succeeded in producing commercial profits or have founded charming and prosperous homes.

Geologically, all this region from the edge of the great valley to the foot of the eastern slope of the Sierra Nevada presents the strongest evidences of useful minerals, especially on the western slope, and among them gold is always the most prominent. This would be evident to the experienced miner or mining geologist even if actual mining operations had not demonstrated the fact and covered the whole western slope with mines and evidences of mining. Even granting that the so-called worked-out areas of the foothills may be used as agricultural lands, it must be remembered that all this region is seamed by gold-bearing veins, the development of which would create far greater wealth than farming, and would not in the least interfere with the culture of the soil. Why then should not this land be preserved to the miner, who may also till the soil and found a prosperous and permanent home on his mineral land should he so desire. Even the present Commissioner of the General Land Office, in his letter to the Secretary of the Interior, of August 29, 1893, says: "It is deemed, however, that a law should be passed by Congress enabling the Land Department to thoroughly investigate the character of the lands supposed to be mineral and within the reservation of the law, before the railroad is entitled to any cession whatever. It would not be unreasonable to direct that the patents issued should themselves contain a reservation of land therein described if it prove upon further development to be actually mineral land."

The last sentence expresses nearly what the miners of California desire, but they would wish to have the character of the land decided by competent Commissioners, independent of the land office, and whose decision should be made final. It is to be noted that the above opinion appeared before the change of heart of the Commissioner and before the promulgation by the Secretary of the Interior of the notorious, not to say infamous, rules of July 9, 1894.

In the high Sierra the broad lava ridges, generally covered by timber, present no field for the farmer except that a clearing may enable an industrious man to make a scant living thereon under favorable conditions. Their value for such a purpose would bear no appreciable comparison to their value for drift and hydraulic mining. The deep valleys situated within the Sierra, such as the American, Indian and Genessee valleys in Plumas and the great Sierra valley within Plumas and Sierra counties, although probably underlaid by gold-bearing veins and gravels, have long ago been recognized by the miners of these regions as agricultural lands, and support now a prosperous population engaged in farming and dairying, in perfect accord and harmony with the miners that surround them and largely contribute to their prosperity. In the same way and by the same tacit common-sense approval of the miner, the large alluvial tracts along the eastern edge of the Sacramento valley, often markedly auriferous and most prominently so around the outflows of Feather, Yuba, American and Tuolumne rivers, have without any controversy been conceded to be practically agricultural, although profitable mining is in progress at many points within these areas.

The preceding references to the character of the mineral lands may be said to embrace those that are extrinsic and to some extent negative; an inquiry into the intrinsic or inherent qualities of mineral land the world over will furnish still more important testimony.

The auriferous metamorphic schists and igenous crystalline rocks of California find their counterparts almost everywhere on the American continent, and are not at all lacking in the Atlantic States. Nowhere in the world does the experience of the gold miner record as a general fact that the noble metal has been found evenly distributed in paying quantities over a large area; the workable deposits of placer mines compared with the scope of the mineral land are small and generally confined to the lines of erosion by rivers and streams. California alone offers a partial exception to this rule in the extent, diffusion and richness of its ancient gravels. Probably not over ten per cent of the area of most mining claims will contain the actual payable deposit, but every portion of a claim may contain and finally develop a gold-bearing vein of value. Although the practically productive portion of a gold mine may be small, the method of location under the laws must always include much apparently waste ground, which, however, is necessary for the operations of mining. This becomes specially evident in the lava-capped regions, where the gold-bearing channels of mighty prehistoric rivers must be sought for under an unbroken expanse of deep volcanic material, presenting in itself no direct surface evidence of their richness, which, however, is fully demonstrated by developments in surrounding mines.

Contrasting the actual gold values produced from superficial areas of mineral land with productive values of similar agricultural areas, an estimate can be made only of placer mines and chiefly of surface deposits, as in rivers, creeks, gulches, flats and bars. Based upon an extensive experience, the writer would offer the following comparisons: Shallow placers when barely paying expenses to working miners produce $500 per acre; with a production of $1000 per acre such mines pay small wages; at $2000 per acre surface placer mines become fairly remunerative if favorably situated, but the average of profitable placer mines produce from $5,000 to $10,000 per acre.

The production from deep gravels in drift and hydraulic mines generally exceeds $10,000 per acre, and in the case of large hydraulic mines rises to $100,000 per acre. Reliable data place the production of the Smartsville gravel beds, Yuba county, at $60,000 per acre, and of the Spring Valley Company's mine at Cherokee Flat, Butte county, at over $65,000 per acre. It is to be noted that both these mines are now idle and under injunctions. Several drift mines, notably in Nevada, Yuba and Sierra counties, can be cited where the production, if computed on the actual area of channel worked, exceeds $100,000 per acre. Vast tailing beds exist within the main gold belt, containing gold values ranging from $5,000 to $15,000 per acre. These estimates apply to later years; for the earlier periods of gold mining in California previous to 1870 the average production should be trebled, and probably exceeded $20,000 per acre.

An estimate of values in quartz mines, although largely approximate, can be made on the basis of an average yield of six dollars per ton, and width of vein of four feet, when the product per acre, computed on a full-sized location, 1500 feet by 600 feet, worked to a depth of only 500 feet, would be $92,000.

The above values, when contrasted with the product of the average agricultural lands of this coast, become instructive to the political economist, and a comparison between the now current prices of prominent and productive gold and silver mines and those of cultivated farms becomes still more striking. Millions of acres of purely agricultural lands within California remain yet fallow or but slightly used, and can be purchased to-day at moderate prices, even from the railroad companies. In spite of the efforts so apparent to decry the importance of our mining industry and to exhibit it as unstable and speculative, the investments of capital made in this State of late years have been largely in mining properties, and probably in excess of investment in farming lands, and this fact alone largely explains the strenuous efforts of the railroad to absorb the mineral lands.

Meadow Valley, Cal, Jan. 25, '96.

*(To be Continued.)*

## The Best Is the Cheapest.

Every intelligent business man must recognize the fact that advertising is not a matter to be let out to the lowest bidder. It might be so if all papers were of equal value as advertising mediums. But with this value in different publications ranging from nothing to the highest figure, it is contrary to the first principles of business to take the one that will do the advertising at the cheapest rates.

It would be about as sensible to put in office men who might bid the lowest for the place. Fancy a great railway corporation, a bank or an insurance company selecting its president and other officers by competitive bids, without regard to their qualifications, or the manager of an extensive mercantile business, or a lawyer in a suit involving millions of dollars, being selected because he is the lowest bidder! The purpose in all such cases is to secure the best services for the prices paid—the best returns for the money spent.

STICK CEMENT for glass and china is made as follows: Sulphur, six parts; Burgundy pitch, four parts; shellac, one part; elemi resin, 2 parts; mastic resin, 2 parts; kaolin, in fine powder, six parts. Melt all the ingredients together and heat the surface to be joined before applying the cement.

## California Geysers.

One of California's many wonders is the Geysers, situated in the northeast corner of Sonoma county. They are less than 100 miles from San Francisco, and are approached by good stage lines either from Cloverdale or Calistoga, the former being, however, much the nearer to the scene. Our engravings show some of the features of the scenery in the region of the Geysers and the approaches thereto. The scene on the road, which is given herewith, is not one of the most thrilling, for the road on the left in the foreground has a firm hold on the hillside. There are other places where a roadway is claimed upon the flanks of the most precipitous mountains, and grades of hair-lifting degree above gorges of heart-sinking depth test the nerve of the tourist to keep his seat. Thus through peaceful vales and amid quiet hillsides, one approaches mountain wildnesses and the infernal special features of the geyser gorge. Herewith is given a superficial view of this inferno, a rocky glen through which flows a stream of hot water, the ground soft and rotten beneath the feet and burning to the touch, while a seething cloud of steam rises four hundred feet, shutting out all view of the narrow, precipitous path. On a bench that runs along the side of the canyon is a score of holes like the open lids of a great range. They are not two feet apart, yet in one of them the water is black, barely simmering, veritable ink, with which visitors inscribed their names on the hotel register, and in the next one a pool of green water boiling, while a third of milky fluid is undisturbed by its neighbor of amber color that is sending out little jets of steam like a small volcano. As the eye runs along this series of natural pots, kettles, pans and covers, it is easy to believe that the everlasting feast that is being cooked will be a credit to its chef. The range, the background, the floor, are ornamented with the colors from eighteen distinct minerals, and the vapors that greet the nostrils hold a dozen different acids. Farther in the canyon the scenery becomes wilder, the noises lounder, the footing less secure, and the path more uncertain. From fumaroles, cracks and fissures steam puts forth. The names with which man has designated these various wonders are all drawn from the nomenclature of hell. The "Devil's Tea Kettle" boils on and on and wastes enough force to propel the battleship Oregon; the "Devil's Gristmill" grinds away, throwing out steam and hot water with energy worthy of a better cause; "Pluto's Punch Bowl" contains a never-failing supply of hot lemonade that lacks only sugar. Then there are the "Devil's Arm Chair" and the "Devil's Canopy." On the borders of the Epsom salt spring one can scoop up handsful of salts as pure and white and light as cotton balls, while there is a whole drug store of sulphur, copperas, magnesia, soda, alum, potash, to be had for the taking. Description only repeats itself as the tourist works his way slowly and cautiously among this world wreck and up some hundred and sixty feet to a clayey plateau where he can gaze down in wonderment on the "Steamboat Geysers," which snort and blow so that they can be heard miles away.



ON THE WAY TO THE GEYSERS IN NORTHERN SONOMA COUNTY.



DEVIL'S KITCHEN.

## Labor and Time Sometimes Wasted.

Every one having natural feelings is pained when he sees another person misdirecting his efforts to perform a worthy task. This is especially true of inventors. The man who tries to get up a new mechanical device which shall be useful to other people and a source of profit to himself is to be encouraged. His is a commendable undertaking. And the American people have so much talent for such things that innumerable attempts are continually being made in this direction. But many of these are fruitless. Some of the failures involve a loss of money, as, for instance, in materials and patent fees; but they all mean disappointment and a waste of time, thought and trouble. The chief explanation of such mistakes is the inventor's ignorance of what has previously been done by others who had the same general object in view as he. In many cases his idea is not original; some one else has tried to do the same very thing in the very same way. Often a much better device than his is already in common use.

For instance, there is now in service on several railways a track bolt which needs no nut-lock. Several styles of nut-lock are being used yet, and they will continue to be manufactured for a while. But there is no demand for a new style. In a few years the nut-lock will be a thing of the past. So with car-couplings. Partly from self-interest and partly from legal compulsion the railroads have been looking for an automatic device which can be set from a position of safety, so that a man need not go between the cars to complete the job at the instant they come together. Probably over ten thousand patents have been granted on inventions of this one class. After looking over the best of them the Master Car Builders' Association voted a few years ago to adopt for new cars only couplers of the Janney or "vertical plane" type, great hooks that swing sideways and have perpendicular surfaces where they come in contact. There are hundreds of variations of this one style; and railroad experts say that this is the field to which further study and experiment should



FIG. 4.—80-FT. STATION, SILVER KING MINE, KOOTENAY, B. C.

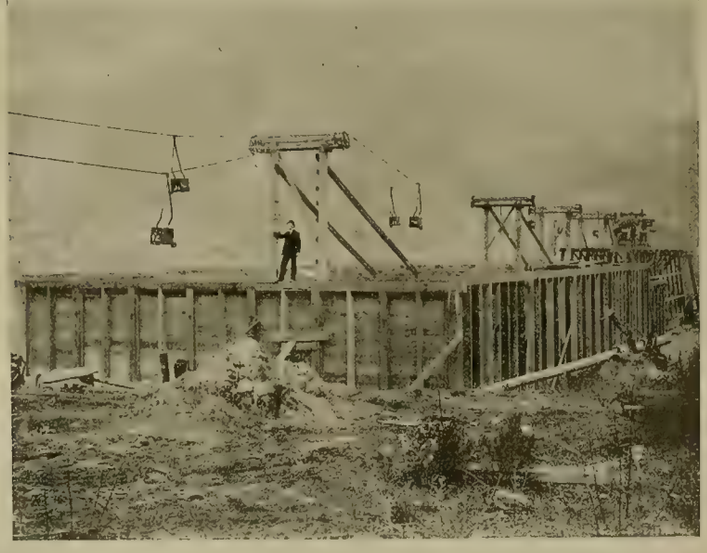


FIG. 5.—LOWER TERMINAL AND ORE BINS, SILVER KING MINE, KOOTENAY, B. C.

(See page 81.)

be confined. But, without knowing this, scores of excellent men with worthy ambitions and in need of money, go on inventing other styles of coupler. They devise mechanisms having more or less merit, but which won't sell. The railroad people won't buy. If you mention this to the inventor perhaps he gets mad or at least suspects your motive. He finds it hard at first to believe you. It would be an interesting question for a debating society to consider whether or not it is a kindness to tell such a man the truth. And so with scores of other inventions.

When a man gets what is a new idea to him he ought to take the pains to find out, if possible, whether it is also new to experts. By proper inquiry he may discover that it has been tried by others and will not work. Or he may find that it is entirely original, and will do what it is designed to do, but that there is a much simpler, cheaper way of obtaining the same result. In either case he could not sell his idea. There is danger that the inventor, in his effort to keep his scheme a secret, will fail to seek information which would save him a lot of work and subsequent despair. Having once satisfied himself that no one else has thought of the same or a better thing, and having made sure that there would be a large demand for the article he has in mind, an inventor should proceed to experiment with the idea. Every detail should be thought out carefully and repeated tests made. It often happens at the last moment that unforeseen difficulties are discovered which make a change of plan necessary. There is danger that a good thing may fail for lack of patience and thoroughness.

## The Training of a Mining Engineer.*

By HENRY LOUIS.

This subject should possess a certain amount of general interest at a moment like this, when we are in the throes of one of the wildest mining "booms" that has ever been known. Many millions of pounds have been invested during the last few months in gold mines, and the public, who have eagerly invested in such mining shares, and who have rushed, not a few of them, to a substantial premium, have done so in many cases upon the faith of the reports made by mining engineers not personally known to them. Upon the correctness or incorrectness of the reports of these engineers will depend success or failure in the investment of all these large sums, and perhaps the fortune or ruin of not a few of the investors.

A knowledge of the sciences upon which mining is based is obviously indispensable, but this knowledge by itself is not enough. The mining engineer must be able to apply these sciences, and in applying them he must forget, as far as possible, the study of science for its own sake, and must bear in mind only the practical results for which he is striving. As an example of what I mean, I may quote a case of an ultra-scientific gentleman who was put in charge of a gold mine, and who resorted to elaborate processes to get out the utmost particle of gold from the ore he was treating, overlooking the fact that it would have paid him far better to have let a little run to waste, because these last grains were costing him far more than they were worth. Similarly in coal mining it is, of course, good practice to get as large a proportion of coal out of a given area as possible, but a point may easily be reached when the cost of the timber that might have to be put in to get the last portions of coal would exceed the value of the coal got. In other words, due regard must be had to what the economist terms the "marginal increment." These are instances of what I mean by following too closely the principle of pure science to the neglect of commercial considerations.

A mining engineer's training should include a short time in an electrical laboratory or shop, where the student may be familiarized with the construction of electrical machinery and the application and measurement of electric currents. Of the importance of mechanics little need be said; such subjects as machine construction, strength of materials, the steam engine, water motors, and many others, come so obviously into the every-day practice of the mining engineer that he must perforce study their principle thoroughly.

A mining engineer is so often called upon to design machines for various purposes, or to test the efficiency of a machine already constructed, that he must be a good mechanic. I hold that it is not necessary for him to actually serve any time in workshops, although he will often find it an immense advantage to be able to use some of the simpler engineer's tools, and more especially to do a little smithing. In out-of-the-way corners of the world I have found the ability to sharpen a drill or to point a pick of greater value to me than might be supposed by those who have never prospected in remote regions.

These three sciences — chemistry, physics, and mechanics, together with the all-pervading mathematics—form the basis of the mining engineer's training. Next comes what may be called secondary sciences, more closely connected with the miners' special work. These are geology and mineralogy.

* Condensed from an inaugural address delivered at the Durham College of Science, Oct. 17th, 1895.

Geology is, to a great extent, the scientific basis of mining; the man whose daily duty it is to exploit certain portions of the earth's crust must know thoroughly the rocks of which it is composed, their appearance, their composition, and the mode in which they were formed. He must not only know geology thoroughly, but must also have some knowledge of the subjects most closely connected with it. For instance, he must know something of palæontology. Evidently, the more he knows the better; but a fair general knowledge, without entering into recondite details, is all he needs. Thus he ought to be able to recognize a tribolite when he sees one, and to know that if he comes across strata containing these fossils he need not waste money in sinking deeper in search of coal beds. This knowledge is quite enough for practical purposes, and he would not be any the better off, practically, for being able to name the genus and species to which the tribolite might belong.

Similarly as regards lithology; this science, in its ultimate developments, is best left to specialists. All a mining engineer really requires is to tell broadly what class of work he is dealing with. It does not matter much to him, as a rule, whether a certain rock that he might come across is (say) a diorite or a diabase, provided that he knows, beyond the possibility of mistake, that he is not dealing with a stratified rock, and what the effect of a dyke of igneous rock is likely to be upon the strata which it traverses. In fact, for the mining engineer physical geology is the most important part of the subject, and one which he must have at his fingers' ends. It is, perhaps, needless to say that geology must be studied in the field no less than in the lecture room, and that the mining engineer ought to be familiar with all the various indications by which geological phenomena can be recognized and traced.

Mineralogy, including crystallography, deserves more attention than is usually devoted to it. The ability to be able to recognize at once any mineral that he comes across is of immense use to the mining engineer, and in this he is always greatly assisted by crystallographic indications. I may quote a case in point. I was once sent to report in a great hurry upon a deposit of magnetite in Nova Scotia that was offered for sale as a Bessemer ore. I found, on examining the ore, that it contained minute needle-like crystals, which, under the lens, appeared as hexagonal prisms, and which, from their crystallographic characters, I concluded to be a mineral called apatite, consisting of phosphate of lime. I accordingly broke off the negotiations at once, and subsequent analysis confirmed the correctness of my diagnosis. Here, then, was an instance in which a knowledge of crystallography saved much time and, possibly, a heavy pecuniary loss. Another instance that came under my cognizance was that of an engineer who had to report on a silver-lead mine. He took his samples from various points along levels, and, as his assays gave very satisfactory results, he was preparing to report favorably when a close examination of some crystals of galena that he had broken out from the roof of a level showed Portland cement on the back of the specimens. Needless to say, this discovery was enough to show him that the mine had been "salted." These two examples will, I hope, suffice to show how the knowledge of what is really a pure science can have a very practical value, even in the commercial sense, for a mining engineer.

The first part of a mining course usually consists of what is, strictly speaking, a portion of geology—namely, on account of the various forms in which mineral deposits are met with, the mode in which these deposits have been formed, and the various classes of dislocations and interruptions to which they are subject. These matters need dwelling on in more detail than is usually possible in a course of geological lectures; indeed, in some continental universities these subjects are elevated to the rank of a separate science, and professional chairs have been devoted to it. The student has next to attack mining proper, and here he comes at once into a new world. He has hitherto been studying pure science; now he has to learn an art, and must from the first be taught to consider it in its trade aspects. All such subjects as prospecting, boring, shaft sinking, exploitation, haulage, winding, pumping, ventilation, and so on, have to be considered in their economic, as well as in their technical, aspects.

All that a lecturer on mining can do is to describe to his students the practice in various parts of the world, and the principles upon which it is based, drawing especial attention to those methods that have proved economically successful, and also, whenever possible, contrasting with them other systems that have proved failures, or have been superseded by better ones. After all is said and done, mining must perforce be learnt in the mine. A combination of practical work with lectures is the best way of learning, but, then, it is always preferable, whenever possible, that elementary lectures should precede the practical work, so that the student may know what to observe and how to observe it. After he has learnt all the pure science he needs, let him attend a course on elementary mining, and not till then let him go underground. Advanced lectures of a more specialized nature should then be attended, say during two days a week, while the student is working in the mine for the rest of his time. Furthermore, there should be special short courses on such matters as mine accounts, mineral legislation, and mineral statistics. Mine surveying should be thoroughly taught in a course of demonstrations, in which the students themselves are made to execute surveys, if possible, underground, or if not, at any rate under somewhat analogous conditions. They should be taught to calculate and plot their own surveys, and especial attention should be directed to the calculation of quantities upon a systematic basis.

A branch of mining that requires special training is that of ore dressing, in which term is included all the mechanical preparation of minerals after they have been brought to bank in order to fit them for market. All methods of crushing minerals and dressing them, whether the object of the process is to save the heavier portions, as in lead dressing, or the lighter ones, as in coal washing, are also included. This subject is best taught by laboratory demonstrations. A laboratory for this purpose should be filled with various types of crushing machines, and with experimental jigs, shaking tables, etc., so that the student can test for himself the effect of various processes, and of various ways of carrying out the same process upon a given ore; there should also be facilities for assaying the products of the operations, so that the student can prove to his own satisfaction the value of his work. Properly conducted, such a laboratory course has immense educational value, in addition to the training it affords in the treatment of minerals, and a student who has gone through such a course will have a grip of his subject and an intimate knowledge of minerals, such as no amount of mere lectures or reading can give him. I am, accordingly, inclined to lay especial stress upon the importance of a course of practical ore dressing.

Finally, the mining engineer must have a good general knowledge of metallurgy. It is no exaggeration to say that nine-tenths of all the products of mines, whether coal or metalliferous, are intended to undergo metallurgical treatment. In fact, minerals are mined and prepared for that object. Unless the mining engineer knows exactly what the processes are by which the mineral he raises will have to be treated, he is not in a good position to judge of the most suitable condition in which they should be delivered, and without such knowledge he is likely to produce an article less readily marketable than the man who knows what after-treatment he is preparing his ores for. Obviously, therefore, the man who knows metallurgy is likely to get better prices for his products than the man who does not. In addition, the study of metallurgy completes and rounds off his knowledge of minerals, and thus puts a finish on his technical education. The minor details of metallurgy are not, indeed, required, but a general knowledge is, and no man can be considered a really thorough mining engineer unless he is a metallurgist as well.

I have now laid before you, briefly, the main elements that should, in my opinion, compose the technical training of a mining engineer, and I venture to think that a man thus trained is in a position to take his place in a mine, and to be of some use from the day he enters it, although, of course, he will have to spend a good many years underground before he can attain any mastery over his subject. It may be objected that such a training as I have sketched out will require a good deal of time. So it will. I do not consider five years any too much to devote to the study of mining engineering. I do not know of any profession that can really be learnt in less, and hold very strong opinions as to the injury inflicted upon the mining industry in every way by the admission into the ranks of mining engineers of men only partly qualified for their duties. Unfortunately, mining is, to some extent, a hazardous career, and chance plays a far larger part in it than in most other pursuits. Hence it may happen that an untrained man now and then finds himself in charge of so good a mine that all his ignorance cannot prevent its paying its way. I remember an instance in South Africa, where a certain mine manager had control of a very successful mine, and for a time enjoyed quite a reputation as a mining authority; yet all this gentleman knew about mining was what he had been able to acquire while following his former occupation of a ship's steward! Such things will occur as long as the duties and training of a mining engineer remain vague and undefined, but it is pretty evident that a clearer public opinion on this point is gradually springing up. One thing is quite certain, and that is that in the face of the keenness of competition all over the world to-day no mining engineer can afford to neglect any item of training that is likely to help him in the struggle for existence, and that no mine can pay so well, in the long run, as the mine that is controlled by a properly qualified manager.

Do not think that I am taking too candid a view of the mining engineer's duties; the sole justification for his existence is that he can make mining pay, and mining, I repeat, is a purely commercial pursuit. Accordingly, as I have said, the mining engineer must be first and foremost a man of business, and must study science, not for its own sake, but for the profit in pounds, shillings and pence that he can get out of its application. If any of you are in-

clined to contrast unfavorably such a purely utilitarian career with the pursuit of science for its own sake, I would ask you to remember that, while the scientist passes his life in adding to the knowledge of mankind, the technician spends his in adding to the stock of human comfort by his labors; and I venture to assert that of the two the latter object is at least as important as the former one.

## The First Calcic Carbide Plant.

Written for the MINING AND SCIENTIFIC PRESS by ORRIN E DUNLAP

The first calcic carbide plant to be built for commercial purposes in America, as a result of a discovery made by Mr. T. L. Willson in North Carolina, is nearing completion on the lands of the Niagara Falls Power Company, in Niagara Falls, N. Y. The product of this initial plant will be shipped to Philadelphia, Pa., and there made into acetylene gas, for use throughout that city and southern Pennsylvania.

As the new plant there is the first of its kind, many interesting experiments will probably be made in it. At the start it will be important to ascertain the amount of electric current which will prove the most economical, for so far the experiments have been made with currents varying from 25 H. P. to 235 H. P. The contract of the company with the Niagara Falls Power Company calls for 1000 or more H. P., a force much larger than before used, it will be seen. One important feature of the plant is that an alternating current furnace is to be used, whereas all the other electric manufacturing plants at Niagara Falls use direct current furnaces. The current is received all on one phase and used at a voltage of about 100, a fact which tells that it will have to be reduced considerably from the voltage at which it is sent out and delivered by the generators of the Niagara Falls Power Company, which is about 2200. At the commencement it is likely that the furnaces will be operated with a current ranging from 100 to 1000 H. P., and it is possible from the dimensions of the furnace that a current of 500 H. P. will be found the most economical.

The size of this first carbide plant is 40x90 at the foundations. The structure is of brick, the front portion being two stories high, or thirty-one feet to the eaves, while the rear part is twenty-one feet. It contains a furnace room, a crushing and grinding room, a laboratory, a switchboard room, a transformer room and a room for the help employed. The crushing and grinding portion of the outfit is to be of sufficient capacity to supply a plant of fifty tons capacity, whereas the capacity of the plant at the start will be at least five tons per day. A two-phase 75-H. P. motor will operate the grinding plant. In the furnace room four furnaces have been built, each containing cast iron crucibles 3 feet 6 inches long, 3 feet 6 inches deep, and 2 feet 2 inches wide. The current will be kept on each furnace for about three hours, one furnace being operated at a time. Each horse power used is supposed to give twenty pounds of calcic carbide every twenty-four hours, and each pound of the product is supposed to produce a little over five feet of gas. It is expected that by February 1st the factory will be in operation.

Considering the fact that calcic carbide is made by the use of such low-priced materials as coal dust, lime dust, water and electricity, and that it can be made anywhere, there is no telling the revolution it may create, especially as it is recognized as the highest illuminant hydrocarbon known in chemistry. The company that owns the Niagara Falls plant makes the claim that acetylene gives more light, throws out less heat, consumes less oxygen and can be produced at much less cost than other illuminating gasses. It is capable of being stored as a solid in the shape of calcic carbide, as a liquid or as a gas. It may be shipped long distances as a carbide or as a compressed liquid gas manufactured from it, and in the latter state may be applied to all purposes of isolated lighting, especially as in railroad trains, street cars, carriages, bicycles, steamships or sailing vessels, street lighting, and it may be used in dwellings, stores or manufactories, its application for the latter purpose permitting the manufacture of a gas sufficiently low priced to be used for fuel or heating purposes.

Acetylene gas, like many other valuable and useful things, was discovered by accident. It has long been known to chemists that carbon will combine with various metals when great heat is applied, but the product called "carbides" has been but little studied. In 1866 Berthelot discovered sodium carbide, and from that on until 1888, a period of twenty-two years, the scientific records fail to report further progress. It was in 1888 that Mr. Willson began a series of experiments in an electrical furnace, and no doubt the electrical development was the actuating cause of the success that accidentally crowned his efforts. Mr. Willson sought to reduce refractory oxides by carbon, the reductions to be accomplished by the heat of this electrical current and not by the electrolytic action. Mr. Willson's experiments were extended over a considerable field and period, and finally he ascertained the fact that a mixture of powdered lime and coke dust introduced into a furnace would develop into a syrup-like mass of practically pure carbide of calcium, which, when taken from the furnace and placed in contact with water, would evolve acetylene gas in great quantities. Calcium carbide is a dense dark brown substance which gives off a peculiar odor owing to the action of the atmospheric moisture. In a dry atmosphere it is odorless. The gas made from it, acetylene, is colorless, and a high authority has stated that as compared with coal gas its poisonous qualities are only one to fifty. The gas has a pungent odor something like garlic; a feature of importance is that its presence will indicate a leak very quickly. The fact that acetylene can be placed in three conditions, viz., a gas, a liquid or a solid, is significant of its commercial future. The promoters of the plant give some interesting figures in stating that, assuming that twenty pounds of carbide are produced each twenty-four hours by each horse power used, the amount made during 300 working days would be three tons per H. P. per year, and applying the 100,000 H. P. available from the present tunnel to its production it would mean the production of 300,000 tons per year. This, they say, should produce at least 3,300,000,000 feet of acetylene gas, which, as its illuminating abilities as compared to coal gas are as ten to one, would represent all of 33,000,000,000 cubic feet of this gas, an amount that equals, if not exceeds, the annual output of coal gas throughout the whole United States. An important feature of acetylene is that the heating effect of its flame is but little more than that of an electric incandescent lamp. As the supply of this factory is to be shipped in barrels to Philadelphia in the form of calcic carbide, it is natural they should compare the illuminating qualities of their product with the gas now used in that city. In this connection it is stated that when acetylene is burned at the rate of five cubic feet per hour it produces a light equal to 250 candles, while to compare their qualities it is further pointed out that the best illuminating gas from coal or water gas is seldom over twenty-two candles for each five feet consumed per hour.

The Philadelphia gas, as is pointed out, is equal to nineteen or twenty candles. Thus it will be seen that acetylene will produce at least 13¼ times more light for the same quantity consumed, or in other words, 1000 cubic feet of acetylene gas will furnish the equivalent in lighting power of 12,500 cubic feet of Philadelphia coal, and furthermore, a three-months' supply of acetylene for a good-sized house can be stored in a cylinder six inches in diameter and four and one-half feet long. But these figures have mainly to do with the nature of acetylene as an illuminant, in addition to which its commercial value for power and heating purposes is to be taken into consideration and studied. There is no doubt that other factories for the manufacture of calcic carbide to supply New York, Massachusetts, Ohio, northern Pennsylvania, Indiana, Illinois, Rhode Island, Connecticut, Missouri, Michigan, Minnesota and other States are likely to be erected at the Falls because of its proximity to the fields from which the materials used in its manufacture are obtained, and also because of the great supply of cheap electrical power obtainable there. Herewith is presented an illustration of the building containing the plant—the first of its kind in the world. This was engraved specially for the MINING AND SCIENTIFIC PRESS and is believed to be the first illustration of the building published.



THE CALCIC CARBIDE PLANT AT NIAGARA FALLS.

AN interesting experiment was successfully performed last month by Mr. P. B. Delany, at a lecture given in the presence of the New York Electrical Society, in the course of which the lecturer sent messages over a telegraph wire at the rate of 100 words in three and one-half seconds. Although the termini of the wire were in the same room, the achievement would be just as practicable were they a thousand miles apart. The strength of the current used was only a little over 100 volts. With a greater voltage, Mr. Delany said that messages could be sent at even greater speed and for any length of time. The messages had first to be placed on a continuous tape in which holes were punched, so many holes representing one letter and so many another. This is done by a perforator that rapidly punches the number of holes representing in each instance the required letter. Then the message is ready for the transmitter. This is a delicately adjusted machine that causes the receiver at the other end of the wire to register a small dash on another tape for each punched hole that passes through the transmitter. No matter how fast this perforated tape passes through the transmitter, impelled by whirling cylinders, the receiver faithfully records each performance at the other end. One wire in this way can, it is said, carry messages as fast as fifty or more operators can get them ready for the transmitter. The speed accomplished at the test given by Mr. Delany was 1714 words a minute.

THE following is a memorandum of rainfall at Edmanton, Plumas county, Cal., during the recent rainstorm. Altitude, 4750 feet; latitude, 39 deg. 54 min. north:

| | *Precipitation in inches.* |
|---|---|
| January 13 | 0.76 |
| " 14 | 1.61 |
| " 15 | 5.03 |
| " 16 | 6.02 |
| " 17 | 3.78 |
| " 18 | 1.55 |
| " 19 | 2.90 |
| " 20 | 3.30 |
| " 21 | 1.07 |
| Total | 26.02 |

Add to this old snow melted by the rain, fully equal to ten inches, and the volume of drainage would be over thirty-six inches, all gone to waste.

J. A. EDMAN.

NOTHING is more expensive than penuriousness; nothing more anxious than carelessness; and every duty which is bidden to wait returns with seven fresh duties at its back.

# Scientific Progress.

### Edison's Magnetic Separator.

The idea of using magnets to assist in the separation of iron from the rock with which it is sometimes associated in the earth has been made the basis of a good deal of experiment and invention during the last few years. Several devices embodying this principle have already been patented and put in operation more or less successfully. The most conspicuous worker in this field, however, has been Thomas A. Edison, who has been busily engaged in perfecting the process in the vicinity of a large deposit of iron ore in northern New Jersey. At a place formerly known as Ogden, but now called Edison, operations have been conducted on a large scale. An extensive assortment of machinery for drilling and blasting the rock to a depth of thirty feet below the surface, scooping out the material thus loosened, and crushing it until it is as fine as granulated sugar, has been set up there. It is possible to take out at least 2500 to 3000 tons there a day, and the crushing, conveying and separating apparatus is said to have a capacity of 10,000 tons.

In a vague way it has been known that Mr. Edison had encountered certain difficulties in the application of his theories, but these are now reported to have been overcome. Some of them grew out of the enormous quantities of dust developed during the preliminary treatment of the ore. So filled was the air with minute particles of grit and dirt that the workmen could not breathe without wearing mufflers over their faces. This they continue to do. But the nuisance has been largely abated by surrounding the buckets carrying the pulverized ore with the coarse bagging commonly called burlaps. Another problem related to the lubricating of the bearings of the great crushing rollers, some of the latter being designed to chew up rocks weighing ten tons each. Mr. Edison, in this and other parts of his establishment, would tear out very expensive appliances which did not work right and replace them with different ones, and it is said that a plant which could, with his present knowledge, be reproduced for $500,000, has cost him up to date about five or six times that amount.

The general plan of separation by means of magnets is to let the powdered ore fall so as to pass very close to the ends (or poles) of several horizontal magnets. Those grains which are made up chiefly of iron will be attracted by the magnets and drawn an inch or two to one side of the path which they would otherwise follow, and will be held temporarily, sticking to the poles, while the purely stony matter, insensible to the influence of the magnets, continues to drop. To perform this service electro-magnets are used —pieces of iron which derive their magnetic qualities from a current of electricity sent through coils of wire encircling them, and devoid of any attractive power as soon as the current ceases. In Mr. Edison's arrangement the downpour of ore is checked every five seconds, and then the current is shut off, so that the particles of iron temporarily attracted to the poles of the magnet are released. They fall on the other side of a thin partition from the non-metallic refuse; and the two go out through different chutes, and are carried off by separate conveying machinery. Inasmuch as the first treatment by this method does not extract all the iron from the ore, the refuse is exposed a second and a third time to the influence of magnets, the three operations being conducted on separate floors. The amount of iron (or rather oxide of iron) originally in the rock and remaining uncollected by the magnets is estimated at less than five per cent.

An electro-magnet may be made in a great variety of shapes. Almost every one has seen the long, flat strip of wood around which, from end to end, a fisherman sometimes winds his line. Mr. Edison, for reasons which will be apparent on reflection, adopts this design for his separating magnets. He takes a slab of cast iron 4 inches thick, 12 inches wide and 9 feet long, cuts a notch in each end, and then winds his insulated copper wire on it lengthwise. The ordinary bar or horseshoe magnet attracts only at the end, not along its side; but by his method of winding Mr. Edison makes the whole nine-foot edge of his slab a "pole." That is to say, it will possess attractive power along its whole length, so long as the wire carries a current. This is much the most economical use of the iron in the core, of copper in the coils and of current that could be made for the particular kind of work to be done. Four or five such magnets are mounted, all horizontally, and one above another, and the powdered ore falls in a thin sheet from a properly arranged trough in front of the edges of the whole set. It is said that no less than 500 of these nine-foot magnets are used for the first separation. For the second and third processes magnets of the same general design are employed; except that the second set have a width of only about eight inches, instead of twelve, and the third set only four and a half inches wide.

The stony refuse, or sand, left by this system of treating the ore is sold to the railway companies for ballast. The oxide is then ready to go to a smelting furnace. Instead of shipping it thither in a pulverized form, Mr. Edison mixes it with various plastic materials that will facilitate smelting, and shapes it into bricks, which are pressed and dried. This latter process, invented by Mr. Edison, is said to render the product more salable.

It should be remarked that Mr. Edison's method of separation is not available for all iron ores, but only for a certain class called "magnetic" iron ores, which are sometimes actually magnetic, but not always so, but in which the oxide is free from various impurities found in other ores.

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A NEW chemistry of high temperatures, whose applications are likely to be numerous, is being rapidly evolved. In the reverberatory electrical furnace with movable electrodes, which he devised no longer ago than 1892, M. H. Moissan has obtained temperatures sufficient to produce the diamond, to crystallize metallic oxides, to reduce those hitherto refractory, to melt metals hitherto infusible, to distill lime, silica, zirconia and carbon, and to cause an abundant volatilization of such metals as platinum, copper, gold, iron, manganese, chromium and uranium. In this furnace the electric arc is passed directly over the subject under experiment, which is held in a crucible in a chamber of lime. Chromium is reduced from the sesquioxide as an unoxidizable metal, which can be filed like iron, takes a fine polish, and has the advantage over ferro-chromium for alloys of being free from carbon. The great possibilities of chromium alloys can now be effectively studied. Molybdenum, previously infused, can be obtained in considerable quantities, and is found to have a fine grain, and to be capable of being filed, forged at a red heat, and alloyed with iron in a steel that can be tempered. Tungsten, even more infusible than chromium and molybdenum, is readily liquefied under the electric arc, and obtained in a very pure state. Uranium is readily reduced from its oxides, and when slightly carbureted it has the property of striking fire with flint. Of vanadium, known before as an impure gray powder, small quantities have been obtained as cast metal, having a crystalline and brilliant fracture. The current of a dynamo driven by an engine of forty H. P. scarcely sufficed to melt it. Titanium was obtained with currents of 100 to 300 H. P., and has unexpected properties—taking fire in fluorine, decomposing water at a bright-red heat, and, very curiously, burning in nitrogen at a high temperature. These simple bodies all form crystallized compounds with carbon, boron and silicon, some so hard as to cut the diamond. Possibly others besides chromium may give new properties of value to iron.

# Mechanical Progress.

### An Improved Instrument for Draughtsmen.

The draughtsman is constantly having occasion to lay off all sorts of angles. He is apt to employ for this purpose a "protractor," a semi-circular brass plate, graduated to degrees. There are other implements also to which he may resort. But as it is a waste of money and trouble to have more instruments than one actually needs, it has been suggested by Henry Swift, chaplain in the United States Army at Fort Logan, Col., that still another device, which is an essential to the drawing outfit, be so modified as to serve this additional purpose. The protractor can be dispensed with. Mr. Swift has in mind the gutta-percha triangle, which has one right angle and two acute angles. The latter are often of 60° and 30° respectively, but this is not essential. There are other simple ways of getting those angles. The larger one is obtained by using the radius of a circle as a chord, and halving will only give 15 in whole degrees. The inventor suggests, therefore, that the larger acute angle of this implement be one of 64°. This readily subdivides into 32, 16, 8, 4, 2 and 1, thus facilitating the task of obtaining angles of any number of complete degrees. Of course the triangle may be made of any other suitable material. It is only essential that the longest side shall be arranged as a scale.

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MANY thousand square miles of the northwestern part of New South Wales and the adjacent territory were once covered by an inland sea, and are now occupied by a cretaceous formation that absorbs like a sponge the entire drainage of the western side of the tablelands, carrying the water in unknown subterranean courses to the sea. As the annual rainfall is scanty, this region is too dry for cultivation. In 1879 an attempt was made at Killara station to get water by boring, and an abundant artesian supply was tapped at a depth of 140 feet. In 1884 the Department of Mines took up the work. Its first bore struck a small supply of water at eighty-nine feet, and in December, 1894, it had completed thirty wells, with nine in progress and twenty-three others located, and had failed but once to get water. Of the thirty completed wells, twenty yielded an artesian supply of over 7,000,000 gallons daily, and from ten a daily supply of 500,000 gallons could be pumped. Water for the Northwestern traveling stock routes is furnished by fifteen of the largest wells. In addition to the Government work, private enterprise had completed ninety bores in June, 1895, of which seventy-three gave a combined daily flow of about 30,000,000 gallons, and seventeen supplied water by pumping. Gardens and orchards flourish luxuriantly near these wells. Little water is yet used for irrigation, but recent investigation tends to show that the artesian water-bearing basin extends much farther southward than has hitherto been supposed, and that a great barren region may be transformed by further well-boring into a rich farming country, adding much to Australia's resources.

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WHILE the attention of the entire world has been centered upon the "harnessing" of Niagara Falls for the purpose of producing and transmitting electric energy for commercial purposes, the citizens of the coal-mining towns in Pennsylvania have been studging how to utilize the vast quantities of culm accumulated near them, for a similar purpose. Culm is the name given to waste coal, having reference in a general way to the great banks of anthracite and lumps smaller than marketable grades, constituting the refuse of the mines for many years back. It is estimated that thirty-five per cent of the total output of the coal mines of Pennsylvania goes to the culm banks, and that there is now 22,000,000 tons of this refuse stored up. The total amount of coal going to waste each year is equivalent to 75,672 annual horse power. It is argued that these enormous culm banks can be converted into electrical energy, which can be supplied to consumers at a much lower rate than is possible for the Niagara Power Company to do, owing to the difference in the original cost of the investment, on which the fixed charges must always be based. In fact, the business men of Scranton, Penn., claim to be able to furnish through their culm banks electrical power at any distant point, at from $4 to $6 less per horse power than the rate charged by the Niagara Power Company, which, as thus far announced, is $20 per horse power for a year of uninterrupted service day and night.

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MUCH of the rich sculpturing in the new congressional library building is being done by the use of a new invention in the shape of an air chisel. By the use of this marvelous little machine the modern statue is carved quickly and with a precision almost equal to the old masters. Of course a model in plaster is necessary, the compressed air chisel being used simply for reproduction. The tool is not unlike the dentist's drill. It runs under about thirty pounds pressure and strikes a blow between 1200 and 1500 times a minute. An expert does excellent work with this machine, which cuts marble as easily as the carving of steamed wood.

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IT has recently been pointed out that already the telephone is used, by actual count, ten times as much as the telegraph, the annual figures being put down at about 75,000,000 telegrams and 750,000,000 telephone talks.

# Electrical Progress.

### Electric Elevated Roads.

Chicago is the only city in the United States having an elevated railway operated by electricity. The intramural elevated road, which was in operation around the grounds of the World's Fair, constructed by the General Electric Company under the "third rail" system of patents, was the first road of this character in the country, and it proved beyond dispute that electricity could be used successfully as a motive power for elevated railroads. The Metropolitan Elevated Railroad, then in course of construction, and on which it was intended to use steam, decided to change their plans to accommodate the use of electricity. The track is constructed of a ten-pound T rail, each rail being electrically bound near its center to the supporting structure. The third or trolley rail consists of a forty-five-pound T rail, located on one side of the track and elevated about six inches above the timber safety guards. This third or conductor rail is supported at intervals of about five feet on six-inch square blocks of Georgia pine, treated with paraffine. The blocks rest on a low, circular, iron pedestal, with no insulation other than the wood. The trolley rails are connected by a light fishplate, and are bonded on the upper side by three short copper strips.

The motor cars in use are forty feet in length, and have a seating capacity for forty people, the seats being on the side, and are used as smoking cars. The controlling devices are situated in cabs at the diagonal corners of the cars, and occupy about one-half of the platform, each car containing a three-horse power motor, operated by means of single reduction gears, and a small air pump for working the braking device. The present power equipment of the motor cars consists of two 100-horse power motors of the General Electric 2000 volts type. The current is taken up from the trolley rail by means of sliding iron shoes located on the side near the corner of the car. The motors are capable of hauling four coaches, but two more motors can be added at any time to haul longer trains, as occasion warrants. A speed of fifteen miles an hour can be at-

tained, but owing to the short stop that has to be made at each station, an average speed of twelve miles is generally figured on.

### Electricity in Mines.

Electric explosion of mining charges permits of an absolutely simultaneous explosion of several charges, which is always desirable from the point of view of the destructive effect produced, and at the same time it avoids the loss of time brought about by consecutive discharges, particularly when they have to take place in badly ventilated workings, from which the smoke and gases produced by the explosion can only be cleared out very slowly. Besides, there is no danger from misfires, and the workings can be immediately approached without fear of the delayed explosion, which is always a possibility with powder fuses. Moreover, there need be no danger from fire-damp, or from the act of firing the fuse. All these reasons, M. P. F. Chalon, writing in *L'Electricien*, thinks, will favor the use of electric fuses. Unfortunately, however, they are very expensive. In France, wire fuses cost 300 fr. a thousand, and the discharging apparatus comes to 400 fr. or 500 fr. High-tension or spark-dischargers are a little more economical, but it is not easy to determine previous to the explosion whether they are in perfect order, and it is necessary that the insulation of the conductors should be absolutely perfect. M. Chalon then goes on to describe a cheap American discharger, which he strongly recommends for adoption in fiery workings in French collieries. The discharger consists essentially of a magneto-electric machine driven by a rack and pinion, so that the action is very much like that of a garden hand-pump, an intermediate gear being provided to give the necessary speed. A discharger of sufficient size to produce twenty or thirty simultaneous explosions weighs thirteen kilogs. (about twenty-eight lbs.), including the strong wooden case. It is designed to work with fulminate detonators up to a distance of about 500 yards. It is tested by connecting up to the terminals a small specially constructed incandescent lamp. A separate apparatus is required to test the fuses and line. A current is sent through the line, not strong enough to heat the wires of the fuses, but sufficient to ring an electric bell if the circuit is in good order and complete. An arrangement is provided for adjusting the current to the number of fuses in circuit.

It has been commonly supposed that the two great enemies of pole lines across country are storms and small boys. During the recent gales and snowstorms long stretches of telegraph lines succumbed, involving enormous expense; but it is said that the incessant depredations of juvenile marksmen cause in the year not less trouble than the wintry blast of a blizzard. In Australia they have a different sort of climatic troubles, and reports come to hand of a light and power company there which not only suffered because drouth deprived its wheels of water, but because severe brush fires burnt down its poles and snapped off the wires in all directions. When to such a state of affairs is added the propensity of the aborigines to whittle down the porcelain insulators into arrow tips and spear heads, it is easy to see that the pursuit of electricity in the antipodes has some disadvantages.

ELECTRICITY has been successfully employed by Dr. M. G. Jenison in checking hemorrhage from the extraction of teeth. The current caused instant coagulation of the blood, and gave relief where the usual remedies were without effect.

AN electric wagon recently went from St. Petersburg to Moscow at the rate of twenty-four miles an hour, much to the alarm of the peasants, many of whom threw themselves on the ground and prayed for safety.

## Practical Information.

### A Study of Flame.

It is the almost universal idea that visible flame is fire in its most notable form; but in fact it is not fire at all. You look into a grate in which soft coal is burning. The flame is leaping in strange, fantastic form fifteen or twenty inches upward from the coal, and with it a good deal of black, sooty smoke. The sooty smoke and the flame are one and the same, with only a difference of temperature. The soot which forms the flame is red hot. It is soot half burned, or rather heated to incandescence but not yet burned—not yet really burned at all. Every particle of the flame is a red-hot coal or particle of carbon. The real fire we do not see; no eye has ever seen real fire. The instant that the carbon atoms become really burned, eaten up by the oxygen of combustion, they are invisible. A particle of the red-hot soot which forms flame contains very many atoms of carbon, and the oxygen eats at them atom by atom, and this atom-by-atom seizure by the oxygen is the real burning, for which the red-hot state is only the preparation.

A soft-coal fire which has died down and apparently gone out may be found twenty-four hours later with red-hot coals "kept," we say, but in fact still burning. The soft ashes closely wrapping them do not keep them alive or burning; they keep them hot enough to let the oxygen go on nibbling furiously at them. The oxygen works inside of the ashes without any trouble, provided only that the red lumps do not get too cold. It, of course, makes fresh heat all the time, and the close wrap of fine ashes keeps this heat right there. The process of such burning is a slow one, but it answers to keep the coal burning.

In burning three pounds of carbon, the heated state of which gives us flame, the fire work is done by eight pounds of oxygen. The oxygen we do not see. The carbon we see only just *before* it is burned; and the result of the burning is eleven pounds of the compound of oxygen and carbon, which the eye cannot see. When a monster steamship burns 300 tons of carbon in coal every twenty-four hours, that means that the 300 tons of carbon are made red hot for burning, and are then consumed by 800 tons of oxygen, with the passing off up the chimneys of 1100 tons of the compound of carbon and oxygen. The heated carbon not yet burned is intensely visible; but as it burns, atom by atom, it ceases to be visible, and the compound of carbon and oxygen is no less invisible, being a gas, each molecule of which consists of a molecule of oxygen (composed of two atoms locked together) into which one atom of carbon has been swallowed, making a three-atom molecule.

The fire belongs wholly to the oxygen. An atom of oxygen is in a state of motion, of spin or whirl like a buzzsaw, only many thousand times faster. These atoms unite in pairs, forming molecules, which have the same spin, only somewhat less swift. It is this lightning spin of the oxygen molecules by which each one devours an atom of carbon, with the effect which we call fire—only the real fire is back of what we see.

The oxygen of the air is a solid cloud of fire; it is essential fire which we breathe. A terrific conflagration only means that this universal fire has found stuff of some kind heated to the degree which prepares it to be consumed. In every case of fire the operation is that of oxygen consuming the atoms of combustibles through that intensity of whirl or spin which all oxygen has, and which is the essence of fire. But the oxygen atom is not a solid atom. It is rather a whirlpool of electric substance or fluid, composed of inconceivably fine atoms in a state of inconceivably rapid whirl. We see a fire start, but in fact there is no start. All the motion that may make to-morrow a conflagration, eating up a thousand square miles of forest, is going on to-day with an intensity very much *greater* than that of a conflagration. In the conflagration every fiery motion is checked by whatever combustible it may devour. The essential fire of the universal air is *greater* while it gives no sign than it is when it gets at work on combustible materials. We cannot too carefully reflect that there never occurs anywhere any new start of motion. What seems a start is only motion, which had existed all along, taking effect as the current of Niagara takes effect on anything thrown into it or launched upon it.

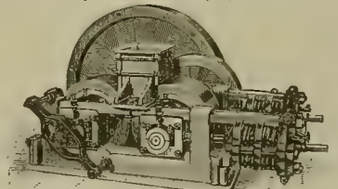
PROF. OSTWALD offers a peculiar speculation which he calls a "chemical theory of the freedom of the will." He regards it as impossible that all natural phenomena should be purely mechanical, as materialists would consider them, for mechanical processes are reversible—they will work backward as well as forward—while natural processes will not. He regards the action of the human will as being precisely like the chemical process known as catalysis, in which an agent influences the time of a reaction without being itself affected. It is exactly thus that the human mind acts on matter, accelerating the chemical and mechanical processes associated with physical activity without any expenditure of energy.

A NEW THERMOMETER has been invented, designed especially for determining the temperatures of difficult or inaccessible places, such as the bottom of the sea, etc. Its action depends upon the well-known fact that different conductors of electricity vary in their resistance at different temperatures, and at different ratios. It has also been applied to measuring the temperature of steel tape, used to establish a base line, instead of ascertaining the temperature of the air, as was previously the custom.—Popular Science.

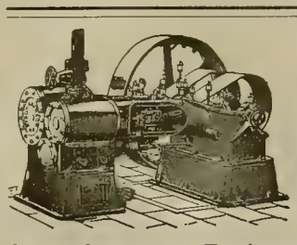
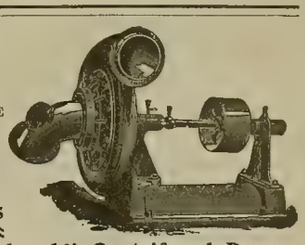

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# Mining Summary.

### CALIFORNIA.

A recent inspection of the great mother lode in California has moved Martin Harkness of Salt Lake to speak of the conditions that prevented the development of this enormous body of free milling gold quartz in the early days. The extent of the vein is 300 feet wide in places and two or three hundred miles in length, and the value of the ore was well known forty years ago, but it then required very high grade ore to pay the cost of production. A miner expected an ounce of gold per day for his labor, and freight transportation from San Francisco to the gold fields was often as high as 50 cents per pound. The stamp mills attempted to be operated were of the rudest construction, the stamp stems being made of live oak beams, roughly shod with iron. In spite of these adverse conditions, the Hayward mine and some others were opened up, and the former has been in continuous operation for forty years and has a mountain of good ore left. Mr. Harkness states that there are many abandoned workings along the vein, which doubtless produced ore not considered profitable in the early days, but which would be regarded as very high grade now. With the application of the cheaper machinery and economical appliances of modern days to the development of the mother lode, he believes its production will exceed that of the whole of South Africa. Salt Lake, Utah, Review.

#### Butte.

In the Golden Butterfly the upraiser has been extended 65 feet; it is believed 20 feet more will reach the gravel deposit; more men will be needed.

The Rock river mines are being prospected.

The Banner shaft is now down 900 feet and will be sunk 100 feet deeper.

NEW MINE TO BE OPENED. — The Golden Channel will soon be opened northwest of Powelton on Butte creek. The channel was struck some years ago and a tunnel was run by Harris & Doon 375 feet. The tunnel will now be extended about 180 feet or until the pay gravel is reached. This mine is believed by old timers to be an extension of the Portuguese channel.

CHEROKEE MINING.—*Mercury:* T. L. Vinton of Cherokee is working about twenty men on the bottom of the Spring Valley Mining Co.'s property, washing out the gravel to the bedrock. Immense quantities of gold have been taken out of land adjoining, and if they could wash the hills down with a monitor, they would give to the world millions of dollars in yellow metal; but they might cover up a few sheep ranches with some slickens, so they simply wash over the rocks or gravel that produces no slickens.

#### Calaveras.

BOSTON-MOKELUMNE HILL. — The Boston mine under the superintendency of Colonel Robinson is making and contemplating numerous improvements. They are constructing a chlorination furnace with a capacity of six tons in twenty-four hours, which will soon be completed. Their shaft is down 300 feet with a necessary sump of more than 50 feet. At 300 they are going to run levels and take out ore to keep the twenty stamps running. In the spring they will add forty stamps to their milling capacity and will put in a large hoist and continue their shaft on down to a depth at which they can keep the mill pounding away. They are preparing to work the ore for both gold and silver, the latter being found in considerable quantity.

PLYMOUTH ROCK. *Ledger:* Thomas Smith, at the Plymouth Rock, who has adopted a process to work the ore by first reducing it to a pulp by milling, without amalgamation, and then treating it with cyanide, virtually the MacArthur-Forrest process, has interested M. P. Morgan and T. T. Lane recently superintendent of the Utica properties at Angels. A ten-stamp mill has been erected, twelve Tulloch concentrators put in and the cyanide plant installed and work commenced about a week ago. They are now treating about twenty-five tons daily which is yielding an average of a little less than $9 per ton. Their assays show that they are saving 85 per cent of the assay value of the ore. At present they are taking their milling rock from a tunnel which enters the hill from a gulch about a quarter of a mile from the Calaveras river. They have crosscut the ledge in this tunnel and find it to be 100 feet in width, about 100 feet from the mouth of the tunnel and about 90 feet from surface.

#### El Dorado.

(Special Correspondence). A San Francisco party last week secured an option on a claim four miles north in the Kelsey district and will begin development work without delay.

A gentleman direct from Cripple Creek is prospecting and bonding property in this neighborhood. He secured an option last week on several claims near Shingle Springs. At present he is over at Kelsey putting men to work prospecting in that region.

The Sunrise ten-stamp mill begins operations to-day. This is about six miles to the north of Placerville.

Work on the Big Tunnel, cutting a number of veins at 900 feet depth in the Gentle Annie group, is progressing rapidly. Melton & Parlow, the owners, are sparing no money in fitting the plant with machinery and equipping it with all the modern methods necessary for successful mining. They are now placing 3000 feet of five-inch pipe to furnish air for the drills and power for the hoisting works. The mine continues its monthly shipments of bullion; but its increased capacity, when completed, will make it one of the great producers of the State.

The Grand Victory last week struck another large body. The new find bears 26% lead and the gold runs over $60 per ton. The continued similarity to this property of the Salisbury, a new plant in course of thorough development, and adjoining the Grand Victory on the south, is causing favorable comment. With 100 stamps on each of these properties, as is now contemplated, they will be among the best paying bullion producers in California.

Work on the Big Sandy, four miles north of here, is progressing very slowly.

It has often been remarked that Eastern capitalists, who take an occasional flyer in mining industries, would not so readily relinquish their mining enterprises if the usual methods applied in the management of mercantile, manufacturing or any other business were adhered to in their mining ventures. Mining and milling ores is not a haphazard affair and should be entrusted to capable and energetic men only, endowed (along with the other necessary qualifications) with prudence and quite a little business ability, particularly when valuable properties are 3000 miles from the men who furnish the bone and sinew of capital for development and construction purposes. These plans followed would save the closing down quite occasionally, and would prevent the condemnation of good and well-paying mines. Capital would not become so chary of investment in legitimate mining enterprises.

J. O'Toole, working at the Taylor mine near Placerville, was struck by a timber while being hoisted last Tuesday and instantly killed. He had been given employment but a few hours before and lost his life by being unable to understand the necessity of keeping his head in and not extending it to look around while the skip was in motion.

Placerville, Cal., Jan. 27, '96.

#### Inyo.

RELOCATED. — *Register:* The Dark Horse mine, fifteen or twenty miles north of Bishop in the White mountains, which was sold to English capitalists a few years ago for $20,000, was relocated this month, the assessment work not having been done. L. E. Girard, M. J. Bradshaw and C. Duarte are the locators.

#### Mariposa.

HITES COVE MINE.—*Gazette:* At the Hites Cove mine, at Minear, the principal work now is development on the lower level, 1000 feet below the surface, at a point 300 feet below the adit tunnel. There are about twenty-six men employed at present, and the mill will continue shut down for the winter. After that, operations will go on upon a more extended scale. There are about 20,000 tons of tailings below the mill, worth from $5 to $7 per ton and these will come in for attention at an early date. For the rest of the winter operations will be principally confined to getting things ready and to exploring by crosscutting and drifting on the vein. There are three parallel ledges in a slate formation. The ore can be mined and milled for less than $2.50 per ton. John I. Minear is superintendent.

About 100 pounds giant powder exploded in a tunnel in the mine last Tuesday, killing three men. The men, Wm. Stern and two helpers, had started to drill a hole for a blast and went to where the powder was kept away in the other end of the drift to prepare the cartridges. How the explosion occurred will never be known, the probability being that one of the unfortunate men dropped a light.

#### Madera.

GRUB GULCH. *Gazette:* The mines at Grub Gulch, about thirty miles southeast of Mariposa, are being started up again. Several men have left Mariposa this week to work there. The principal mine at Grub Gulch, which was once a prosperous settlement, is the Mammoth, which has a complete electrical plant. This power is to be removed to the Healy mine and used there. The Gambette, an important mine, is paying well. In the same group are the Enterprise, the Lucky Bill and several others. The Enterprise is run by water power from the Fresno river, and has a ten-stamp mill. There is considerable activity in mining at Grub Gulch at present, and the indications are that next spring will see a marked revival.

#### Mono.

*Index:* During '95 there were shipped from Bodie, $356,620.71; from Lundy, $102,273.05; Scattering, $7,068.65: Total, $465,962.41.

#### Nevada.

NEVADA CITY MINING DISTRICT.—Activity in Nevada City Mining District during 1895 was even more marked than in that of her sister city, Grass Valley. Probably never before in its history, at least not since the more productive of its mines have become fully developed and the merits of its auriferous veins become known, has this mining district possessed such magnetic force in attracting men of technical knowledge, and capitalists of influence and means. The steady and gradual increase in population and in the production of gold has proved to the world the permanency of our mines and the extent of our prosperity. This may be attributed chiefly to the extensive and judicious circulation of our resources through publications which have been disseminated throughout the principal mining and capitalistic centers of the world. Foreign capital is apparently just beginning to realize the fact that no section of the globe offers better inducements for the judicious investment of capital than does this and adjacent districts. Ephemeral booms such as are boasted of in Africa and Colorado are unknown here, and our people rely entirely on the permanency and uniformly productive character of our veins for their prosperity. It is this fact which cause men who come here to invest in our mines to marvel at our resources and wonder why they have not been more thoroughly advertised in the past. Once they become interested there is a fascination which holds their attention and which makes it almost impossible to relinquish their interest. For this reason we generally manage to retain the capital introduced into our district.

The greatest scene of activity during the past year has been on Deer Creek. In this vicinity there is a network of auriferous veins which it would be difficult to duplicate in any part of California. Situated on the various veins is a group of mines within a stone's throw of each other which have become celebrated for their depth and production. This group includes the Providence, Champion, Mountaineer, Wyoming, Cadmus and Home mines, all of which are in active operation and employing a large number of men. The Providence is among the foremost mines in the State in point of production and depth. It has already attained a depth of over 1800 feet and has to its credit the magnificent sum of $6,000,000, which but few mines can equal. Developments have progressed so rapidly within the past few months that the present mill of 40 stamps is incapable of treating the ores extracted, and it is rumored that forty additional stamps will be erected in the near future. If this plan be carried into operation, it will double the output of the mine and require the services of a much larger force to supply the increased capacity of the mill. It will also give the Providence company one of the largest and best equipped mills on the Pacific coast. The vein carries such a high percentage of sulphurets that the company found it expedient to have them treated at the time, and for this purpose an elaborate chlorination works was constructed. During the past year a new and expensive pipe-line has been laid, which guarantees a powerful and continuous supply of water for motor power.

What is true of the Providence mine is equally true of the Champion mine, which is situated on the opposite side of the creek. This mine has made phenomenal progress during the past year, under the efficient supervision of Frederick Zeitler. It will be remembered that two years ago the Champion Co. was enjoined by the owners of the Wyoming mine. It was stated by the owners of the Wyoming that the former company were encroaching on their mineral rights. This necessitated the suspension of operations for several months and resulted in costly and protracted litigation. The matter was finally amicably adjusted by the purchase of the Wyoming property by the Champion Co., the purchase price being $80,000. The last installment of the purchase price was paid a short time ago and was the product of the mine. In fact, we are given to understand that the entire sum paid for the Wyoming property was extracted from the mine, besides the amount which it took to liquidate the indebtedness incurred through litigation, which is said to be something enormous. In addition to this, arrangements have been made for the construction of an additional forty stamps to the mill. This will make seventy stamps in all. The mill is now in course of erection and when completed will be one of the finest in the State. In the near future we shall witness a material increase in the production of the Champion and a corresponding increase in the happiness and prosperity of our people.

At the Mountaineer mine numerous improvements have recently been made—improvements which, when completed, will place the mine amongst the most prominent gold producers of this district. New pumping and hoisting machinery has been erected, which will develop the mine to a great depth. At the present time the shaft is being sunk below the 800-foot level and considerable stoping is being done. The mill, which contains twenty-five stamps, is kept busy night and day. The mine has been a great producer and Mr. Dennis, the superintendent, has unlimited confidence in its future success. It is expected that it will greatly increase its production during 1896.

At the Mayflower mine, which was purchased less than two years ago by Lane, Hobart, Haywards, et al., phenomenal progress has been made. A complete transformation has occurred. The old mill of four stamps has been superseded by one of twenty stamps which is enclosed in a commodious building and which contains all the modern appliances. A new hoisting works and pumping plant have been erected by the new company which are capable of developing the mine to a depth of 2000 feet. The property is regarded as one of the most promising and productive of the mines of this famous district.

In close proximity to the Providence mine are the Cadmus and Home mines, both owned by a San Francisco company, at the head of which is Mr. Charles Stepp, of Geary street. These mines are being resuscitated under the management of Charles Kahl. They were formerly very productive, in view of the meager manner in which they were developed. In the past few months competent and substantial machinery has been erected on these mines, and the formal christening, which was attended by about forty stockholders from San Francisco, of the machinery was made the occasion of much rejoicing by our people. A very prosperous career is predicted for these mines, and it is safe to say that in the future they will greatly add to the output of the district.

Another of the abandoned mines of Nevada City that has been rehabilitated during 1895 is the Gold Tunnel. This is one of the oldest mines in the district and was located in the early fifties by Capt. Kidd and others. For years it was very productive, immense fortunes having been made by those interested. But it fell into incompetent hands and was finally abandoned through mismanagement. On the 1st of last June the writer, in conjunction with three other gentlemen, secured a bond on the property and since that time extensive development work has been done, with the prospect of the mine eventually becoming a valuable property. The ore in this mine is of a very high grade, paying as high as $500 per ton, with a fair percentage of sulphurets.

Negotiations are now pending for the purchase of the Nevada City and Chapman Ranch mines. These mines are in close proximity to each other, and worked conjointly would undoubtedly develop a valuable property. For years the Nevada City has been a very productive mine. The ore is of a very high grade, and the sulphurets vary from $100 to $400 per ton. It is believed that the negotiations now under way will prove successful and will result in material benefit to the community.

The Federal Loan mine bids fair to be very productive during the current year. Recently a vein was encountered which proved to be very rich in free gold and sulphurets. If this vein continues in depth it will put this mine on a dividend-paying basis. All the other mines now in operation have a fair production and are progressing steadily. From this resume it will be observed that Nevada City is enjoying an era of unbounded prosperity, with the promise of still greater things in the future. SAMUEL BUTLER.

Nevada City, Jan. 28, 1896.

DAM DESTROYED.—Grass Valley *Tidings:* The dam recently completed at Omega has been almost ruined as a consequence of the late storm. The dam was constructed by consent of the Debris Commissioners, and hydraulic mining would have been started in the spring. During the storm a great body of water accumulated back of the structure, and upon advice of one of the inspectors, who was on the ground, a cut was made near one end of the dam to let off the water. It was soon seen that this was a great mistake. The flowing stream gradually wore a large channel in the earth, and last Sunday night a cave occurred which carried away the foundation of a portion of the dam, and before the break could be stayed, 100 feet of the dam had been demolished. The dam was 160 feet long and 65 feet high. The mining ground had been leased to Chinamen, who were about to begin hydraulicking. The cost of the dam was nearly $10,000.

A BIG SUIT.—The suit of the Carson City Mining Co. against the North Star Mining Co. is now on trial in this city before Judge Beatty in the U. S District Court. The plaintiff asks for $825,000 for ore alleged to have been extracted by defendants from its ground during three years prior to Sept. 13, '94, the date of commencement of the suit. It is the old, old question of apex and side lines and extra lateral rights, which means much for mining lawyers.

#### Placer.

*Argus:* The heavy rain of last week caused a landslide at the Osborn or Gaylord mine, and in consequence a large portion of the tunnel was covered up.

Col. Davis has completed a contract for putting in a 85000 electric plant at his Texas Bar mine, adjoining Mammoth Bar. The work will be done under the instruction of Howard Davis, who is general superintendent of his father's properties.

P. M. Ninas, an Ophir miner, picked up a five-ounce nugget the other day.

#### Plumas.

THE SHENANDOAH. — Plumas *Independent:* Supt. S. K. King writes that he will return from Oakland about the first of February, about which time Mr. Smith, son of the late president, will arrive from Denver and the future policy of the company determined.

#### Shasta.

A TALC MINE.—W. R. Conant on his ranch below Castella has a rich body of talc. The paper mills in the East have to ship it from Japan. A few carloads from Mr. Conant's mine have been shipped to the paper mills in Oregon and it was found to be a better quality than the imported article, the Dunsmuir *News* says. On Mr. Conant's ranch there is a whole mountain of it.

HARRISON GULCH.—*Free Press:* At Harrison gulch, Conant, Fowler, Benton and Rhodes, since the 25th day of October '95, put up a mill which milled 160 tons of ore netting 287 ounces of amalgam, valued at $17.50 an ounce, or $4029—more than enough to pay expenses.

IMMENSE HORSE POWER.—At Keswick the Mountain Mines Co. now contemplate the erection of eleven furnaces instead of six as at first intended. This will almost double the productive capacity; the required horse power will be 1500. The company intended to locate a power at the junction of the Pit and McCloud, but found that Fitzhugh of San Francisco has located a water right there ahead of them.

When Iron Mountain was first discovered there were those who said that it was the biggest mine in the world and it looks as if time would make those words prophetic. The Anaconda works at Montana will not be more extensive when those at Keswick are completed.

R. G. Hart will add five stamps to plant at Hart shortly, making twenty-five stamps in all. The rich ore in his shaft 200 feet below the 900-foot level continues. This ore body, nine feet thick, is directly under the apex of the mountain. This is the deepest mine in Shasta county.

NEW MINING CORPORATION.—The Old Spanish Mining Company has incorporated; T. J. Taylor, president; F. H. Deakin, vice-president and treasurer; O. S. Cressby, secretary; F. J. R. Dawson, superintendent.

They have a shaft down on an 8-foot ledge 100 feet, and there are at least 400 tons of ore in sight that will average $10 per ton. In the ledge, at the bottom of the shaft, they have found a vein of sulphurets 14 inches in width and widening. The company will erect buildings and hoisting works and let contracts for the remodeling of the present shaft, and for sinking to a depth of 200 feet. They will then put up a mill and work their own ore. The sulphurets will be taken to the smelter of the Mountain mines, at Keswick.

SLIDES AND WASHOUTS.—The heavy rains have played sad havoc with the Iron Mountain railway. The blasting necessary to build the road loosened the earth, and the soaking rain has caused numerous slides all along the line, they being the deepest where the banks are the steepest. Many of the culverts have also been filled with dirt, causing the water to overflow the road. While this is to a certain extent discouraging, yet they are simply having the same experience as the Southern

Pacific when their road was extended beyond Redding. These slides will occur from time to time for a year or more, and it will probably become necessary to enlarge the culverts. The broadway has not been ballasted, and until it is there will be more or less trouble. It is doubtful if the company gets its works in operation much before May or June.

### Sierra.

GRASS FLAT. Corr. *Messenger*. The Thistle Shaft mine is employing a large force of men.

The Taber mine is expected to resume operations under a new management, in the spring.

The Pioneer mine at Grass Flat is working twenty men.

The Treasure mine at Gardner's Point has been ceased for ten months. The leasers are fitting up the old works and have 500 feet to run before striking new ground.

### Siskiyou.

CENTRAL NOTES. *Journal*. A large majority of the smaller mines in this county, we have not been started up yet, will commence immediately, now that the heavy storms are past. Many of the mine owners would not risk turning the water into their ditches until there was no danger of damage.

The Blue Gravel mine, at Greenhorn, is now employing twenty five men, who are taking out a great deal of dirt, which the proprietors expect will pay handsomely.

At the Barley & Carrick mine on Greenhorn, the force is busy taking out quartz, and by the time the owners of the mine can get the quartz down to the mill for crushing, they will have over 1000 tons out. The rock from this mine has always paid well, and it is expected the quartz which they are taking at present will average better than any former crushing.

The Mint mine near Yreka, owned by Herr and Van Nader, has been leased to Brown and Thompson for one year. The new proprietors are busily engaged in taking out quartz.

The dredging apparatus tested in the Sacramento river and other streams for raising pay gravel, is to be tried next season in the Klamath river. By dredging any part of the river can be prospected to the bedrock, and if not paying well, the dredging boat can be moved to another point for anchorage. It is claimed the scoops will dig down into the bedrock some distance, especially if soft, and thus reach the crevices in which such great quantities of gold is often found.

### Tuolumne.

SONORA. *Independent*. At the Star mine a ten-stamp mill is running constantly. Mr. Gates' new plant for saving sulphurets is completed and in use. Mr. Wilmans, the general manager, and Wilbur Long, the superintendent, are pushing the work of development ahead with energy.

Some rich ore has been struck in the Alameda mine. From the crosscut at the lowest level opened, a contract had been let, to drift along the vein, to the north, for 200 feet, and within this section the rich rock was struck. The mine was bonded by M. B. Harrison some time ago to Hugh McDonald for $30,000. The bond expires in April.

### NEVADA.

THE BUCKEYE MINING DEAL. The Carson *Appeal*, talking of why the placer deal, by which Hayward, Lane and the Hobart estate intended to buy the Buckeye mines at a big price, was finally declared off, says: "It was not the fault of the mines, but the innate, copper-plated hogishness of the people in the vicinity of the claims. Within a few weeks after the sale was announced people rushed in and began locating the ground where the hydraulickers would naturally need a dumping ground. These locations were made on agricultural ground, including Tim Smith's ranch and a mile beyond. Seeing that a move was on foot to compel the mining company to pay any price the owners wanted for this ground or be pestered with law suits, Lane and Tozier, to head off the game, decided to use the west side of Mt. Seigel for a dumping ground. This got out, and inside of a week sixteen hundred acres were located west of the mountain by parties who thought they had a dead cinch on the company. It was here that Mr. Lane saw that he was surrounded on all sides by parties who simply expected to have him put up the capital and do the work, while they took a share of the profits. He decided to throw up the whole thing and fool the hogs. It is this sort of business that has for years driven capital away from Nevada, and as long as this game is carried on Nevada will remain in the dumps."

### LINCOLN COUNTY.

*Tribune*: H. A. Cohen, who manages the De Lamar properties at De Lamar, has bought a large amount of mill machinery which will increase the output of the mines by over 200 tons daily. At present the output is 65 tons. With the additions that are being made to the mill, it can be made to reach 300 tons. The ore is of a peculiar character, requiring fine pulverizing for successful treatment.

### ESMERALDA COUNTY.

A GLOOMY OUTLOOK.—A correspondent of the Hawthorne *Bulletin* from Silver Peak, Esmeralda county, speaks thus gloomily of the outlook for that camp: "Silver Peak proper is very dull at present. Another cloud has come over prosperity. An injunction was served on the company a week ago and everything was shut down awaiting the action of the courts. Prior to this time, we were enjoying prosperity and things looked as though we were on the way to happiness and peace. Now all is in doubt, and we can only hope for a speedy settlement of the controversy, when we will be able to go on producing and assist in the development of old Esmeralda."

At the annual meeting of the Belcher Mining Company 77,587 shares were represented. The following were elected to serve for the ensuing year: James Newlands, president; A. K. P. Harmon, vice president; and J. P. Martin, George D. Edwards and James Newlands, Jr., trustees. C. L. Perkins was re-elected secretary, his financial statement showed an indebtedness of $2941.63. W. E. Sharon was re-elected superintendent; his report showed that during the year they had extracted from the mine and shipped to the Brunswick mill for reduction 1610 tons and 650 pounds of ore, taken principally from the old stopes on the 1000 and 1150 foot levels.

### OREGON.

A KAOLIN MINE. At the kaolin mines at Mosier, Wasco county, there is apparently no limit to the amount they are capable of supplying. The product is valued at $50 per ton at the mines. The mine at Mosier is operated by a tunnel run into the side of the mountain and the cost is apparently light. Thirty-two tons were shipped to New York in '95.

The manager of the Black Gold Channel Mining Company says Chicago capitalists are contemplating the construction of a ditch from the headwaters of Rogue river, to supply water for the use of the 3000 acres of mining ground on that creek. A preliminary survey of this ditch has already, at a cost of nearly $2000, been made, showing the feasibility of the scheme; and the estimates of the amount of rock work, etc., required, and of the probable cost have been forwarded to Chicago.

### WASHINGTON.

A SQUAW CREEK MINE. A recent carload shipment of ore from the Friday mine in the Squaw Creek district went $86 a ton, says the Okanogan *Outlook*. They are now running a tunnel to crosscut the ledge at a depth of about 150 feet. This is one of the best "poor man's" prospects in the county.

NO DRILLS OR POWDER. *Spokesman-Review*: The Deer Trail No. 2 mine, about forty miles north of Davenport, owned by C. C. May and F. H. Luce, has shipped $35,000 worth of high grade ore the last season, and will, as soon as transportation permits, ship about fifteen cars of ore monthly. There have been no powder or drills used in the mining. Picks and shovels are all that is required. It is knocked down, broken up and put into sacks for shipment. There are six tunnels on the property and fifteen men are at present employed in working it. The ore is hauled to Davenport and from there it is shipped to Tacoma. The rock is of such a character that the owners are compelled to timber the mine, and this is the greatest expense.

### BRITISH COLUMBIA

PILOT BAY SMELTER.—The smelter at Pilot Bay, from March to December 30, '95, shipped 3220 tons of bullion to Aurora, Illinois, for refining. During the year the smelter company transported 52,000 tons of ore and lime rock from the Blue Bell mine, and purchased 2500 tons of ore of the value of $156,464 from outside mines. Since July 10, 1894, the company has expended, for machinery, labor and purchasing ores, over $650,000. During 1895 the company employed over 200 men daily, and paid out for labor $170,000. It also paid out during the same time over $85,000 for supplies, $70,000 for duties and $92,500 for freights.

### UTAH.

The Anchor mine near Park City is producing second-class ores which carry a big per cent of zinc. Some years ago it became necessary to throw off much of this metal to bring the concentrates within the commercial demand, so the jigs were set for that purpose, and thousands of tons of zinc were run down the creek a few miles, to be caught by dams thrown acsoss the gulch. Later the jigs were arranged to save this zinc, mixed with silica, afterwards to be piled in a great dump by the side of the mill. At the last annual meeting of the company, in November, the manager—David Keith—reported that "the tailings of the mill, amounting to over 16,000 tons, averaging 8.4 per cent lead, 10 ounces silver and from 26 to 30 per cent zinc, and consequently unmarketable, have been sold under a contract at $1 per ton as it lies.

LARGE CONTRACT LET.—*Tribune*: Vice-President W. R. Busenbark and Manager Kislingbury of the East Golden Gate Mining Company have let a contract for a 200-foot shaft, to be sunk on their group, situated east of the De Lamar property, to John Lynch & Co. It is to be a large, double-compartment shaft 4½x9 feet in the clear. The company furnish framed timbers and pay $9.50 per foot for the work. Some time ago Manager Kislingbury advertised for bids for this work, but contractors were afraid to take hold, fearing that a vein of water might be tapped and make it a very unprofitable venture. Messrs. Lynch & Co. refuse to bind themselves to sink more than 100 feet at the same figure should water impede their progress. Manager Kislingbury says the company will erect a large shaft-house, and a suitable engine will be in position by the time Lynch & Co. have completed their contract for the East Golden Gate Company to sink 500 or 600 more, where they expect to strike the main ore body.

### IDAHO.

Mt. Home *Bulletin*: Supt. Thompson, of the Bear Creek Alluvial Gold Co., at Rocky Bar, departed for Scotland Friday evening, where he will spend the remainder of the winter, expecting to return in March to renew work on this gold mining enterprise. During the past season he has constructed over 2,000 feet of double flume along Bear creek and removed innumerable tons of big boulders with a steam portable derrick. He has expended nearly $50,000 getting this property in good working condition, and has that much more at command. Next spring a ditch will be constructed to convey water from the head of Roaring river to the Red Warrior divide, a distance of twelve miles, for the company's use.

THE HIDDEN TREASURE.—The *Statesman* was recently shown figures giving results from a quantity of ore and concentrates shipped from the Hidden Treasure mine, near Boise, in Neal district, to Salt Lake. They were 11,894 pounds of concentrates and 1879 pounds of raw ore. The concentrates yield $82.62 a ton and the ore $156.54 a ton.

### MONTANA.

BOSTON & MONTANA.—*Mines*: Captain Couch is now preparing his annual report of the operations of the Boston & Montana Company for the past year. The company produced about 10,000,000 pounds of copper during that period. The company last week declared a quarterly dividend of $2 per $25, payable Feb 20th, to stockholders of record, Jan 21st. With this payment, $8,775,000 will have been paid in dividends to date.

### SOUTH DAKOTA.

A NEW ROASTER. At the Golden Reward mine, near Deadwood, the Brown roaster is now in successful operation. It is an elliptic, reaching around the building, 258 feet, the ore bed raised above the ground about three feet, resting on a foundation of brick work. There are two rails, one on the inside and one on the outside of the ellipse, upon which carriages are run, propelled by a cable running around the inside of the curve. One hundred and eighty feet of the ore bed is covered with a brick arch, with four fire boxes at intervals, so placed that their heat is driven through between the bed and arched roof. The ore, which is ground to a thirty-mesh fineness, in the main building, is carried to the roaster, where an automatic feeder lets it in by gradual feeds. There are four carriages with shovels that resemble a farm cultivator, being wide enough to cover the eight foot surface of the ore bed, and when a carriage goes into the roaster it trips the feeder, allowing ninety-two pounds of ore to fall into the roaster, and the shovels onto the machine, which goes right on through at a steady measure, keeping the ore moving gradually until it is finally swept off the end of the bed onto an elevator that carries it up into the solution tubs. The shovels on each carriage mismatch the ones upon all the others, so where one set leaves a ridge the next splits it, thereby keeping the pulverized ore evenly distributed throughout. The last seventy-eight feet of the ore bed is open, and it is here that the ore is cooled sufficiently to be handled by the elevator. A carriage goes under the feeder every fifty-five seconds, taking in with it ninety-two pounds of ore, which, reckoned by the day's run, would approximate sixty-five tons. It is estimated that the ore is under heat for eight or nine hours, as it is moved but a few inches by each carriage. There is a brick ridge between the car tracks, and cable pulleys, and the ore bed, and but little heat is felt by the track and cable, although within a few inches, and in view, the heat is intense, the brick shield being a breaker of the heat, which is directed much as is the heat of a blacksmith's forge. The gearing of the carriage is ball-bearing.

### WYOMING.

The Casper *Derrick* reports having sold over 1000 oil placer location blanks during the first two weeks of this year, which indicates pretty lively times among the oil prospectors of central Wyoming.

### COLORADO.

Golden is to have a concentrating works with a capacity of 50 tons per day.

An English syndicate with a capital of $10,000,000 proposes to drive a tunnel which will cut Pikes Peak at a depth of 5600 feet.

The new smelting charges have compelled a good many leasers in the Aspen mines to stop work. A grade of ore that netted them about $8 per ton last year barely nets them 15 cents a ton under the new arrangements.

The gross value of the output of the Isabella properties last year, according to General Manager Freeland's annual report, was $362,220.22, and the net profit $160,456.77. Mr. Freeland sends a form of lease and a blank report which appears superior to anything of the kind heretofore received. The blank report is a model of completeness and utility, and is worthy of reproduction, did space permit.

The main vein has been opened for a length of 1800 feet and to a depth of 400 feet. The large area of unprospected ground is being developed under short-term leases. The plan of development comprises four shafts in a row at 800 feet intervals. Three of these have steam hoists. The company has 1500 feet of shafts, 7776 feet of levels, and 2935 fathoms of stopes.

During 1895 there were hoisted from the Buena Vista shaft 9645 mine cars of first-class ore, 4064 cars of second-class, 6629 cars of third-class, 3394 cars of fourth-class, and 9224 cars of waste, a total of 32,956 cars of ore and waste, and 13,478 cars of water, a grand total of 46,434 cars. A car holds about three-fourths of a ton. The expense of mining per gross ton of ore mined in 1894 was $17.78. In 1895 this was reduced to $16.21 per ton.

Total cost, based upon the cars of ore and waste hoisted during 1895, was $3.53 per car, being a reduction of 43 cents over last year.

The average net value of the smelting ore in 1894 was $52.03, and in the first half of 1895 was $62.27, and in the second half $121.07, and in the last quarter $132.64.

The gross value of the ore product of the company for 1895 was $362,220.22. Deducting cost of treatment, sampling, transportation, royalties to lessees, etc., the net profit at the mine was $160,456.77.

### NEW MEXICO.

Silver City *Enterprise*: The Graphic Mining Company has filed articles with the territorial secretary. Incorporators, H. LeB. Mills and Singleton M. Ashenfelter, of Colorado Springs, and Charles H. Curtis, of Hanover, N. M.; objects, mining and kindred pursuits; capital stock, $2,000,000; life, fifty years; directors, J. B. M. Grosvenor, John R. Stuyvesant, T. G. Gordon of New York City; Charles H. Curtis and A. E. Dawson, of Hanover, N. M., principal place of business, New York City, with a New Mexico office at Hanover.

### MINNESOTA.

A BIG SUIT. In the United States Court of Appeals, Judges Caldwell, of Arkansas, Thayer, of St. Louis, and Sanborn, of Minnesota, sitting in bank arguments were begun this week in a big case. J. D. Rockefeller, president of the Standard Oil Company, is the defendant. The amount involved is approximately $1,000,000. At the trial of the case on its merits, in the United States Circuit Court, sitting at Duluth, before Judge Riner and a jury, a verdict was given for the plaintiff, Alfred Merritt, Jr., for $40,000. Mr. Rockefeller's interests are represented by George W. Murray, of New York, and associates. The plaintiff is represented by A. A. Harris, of Duluth, and associates. In August, 1892, the Merritts, who had the controlling interest in some iron mines in St. Louis county, Minnesota, valued at $10,000,000, went into a deal with Rockefeller. A new company was formed, known as the Lake Superior Consolidated Mining Company, and the Merritts received stock in the new company in exchange for their interests. Merritt, in his original bill, charges that he and his partners were inveigled into the deal by the fraudulent representation of Rockefeller as to the value of the properties he controlled. He alleges that Rockefeller represented his mines to be in a prosperous condition, whereas the contrary was the case. That while Rockefeller agreed to a valuation of $10,000,000 on the Merritt properties, they were easily worth between $13,000,000 and $14,000,000, and that they subsequently discovered that while they yielded their interests for stock in the consolidated company, Rockefeller retained for his part bonds secured by first mortgage bonds to the value of $4,000,000 on the properties, to which stock held by the Merritts were subject.

### ARIZONA.

LA FORTUNA. *Sentinel*: Mr. Lees, the head millwright of the Utica mine at Angels Camp, California, owned by Mr. Lane and associates, passed through here Tuesday night with several assistant millwrights en route to the La Fortuna mine, bonded several months ago by Mr. Lane and R. M. Straus.

On his arrival at the mine he immediately commenced to lay the foundation for a twenty-stamp mill and now with his assistants is rushing it to completion and in a very short time the mill will be pounding out gold. There are now employed at this mine, developing it, about 30 men. Hauling the timbers from Blaisdell station, twelve miles southeast of this place on the Southern Pacific Railroad, to the mine, across the sterile mesa to the foot of the Gila mountains, a distance of sixteen miles, is engaged thirty-eight head of horses with drivers and wagons.

The English company, which has been in the past operating extensively in Harqua Hala, has taken down the air compressor and hoisting works and ceased operations, giving a lease on the properties to Arizona miners, receiving a royalty on the output, and will devote attention, so far as that camp is concerned, to milling only.

### LOWER CALIFORNIA.

THE CEDROS ISLAND MINES.—The Cedros island mines are sold to English and California capitalists. The mines were bonded a year ago by the Cedros Island Mining Company to H. A. Howard and F. Robbins of San Diego for $15,000. They were worked for some time, the ore transported to National City to the ten-stamp mill of the company, and there worked, but owing to the refractory nature of the ore it was found impossible to treat it with a profit, and the mines were shut down. The company owns the most promising prospects on the islands, embraced in a concession obtained from the Mexican Government. The principal owners in the company are L. S. McClure and C. B. Richards of San Diego. There are about 5000 tons of tailings at the National City mill, which will pay $12 per ton if properly treated. It is understood that the purchasers have a new method of treating the ore which they are confident will prove a complete success.

The above was condensed from recent extended accounts of the transaction. The following was received this A. M.:

SAN DIEGO, CAL., Jan. 28, 1896.

MINING AND SCIENTIFIC PRESS:—The article published in the *Chronicle* of the 25th, purporting to be an account of the sale of the Cedros island mines, is untrue in every particular. It was furnished to the *Union* of this city by an alleged assayer and metallurgist of this place and was manufactured out of the whole cloth for the purpose of injuring the property and handicapping a pending sale. Mr. Frank Robbins has no interest whatever in my bond on the mines. The property has not been sold. Yours very truly, H. A. HOWARD.

[This is here published only to show why the MINING AND SCIENTIFIC PRESS so often declines to publish sundry statements sent in relative to the alleged sale, disposition and working of mines, big strikes, glittering prospects, etc., till opportunity is afforded for inquiry and investigation. This is done in the interests of the parties themselves, primarily, and to preserve its general reputation for accuracy and reliability. Its desire is not so much to have "the very first news" of a mining transaction as to have it correct and authentic, for it very often happens that serious injustice and injury is done to deserving property by false or misleading statements regarding it. We are personally cognizant of instances where premature and incorrect publicity has spoiled a mining transfer of a perfectly legitimate nature, though as a general thing it is the frauds and fakes with which the mining world is infested that suffer the most from publicity.]

### MEXICO.

#### SONORA.

MINAS PRIETAS.—There are ninety stamps at work in the three mills; additional stamps

are contemplated. It is evident the large ore bodies in the Creston and the Minas Prietas cannot be handled by the forty stamps of the Prietas mill.

The Verde mine has been running two Huntington mills for the past twelve months, but shortness of ore stopped one, caused by neglect to prospect and keep on the ore. Diamond drills are now at work prospecting.

The Creston is the principal mine in the camp, and is down 900 feet with a double compartment vertical shaft. The vein inclines until at a depth of 300 feet where it is upright. This property has been developed under Sterling Mahan's direction. It is timbered with heavy Oregon pine.

The stations in the mine show the ore bodies on all sides and are 40 or 50 feet square. Electric lights are used. In some places crosscuts have been made fifty feet and no foot or hanging wall is seen.

Conservative men say it will average $30 in gold and $40 in silver.

The tailings of the ore is going through roasters lately erected by J. H. Magruder for the company.

The Minas Prietas mine joins the Creston and was bought for $65,000, including the forty-stamp mill. Report says the mill ran on the Prietas ore one month and paid the purchase price.

The process of working the Creston and Prietas ores is by amalgamation.

The Amarillo mine has a twenty-stamp mill at work.

### SIAM.

MINING IN SIAM.—Mining of tin ore on a small scale is developing more activity at present in the northern part of the Malay peninsula, likewise the digging of rubies near Chantabun. Most of the concessions granted for gold and coal mining during the last five years have been forfeited and never renewed, because the prospectors could not raise the necessary capital. The Goldfields of Siam Co. of London, which had commenced to operate the gold mines at Bantapan in 1888, became defunct after losing the entire capital stock. The Sapphires and Rubies of Siam Co. of London liquidated after working three years without profit. The concession of the latter was bought by the newly organized Siam Exploring Co. of London, with a capital stock of £100,000. In the southeastern provinces of Siam, on the line of Cambodja, a Parisian syndicate has bought the three gold mines of Wattana, Buckhanon and Sakeo, which were operated formerly by Siamese. French experts are of the opinion that the enterprise will furnish good profits. The French intend to buy also the English gold mine Kabin, which is situated in the neighborhood.

### SOUTH AFRICA.

A LONDON OPINION ON JOHANNESBURG AFFAIRS.—We hear by cable that the mines are said to be at work again, but this must be taken *cum grano salis*. There is a difference between a mine in full work and a mine in work. The mine in full work is developing as fast as it is stoping. It is keeping its cyanide works in operation and performing the thousand and one other duties that are implied by the expression—"A properly managed mine." A mine in work may be merely keeping the mill going on ore reserves in the ore bins, and there may be no development. In other words, the mines may mostly be living on their reserves, which cannot go on indefinitely.

We prefer to take an opinion between the two extremes, and believe that the Randt mines, without exception, are as short of labor as they were during the whole of December, before the revolution commenced. We shall not be surprised if the January output is reduced by one-half, and it will take at least three or four months (assuming there are no further disturbances) to put things on their old footing again. Meanwhile, it will relieve us to hear that the mines have been kept free of water; for if that is the case, not much, if any, permanent mischief has been done.

Some of those who have been "run in" have not raised arms against the Boer government, but merely taken precautions to defend themselves. After those who were opposed to the Government had been agitating for some time a lot of the better class citizens united for the purposes of mutual protection and the defense of the town in case of riot. We fancy the upshot of the arrests will be this: that four or five of those arrested will be banished from the State for five years, their property in the State confiscated and that about two-thirds of the lesser lights will be let off and the remaining third fined in sums varying from £500 to £5000, which they can well afford to pay. If they cannot, there are those who will subscribe to pay it for them.

The Government has evidently its knife into Mr. Lionel Phillips, who, as President of the Chamber of Mines, made the speech which is supposed to have sounded the signal of revolt. For a long time Mr. Phillips and his firm (Werner, Beit and Co.) were on the best terms with the Government, but latterly their relations have become strained, and then the whole weight of the firm was thrown in against the Government. It is unquestionable that Lionel Phillips and his immediate *entourage* are those against whom the chief animus of the Government is directed.

Our ideas of the punishment (as above) to be meted out is merely a forecast, but first of all the alleged delinquencies will have to be tried by the High Court of the Transvaal.

Though opinion is pretty unanimous here in favor of the action of Mr. Chamberlain, it is divided on the other side. His proclamation was the chief engine that destroyed the hopes of the Johannesburgers. If it had not appeared, and if Sir Jacobus de Vet, the British agent, had followed his instructions and gone out to prevent Jameson attempting to pass the cordon of Boers, Johannesburg would be in a state of quietude, and those who are now languishing in gaol would probably have been at the President's residence at Pretoria, discussing methods for the amelioration of their lot.—London Mining World, Jan. 18th.


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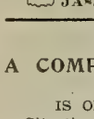
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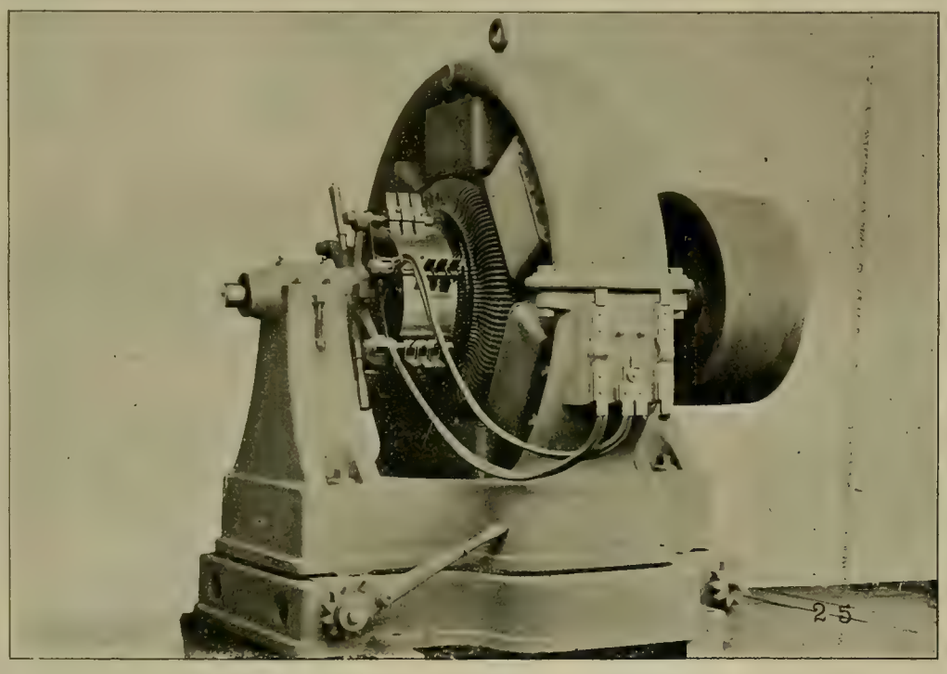
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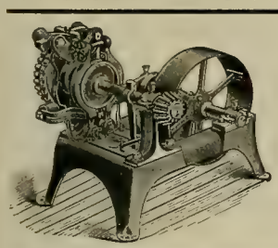
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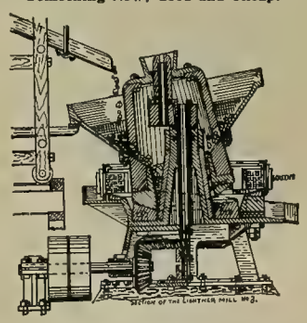
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A Department of Electrical Engineering

Has been established under thoroughly qualified instructors. The course is thoroughly practical. Send for Circular. C. S. HALEY, Sec.

## Coast Industrial Notes.

—The Los Angeles Oil Exchange has advanced the price of crude oil from 30 to 50 cents per barrel.

—The lightship Umatilla Reef, the first electric lightship on the Pacific coast, is being built at Portland, Or.

—Moran Bros., Seattle, who have a Government contract, are making big preparations to go into the shipbuilding business.

—The General Electric Co. has about forty men finishing work on the forty miles of wire for the Fresno electric transmission system.

—The Roanoke, which arrived last week from New York, has on board 5000 tons of rails for the San Joaquin Valley railroad, which will be taken to Stockton on barges.

—The Senate Committee on Commerce has reported favorably on Senator Squires' bill providing for the construction of two revenue cutters for service on the Pacific coast.

—Two 100 H. P. gasoline engines are being built by the Golden State and Miners' Iron Works—one for the steamer Newark, the other for the schooner Barbara Hernster.

—Nearly 300 men are now at work at the Harbor View works of the Fulton Engineering and Shipbuilding Works. They are now building a new steamer, the President, for the Alaska Packers' Association, 140 ft. long, 30 ft. beam, with 350 H. P. triple expansion engine.

—About 750,000 barrels of beer are annually brewed in this State, of which amount three-fourths is produced in San Francisco annually. The business annually uses up 100,000,000 pounds barley and 1,000,000 pounds hops. About 1200 men are employed in the manufacture.

—This week the directors of the S. F. & S. J. V. R. R. let contracts for 18,000 tons of steel rails, 150 flat cars, in addition to 100 already ordered, and $100,000 worth of plates, bolts and spikes, aggregating nearly $700,000. Sufficient material is now ordered to build the road to Bakersfield.

—The Bancroft library of this city has been offered for sale to the New York public library corporation. Although estimated to be worth $500,000 by its owner, Hubert Bancroft, the price asked for it is $300,000. It contains about 60,000 volumes and manuscripts, all relating to the Pacific coast region, from Alaska to Panama.

—The gratifying advance in wheat, though partially checked, justly encourages that great California industry. From 80 cents to $1.15 per cental means a little over $5,000,000 more received by the California grower every year. Argentine speculation and an almost total Australian failure are among the causes for the recent great advance in California wheat values.

—S. M. Knight of Sutter Creek is having built a dredger bucket of his invention, to be operated by compressed air, for the San Francisco Bridge Co., for use in excavating on Puget Sound. It has a 75-ft. hoist and has an estimated capacity of 1000 cubic yards per day. It is said to be the largest bucket of the kind ever built and has cost nearly $3000.

—A new line of business has recently been opened on this coast—the manufacture of machine oil from sharks' livers. Three Norwegians have bought a boat and claim they can catch all the sharks they can handle. They find them in schools north of Cape Flattery. Only the livers are utilized in making oil. The *Lumberman* says the oil sells for from $10 to $12 a barrel at wholesale on Puget sound. It makes a fairly good oil for slow running journals.

—The Panama Steamship Co. is going out of business. For the last six weeks the company's employes have been chiefly engaged in winding up the corporation's affairs, and the leases on the two other steamers of the line have been relinquished. The Panama Railroad Co. intends to continue its operations as an independent carrier between Atlantic and Pacific ports, but future ocean transportation will be made through its connection with the Pacific Mail Co.

—The Manufacturers and Producers' Association, being unable to secure the Mechanics' Institute building for their proposed exhibition next March and April, contemplate the erection of a pavilion, to be filled with an exhibit of home products, at the earliest possible date. Chairman Scott has appointed Messrs. Mead, Bowers and Tracy as a special committee on the subject. The annual meeting of the association, which had been proposed to be held this month, has been postponed.

—The Yukon Transportation Company, Seattle, Wash., composed of Eastern capitalists, will operate freight and passenger boats on the Yukon river and its tributary streams and lakes, the entire run extending from Seattle to Circle City. Two lines will be operated—one for passengers from Juneau, via Linn canal, the Chilkoot pass and the upper lakes, and the other via the Yukon river, over the route usually taken by miners to Circle City, over the divide (Chilkoot pass) a distance of 28 miles. It is the intention of the company not to do any trading.

—Recent industrial and manufacturing incorporations are: Katz & Sons, San Francisco; capital stock, $20,000; subscribed, $20,000. Marshall Gold-Saver Company, Fairfield; capital stock, $100,000; subscribed, $100,000; J. Marshall and J. Wing of Fairfield, J. M. Gregory and J. A. Ostrander of Suisun and W. Tucker of Vacaville, directors. State Mining Journal Publishing Company, San Francisco; capital stock, $60,000; subscribed, $10; J. Power, D. L. Munson, L. T. Lewis, B. Vale and H. de Laguna, directors. Triumph Development Company, Fresno; capital stock, $250,000; subscribed, $225,000; F. A. Alexander, M. Minor, M. H. Heitzig, C. A. Shattuck, H. W. Skinner, J. Green, I. A. Hodges, C. J. Minor and W. D. Crichton of Fresno, directors. Mill Valley and Mount Tamalpais Scenic Railway, San Francisco; capital stock, $200,000; subscribed, $45,600; C. B. De Fremery of Oakland, C. Toohey and W. C. Savage of Marin, A. A. Martin, D. McKay and C. E. Green of San Francisco and S. B. Cushing of San Rafael, directors. Getz Brothers & Co., San Francisco; capital stock, $250,000, all subscribed. Los Angeles Bridge Company, Los Angeles; capital stock, $10,000; subscribed, $1000; D. W. C. Sawyer, B. J. Arthur, R. A. Sawyer, K. L. Arthur and J. P. Spence of Monrovia, directors. Consolidated Asphalt Company, Los Angeles; capital stock, $1,000,000, all subscribed; W. H. Worswick, G. B. Hannaman, F. M. Hannaman and C. E. Donatin of Los Angeles and J. Worstwick of Hanford, directors.

## Personal.

F. A. HUNTINGTON is in Denver, Col.

MAJOR HEUER left for Cincinnati, O., yesterday.

COL. SUTER and Col. Davis have arrived and taken charge of their respective departments.

ALEX. HILL, the superintendent of the Mountain Mines Co., Shasta Co., is in this city, on his way to England.

DR. CHARLES E. BULLMAN, of Plainfield, N. J., formerly editor of the *Safety Valve*, has been selected as secretary of the Venezuelan Commission.

JNO. HAYS HAMMOND is the only American now held in confinement by the Boers at Pretoria, South Africa. Strenuous efforts are making by his friends here to secure his release.

J. B. LOW has been experting the Golden Gate mine in Butte Co., and cables the London owners advising crosscutting to the west, indications being favorable for ore in that direction.

VICTOR CLEMENT, one of the American miners arrested at Johannesburg, South Africa, went from the Cœur d'Alenes two years ago to superintend one of the mines there at an annual salary of $20,000.

A. D. GASSAWAY, recently superintendent of the West Harmony and Delaware mines, Nevada Co., has accepted the superintendency of the Mayflower mine, on the Forest Hill divide, Placer Co. The Mayflower is the largest drift mine in the State and now employs 110 men.

COL. CHAS. R. SUTER has arrived from St. Louis. He succeeds Col. Mendell, of the U. S. Engineer Corps, as Division Engineer for the Pacific coast, and is distinguished by his presidential appointment to that important position from the list of prominent applicants therefor.

R. E. BROWN, who has been mentioned considerably in the recent Transvaal imbroglio, is a mining engineer by profession; has studied law, and edited newspapers. In his capacity as engineer he was employed by the Gem company in Idaho, between 1888 and 1891. In the latter year he started the *Barbarian*, a weekly paper in the Cœur d'Alenes, and was promotor of a townsite on Gray's harbor, Wash., which he called Gray's Arbor. The townsite was not a success, and Brown went back to the Cœur d'Alenes in 1892 and bought the Wardner *News*, which he rechristened the *Barbarian*, in memory of his former paper. It fought the miner's union, and it is said that a number of threats were made against the editor's life. Mr. Brown then went to Wallace, Idaho, and started the *American*, and ran for the Legislature, but was defeated. He then went to Spokane, Wash., and started the *Silver Outburst*. In a little while he went to Chicago, and was there for a while associated with Mr. Harvey in the publication of *Coin*. About two years ago he went to South Africa. His career so far is of a nature that is more interesting than prosperous.

## Mining Incorporations This Week.

King Solomon Mining Company, San Francisco: Directors, W. A. M. Van Bokkelm, J. M. Linehan, J. Stadtfeld, Jr., J. W. Bourdette, C. H. Morrell; capital stock, $3,000,000; $250 subscribed.

Hexter Gold Mining Company, San Francisco: Directors, F. W. Page, A. B. Moulder, J. W. Duke, C. F. Hamilton, and E. C. Jennings; capital stock, $30,000,000, $1,050,000 subscribed.

Jackson Gold Mining and Milling Company, Jackson; capital stock, $750,000; subscribed, $25; Thomas H. Donovan, Charles Peters, V. Monterichard, G. W. Brown and W. A. Newcom, of Jackson, directors.

The Iron Mask Gold Mining Company has incorporated at Spokane, Wash.; capital, $500,000; incorporators, P. Clark, W. J. C. Wakefield, A. Corbin, B. C. Kingsbury, Spokane; J. A. Finch, A. B. Campbell, Wallace, Idaho; H. L. Frank, Butte, Mont.

## A Recent Change in Name.

TO THE EDITOR:—In your map of mother lode of Calaveras, which at this time is very interesting and a useful reference, I wish to call attention that we have changed the name of South Extension Gwin No. 1 and South Extension Gwin No. 2. Both these claims have been purchased by our company and are now known as South Paloma mines.

The patents were issued under the old names, but I want, if possible, to have them known as South Paloma mines, in distinction and relation to North Paloma mine on the other side of the Gwin. MARK B. KERR.

South Paloma Mine, Jan. 26, '96.


# HAMMOND M'F'G. CO.

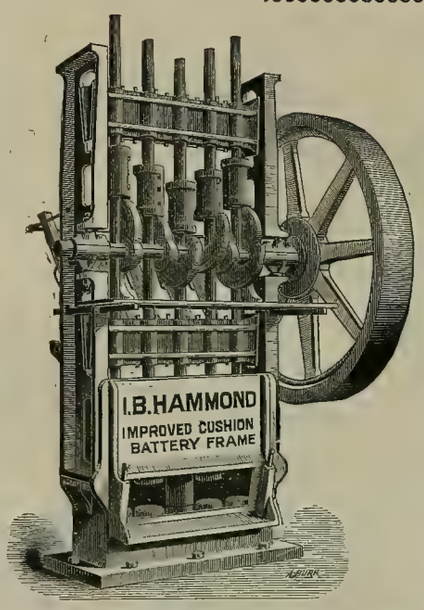
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## Stamp Mills, Ore Feeders

DETACHABLE BUCKET WIRE-ROPE TRAMWAYS,

Roller Grinding Pans, Desulphurizing Furnaces, Etc.




Improved Self-Contained Cushion-Frame Five-Stamp Mill.
Patented in the United States and Foreign Countries.

**The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Setf-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill.**

**FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.**

**SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.**

**THIRD: The Large Amount of Space Saved.**

We refer by permission to Mr. N. A. McMillan, Haines, Oregon, manager of the Blue Mountain Mining Co., at Rock Creek, Or., where ten of our stamp mills are in operation; also to Mr. John S. Miller, Helena, Montana, manager of the Diamond Hill Mining Co., operating one of our forty-stamp mills at their mines at Townsend, Montana.

Send for Catalogue and Price List.

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## JOHN A. ROEBLING'S SONS CO.,

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WIRE ROPE. CLOTH. NETTING. INSULATED TELEPHONE TELEGRAPH WIRE.

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Improved Facilities! Finest Work! Lowest Prices!

Perforated Sheet Metals, Steel, Russia Iron, American Planish, Zinc, Copper and Brass Screens for All Uses.

MINING SCREENS A SPECIALTY.

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# THE GUTTA PERCHA AND RUBBER M'F'G CO.

30 and 32 FREMONT ST., SAN FRANCISCO.

## Spadone's Concentrator Belts.

**The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman of practical experience.**

Illustration Fig 1 shows a cross-section and Fig 2 shows the edge hanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or pots, a direct strain comes upon the top and at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We would like to call your attention to our Spadone Curved Edge* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

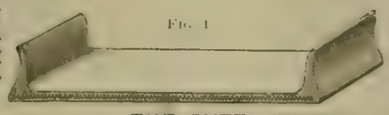


FIG. 1

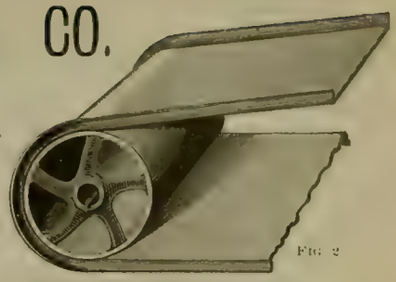


FIG. 2

**We shall be pleased to quote you also on Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING and RUBBER PACKING. Correspondence Solicited.**

THE GUTTA PERCHA RUBBER AND M'F'G CO.

TELEPHONE, MAIN 1813.

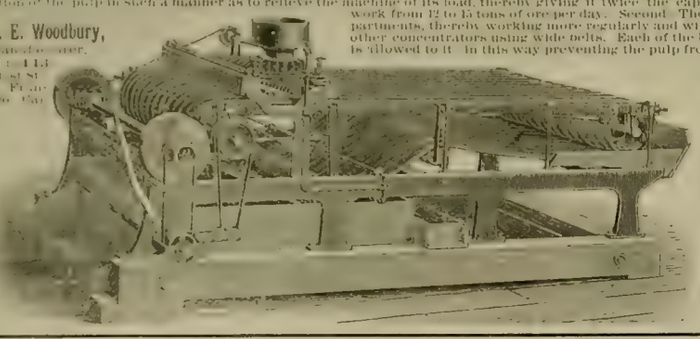
## THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

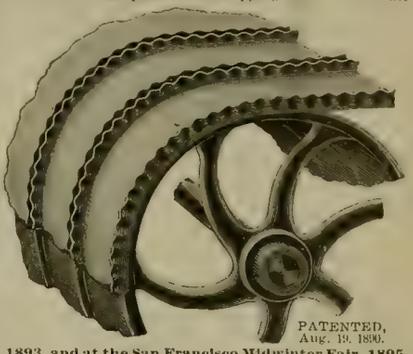
**was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891.**

MORE THAN DOUBLE THIS CAPACITY with one-half less power and occupying less than one-half the space of any other ore concentrator. Built of best Steel and Wrought Iron. Strong and durable. **Price $575 f. o. b.** Send for Catalogue and Testimonials.

The accompanying cut shows the belt in its improved form, which consists of corrugated edges to form an expanding top edge. THE IMPROVED MACHINE HAS THE FOLLOWING MERITS. First. The improved belts, which consist of seven, are constructed and arranged so as to allow each belt to receive a portion of the pulp in such a manner as to relieve the machine of its load, thereby giving it twice the capacity of other concentrators, and enabling it to work from 12 to 15 tons of ore per day. Second. The machine equalizes the load by several compartments, thereby working more regularly and with much less attention than is necessary to give other concentrators using wide belts. Each of the belts on this machine takes care of the pulp that is allowed to it in this way preventing the pulp from running to the lower side of it, as is the case when a machine becomes out of level where wide belts are used. Third. The belts run on a perfect line, needing no adjustment to prevent their running from side to side as to other concentrators. Fourth. The belt surfaces are improved by indentations and corrugations, causing the Concentrator to save fine sulphurets and quicksilver, and perform close work. Fifth. The belts have fluted or corrugated edges, to form an expanded top edge, which effectually prevents from cracking. Sixth. The feed arrangement is perfect. Seventh. The machine is constructed of iron with steel crank-shaft self-oiling boxes, and everything made in the most thorough manner, enabling it to run with very little attention or wear.

Geo. E. Woodbury,
Manufacturer,
141 to 143
First St.
San Francisco, Cal.





PATENTED, Aug. 19, 1890.

**This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st prize at the World's Columbian Exposition, 1893, and at the San Francisco Midwinter Fair, 1895.**

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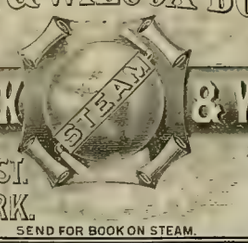
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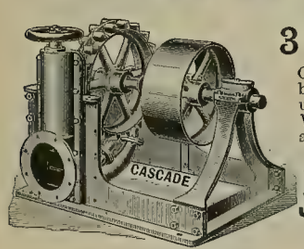
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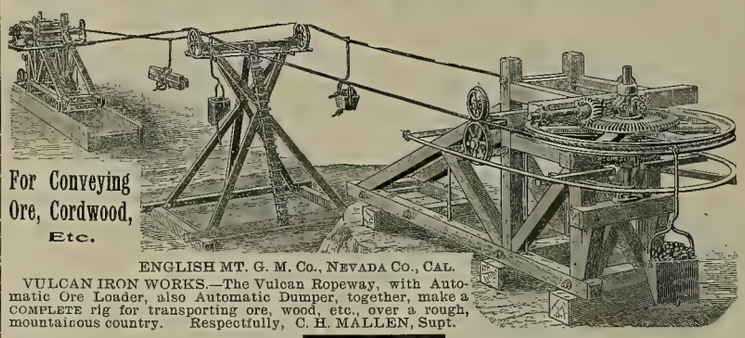
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For Conveying Ore, Cordwood, Etc.

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Cams, Tappets, Bosses, Roll Shells and Crusher Plates.







These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

H. D. MORRIS & CO., Agents, 141 and 143 First Street, San Francisco.

Special attention given to the purchase of Mine and Mill Supplies.



Stamp Cam.

# H. D. MORRIS & CO., DEALERS IN MINING MACHINERY AND SUPPLIES.

141-143 First Street, San Francisco, Cal.

MANHATTAN RUBBER BELTING, PACKING AND HOSE,
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL.

# Westinghouse Electric and Manufacturing Company,

PITTSBURG, PA.

The Largest and Most Completely Equipped Electrical Manufacturing Establishment in the World.

POWER, INCANDESCENT AND ARC LIGHTING, FROM THE SAME CIRCUITS.

We have purchased and are the SOLE OWNERS of the patents issued to Nikola Tesla for the POLYPHASE ALTERNATING SYSTEM, now recognized to be the most successful system for lighting and power purposes.

We furnish complete lines of apparatus for the perfect equipment of ISOLATED PLANTS for Hotels, Office Buildings, Flats and Factories.

STANDARD SYSTEMS

for distribution of light and power in LARGE MANUFACTURING ESTABLISHMENTS, MILLS and MINES.

WESTINGHOUSE ELECTRIC RAILWAY SYSTEM,

the Most Durable, Economical and Efficient on the Market.

SAN FRANCISCO, Mills Building. NEW YORK, 120 Broadway. BOSTON, Exchange Building. CHICAGO, New York Life Building. ✦ TACOMA, WASH., 102 S. 10th Street. PITTSBURG, Westinghouse Building. BUFFALO, Erie County Bank Building. PHILADELPHIA, Girard Building. ✦ ST. LOUIS, American Central Building. CHARLOTTE, N. C., 36-38 College St. SYRACUSE, N. Y., Bastable Building. WASHINGTON, D. C., 1333 F. St. N.

# UNION IRON WORKS,

NO. 222 MARKET STREET, - - - - - - - SAN FRANCISCO, CAL.

—MANUFACTURERS OF—

## MINING AND MILLING MACHINERY,

Automatic Cut-Off Engines, High-Speed Engines, Hoisting Engines, Quartz Mills, Manty Chili Mills, Rolls and Concentrating Machinery, Dodd Sigmoidal Water Wheel, PUMPS--Cornish and Other, Copper and Lead Furnaces, All Classes of Marine Work.

SHIP BUILDERS. ★ BUILDERS OF U. S. WAR SHIPS. ★ HYDRAULIC LIFT DOCK.

NEW YORK OFFICE: 145 BROADWAY. CABLE ADDRESS: "UNION."

# The McGlew Ore Concentrator Company.

PATENTED SEPTEMBER 19, 1893. CHEAPEST, SIMPLEST, MOST DURABLE AND CLOSEST SAVING CONCENTRATOR IN USE. FRANK BARRERE, Secretary and Manager.

Can be seen in operation at the Company's works, 132 Main Street, San Francisco.

Office, 116 Davis Street.

NINETY-FOUR AND ONE-HALF PER CENT —SAVED— ON ORES DIFFICULT TO CONCENTRATE.

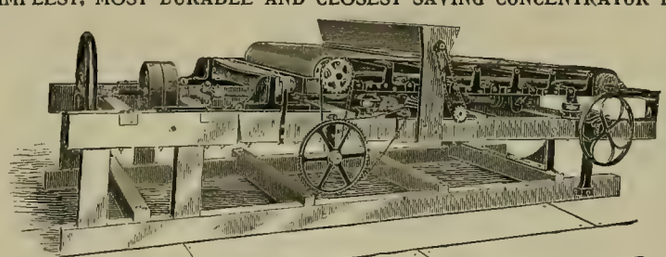
A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.

SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION.

CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH

Including prepared canvas belt 4 ft. 6 ins. wide.



FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.

THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,

E. L. BALLOU, Propr. Ballou Reduction Works.

# The Edward P. Allis Company, Milwaukee, Wis.

Established 1860. Reliance Works.

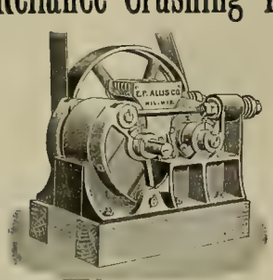
MINING, MILLING AND SMELTING MACHINERY.

Crushers, Rolls, Jigs, Concentrators, Screens, Stamps, Pumps, Compressors, Hoists, Boilers, Etc., Etc.

Reynolds Corliss Engines.

WORK THE BEST. PRICES THE LOWEST.

The Reliance Crushing Rolls.



The Best in the World.

BRANCH OFFICES:

| | |
|---|---|
| San Francisco, Cal. | 9 Fremont Street. |
| Butte, Mont. | 30 W. Granite Street. |
| Salt Lake City, Utah | 73 So. Main Street. |
| Denver, Col. | 427 Seventeenth Street. |
| Minneapolis, Minn. | 416 Corn Exchange. |
| Chicago, Ill. | 509 Home Ins. Building. |
| Kansas City, Mo. | 43 Armour Building. |
| Pittsburgh, Pa. | German National Bank Building. |
| New York City | 26 Cortlandt Street. |
| City of Mexico | Calle Gante, No. 12. |

WRITE FOR OUR NEW CATALOGUE.



NOTICE TO GOLD MINERS!

# SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

## San Francisco Novelty and Plating Works

Incorporated.

SEND FOR CIRCULARS. 68, 70 and 72 First Street, San Francisco, Cal.

Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH

—AGENT FOR—

Hoskins' Hydro-Carbon Assay Furnaces.

# Market Reports.

## The Markets.

SAN FRANCISCO, Jan. 30, 1896.

The iron and steel market is looking up. Being flat on its back, it couldn't do else. Lead is very weak. Copper does not exhibit the buoyancy of one year ago. Silver is steady. There are indications that justice will soon be done in Congress to the white metal and the interests of the country, which have suffered through demonetization.

The Treasury Department has ordered resumption of coinage of silver dollars, which will continue until about $18,000,000 have been coined. When the present Administration came into power there were in the Treasury about $29,000,000 in silver dollars coined from bullion under the act of 1890, and available for the redemption of Treasury notes issued in payment of the bullion purchased. Since August, 1893, about $18,000,000 of these notes have been redeemed in silver dollars and cancelled. The Secretary of the Treasury has now decided to coin from the bullion now on hand, and purchased under the act of 1890, about $18,000,000, which will restore the amount of dollars in the Treasury to what it was on March 4, 1893. The average cost of the silver bullion purchased under the Sherman act was 71⅓ cents on the dollar, which leaves a gain or seigniorage of 28⅔ cents on the dollar. At this rate the seigniorage on the $18,000,000 to be coined would be $5,130,000, which will be accounted for in the available cash on hand, increasing it by that amount.

Final figures on complete returns of the the production of pig iron in the United States for 1895 shows the largest output in the iron-making industry of the United States—9,446,308 gross tons, as against 6,657,388 tons in 1894.

### New York Metal Market.

NEW YORK, Jan. 30.—PIG IRON—Southern, 11@12.00; Northern, 12@12.50.
COPPER — Brokers', 9⅞c; exchange, 10c.
LEAD—Brokers', $2.90; exchange, $3.05.
TIN—Straits, 13c@13.20c.
SPELTER—Domestic, $3.00.

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.87 |
| London Merchants | $4.84½ |
| London Sight Bankers | $4.89 |
| Refined Silver, per oz., 1000 fine | 67½c |
| Mexican Dollars | 54c |

### New York Silver Prices.

NEW YORK, Jan. 30. — Following are the closing prices for the week:

| | Silver in London. | N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 30⅝ | 67 | 9 85 | ..... |
| Saturday | 30⅝ | 67⅛ | 9 90 | 2 90 |
| Monday | 30⅝ | 67⅜ | ..... | 2 95 |
| Tuesday | 30¾ | 67⅜ | 9 90 | ..... |
| Wednesday | 30¾ | 67⅛ | ..... | 3 00 |
| Thursday | 30¾ | 67⅞ | 9 85 | ..... |

### San Francisco Metal Market.

COPPER.

| | | | |
|---|---|---|---|
| Bolt | ½ & 5-16, 21c; ⅜ and larger, 22c | | |
| Lake Superior Sheathing | 23 | @ | — |
| Ingot, jobbing | — | @ | 19 |
| Ingot, wholesale | 18 | @ | — |
| Sheet copper | — | @ | 22 |

ZINC.

| | | | |
|---|---|---|---|
| Sheet | 9½@ | | |

LEAD.

| | | | |
|---|---|---|---|
| Pig | — | @ | 3 90 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.

| | | | |
|---|---|---|---|
| Drop, sizes *smaller* than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and *larger* sizes, " | " | " | 1 65 |
| Buck, Balls and Chilled, do, " | " | " | 1 65 |

IRON.

| | | | |
|---|---|---|---|
| American Soft | 22 00 | @ | 26 00 |
| Pig, per ton | 18 00 | @ | 20 00 |

STEEL.

| | | | |
|---|---|---|---|
| English, lb | 16 | @ | 19 |

COKE.

| | | | |
|---|---|---|---|
| Gas Companies' | 75c ₩ bbl. | | |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 13 00 |
| " in sacks | — — | @ | 15 00 |
| Cumberland | 9 00 | @ | — — |

ANTIMONY.

| | | | |
|---|---|---|---|
| Per lb | — | @ | 10 |

PIG TIN.

| | | | |
|---|---|---|---|
| Per lb | 15 | @ | 16 00 |

QUICKSILVER.

| | | | |
|---|---|---|---|
| Home trade, per flask | 39 00 | @ | 40 — |

BORAX.

| | | | |
|---|---|---|---|
| Refined, in car lots | — | @ | 5½ |
| Refined, in sacks and barrels | — | @ | 5⅝ |
| Powdered, in car lots | — | @ | 5⅜ |
| Concentrated, " | — | @ | 4⅞ |

TIN PLATE.

| | | | |
|---|---|---|---|
| Per bx | 4 75 | @ | 5 00 |

ZINC.

| | | | |
|---|---|---|---|
| Sheet | 8½@ | | |

NAILS.

| | | | |
|---|---|---|---|
| Wire | | | $1 75 |
| Cut | | | 1 50 |

LUMBER.

SAN FRANCISCO — WHOLESALE.

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

COAL.

SPOT FROM YARD—PER TON.

| | |
|---|---|
| Wellington | $ 8 00 |
| Greta | 6 50 |
| Nanaimo | 7 00 |
| Gilman | 6 50 |
| Seattle | 6 00 |
| Coos Bay | 5 00 |
| Cannel | 8 50 |
| Egg, hard | 10 00 |
| Wallsend | 7 50 |
| Scotch Splint | 7 50 |
| Brymbo | 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 50 |
| Liverpool Steam | 6 00 |
| Scotch Splint | 6 50 |
| Cardiff | 6 25 |
| Lehigh Lump | 9 00 |
| Cumberland | 13 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

## Mining Share Market.

SAN FRANCISCO, Jan. 30, 1896.

The market stiffened slightly on Friday and Saturday, only to go off on Monday and Tuesday, under manipulation and a strong bear pressure, but yesterday it showed more strength. The market acts very much as if there are factors at work which will create better prices before long. Evidently the powers that be are fighting to keep it down, but they may not be able to do so much longer. The people are unquestionably ripe for a deal, and with the least sign indicating that such a thing is possible, they will come in on the bull side. Their buying would of itself bring about better prices, owing to a scarcity of shares. The opinion prevails that outside holdings are large, but facts do not carry out such a belief. The absence of any and everything which would create a deal has been quite marked for several years past. Even extracting ore and rosy reports circulated regarding the mines failed to inspire sufficient confidence with traders as to cause them to operate. During this time those holding lines of shares have been steadily letting go, and to-day it is safe to assert that very few, comparatively, have any, and those that have do not carry much. Of course, these remarks apply to those who buy and hold for something big, for outside traders seldom hold long. They either sell on turns or else are turned out by their orokers, who are compelled to this course owing to their customers not responding to repeated calls for more margin. To where the shares have drifted is an open question, but in the absence of evidence that the public are not large holders, it would seem that the shares must have drifted into fewer hands. Even if this should be the case, unless these parties have large moneyed backing, it will be impossible to promote much of a deal in the absence of confidence on the part of outsiders. The election of A. G. Gurnett president of the San Francisco Stock Exchange has made a favorable impression, which is further strengthened by the members he has appointed on the different committees. It is asserted that, from their character and standing, much in the way of reforms can be expected. If the exchange redeems itself and sees to it that affairs be conducted on honest lines, then moneyed men will be more disposed to come into the market. Mr. Gurnett is an earnest advocate of honest methods and true business principles: he is also in favor of having paying gold mines in this State listed on the exchange. With that object in view, he has appointed a special committee on gold mining listing, composed of men of wealth and standing. It is reported that several of the largest dividend-paying mines in this State will be listed some time during the current year. This is a move in the right direction.

From the Comstock mines the advices are uniformly of a favorable character. While the work is not prosecuted with that vigor it should be, yet it is in the right direction. In several the work is largely preparatory, while in others it is going in the direction where ore is expected to be found. In the Alta group nothing is expected until after the Alta assessment is collected. It is quite freely asserted that ore can be found whenever it is advisable. But this kind of talk has been made for so many years it has become threadbare by age. In the Gold Hill group more attention is being given to the work going on, but from its character it may take some time before anything good will come of it, and in the meantime the Crown Point assessment will be collected and others be levied. These are very promising mines, yet they fail to materialize anything outside of assessments. The work in Belcher, Crown Point and Yellow Jacket, it is said, ought to show up something before many weeks pass. Perhaps enough can be shown up to attract buyers at higher prices, when shrewd dealers can get out, and the buyers left to carry the load. In Confidence and Challenge the work does not attract attention. The Con. Imperial management is a long time finding the ore struck last year in Challenge, but which was lost in the latter mine by some kind of shuffle. In Alpha the work is still of a procrastinating character. In the middle mines nothing new has developed, not even an assessment, but it is a moral certainty that the latter will be run into before long. The ore that is extracted does not meet current expenses. The work in two of these mines gains in interest as it is being prosecuted. In the north end mines there is nothing new to report. Our last week's remarks cover this week's advices. Notwithstanding this there are many bulls on the shares in this group. The work that is being done does not differ from that which has been under way for many months past.

The work on the Brunswick lode attracts some attention and that is all. The great expectations of dealers regarding this lode have not been realized and it looks as if it is still some time off. The trouble seems to be that the shares in the leading mine on this lode is not properly handled to inspire confidence. From the Bodie mines nothing new is reported. The managements are still pegging away, but not on the right levels yet.

The following illustrates the changes of the week:

| MINES. | Jan. 23. | Jan. 30. |
|---|---|---|
| Alpha | $ 21 | $ 20 |
| Alta Consolidated | ..... | ..... |
| Andes | ..... | 23 |
| Belcher | 30 | ..... |
| Best & Belcher | 89 | 87 |
| Bodie | ..... | 39 |
| Bullion | ..... | 17 |
| Challenge | ..... | 39 |
| Chollar | 83 | ..... |
| Confidence | ..... | 1 05 |
| Consolidated California and Virginia | 2 50 | 2 40 |
| Consolidated New York | ..... | ..... |
| Crown Point | 24 | 22 |
| Exchequer | ..... | 06 |
| Gould & Curry | 55 | 51 |
| Hale & Norcross | 1 50 | 1 25 |
| Justice | 02 | ..... |
| Mexican | 63 | 63 |
| Ophir | 1 35 | 1 45 |
| Overman | 19 | ..... |
| Potosi | 57 | ..... |
| Savage | 38 | 31 |
| Sierra Nevada | 46 | 47 |
| Union | 41 | 41 |
| Utah | ..... | 15 |
| Yellow Jacket | 45 | 47 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, Jan. 30, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 200 Alpha | 20 | 200 Hale & Norcross | 1 25 |
| 50 Andes | 23 | 100 Mexican | 63 |
| 400 Best & Belcher | 87 | 250 Mono | 16 |
| 400 Bullion | 17 | 100 Occidental | 1 05 |
| 200 Challenge | 39 | 150 Ophir | 1 40 |
| 100 Con Cal & Va | 2 40 | 100 Savage | 31 |
| 100 Confidence | 1 05 | 200 Sierra Nevada | 47 |
| 300 Crown Point | 20 | 300 Union | 40 |
| 100 Gould & Curry | 51 | 2450 Utah | 14 |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 200 C. C. & Va | 2 40 | 200 Exchequer | 06 |
| 100 | 2 45 | 100 Union | 41 |
| 200 Savage | 31 | 50 Occidental | 1 05 |
| 100 H. & N | 1 20 | 200 Andes | 19 |
| 300 Crown Point | 22 | 100 Bodie | 39 |
| 100 Yellow Jacket | 47 | 100 Mono | 15 |
| 200 Sierra Nevada | 47 | 50 Ophir | 1 40 |
| 300 Utah | 14 | 50 | 1 45 |
| 50 | 15 | 100 Best & Belcher | 87 |

## A New Concentrator Belt.

The "Spadone" curved edge concentrator belt is the latest improvement in this line, and commends itself to the attention of mining and mill men with very reasonable claims to superior merits. These claims bear upon the flange, which is so constructed that it turns outwards while passing over the rollers or pulleys, thus relieving the strain from the top and bottom of the edge, directing it automatically to the inside face surface. This saving in strain and wear insures a much longer service for the belt than could be otherwise obtained.

The cuts, Figs. 1 and 2, which appear in the advertisement on another page, give a clear idea of the construction and action of the belt. It is manufactured to fit any size machine, from four to six feet width, by The Gutta Percha and Rubber Manufacturing Co., Nos. 30 and 32 Fremont street, San Francisco, from whom full particulars may be had upon application. *

# Assessment Notices.

ANDES SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 30th day of January, 1896, an assessment (No. 42), of 15 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, No. 22 Nevada Block, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of March, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 28th day of March, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

JNO. W. TWIGGS, Secretary.

Office—No. 22 Nevada Block, San Francisco, California.

JUSTICE MINING COMPANY. - Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of January, 1896, an assessment (No. 60) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 309 Montgomery street, Room 23, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made be before, will be sold on MONDAY, the 9th day of March, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. E. KELLY, Secretary.

Office—No. 309 Montgomery street, Room 23, San Francisco, California.

ALTA SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Gold Hill Mining District, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of January, 1896, an assessment (No. 51) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 33, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of February, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 9th day of March, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. E. JACOBUS, Secretary.

Office Room 33, Nevada Block, No. 309 Montgomery street, San Francisco, California.

SAVAGE MINING COMPANY.—Location of principal place of business, San Francisco, California. location of works, Virginia Mining District, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors held on the fourth (4th) day of January, 1896, an assessment (No. 88) of twenty cents (20c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 50, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the sixth (6th) day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 26th day of February, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

E. B. HOLMES, Secretary.

Office—Room 50, Nevada Block, No. 309 Montgomery street, San Francisco, California.

WEST SIDE CANAL AND LAND COMPANY—Location of principal place of business, San Francisco, California. Location of Works, Fresno and Kings Counties, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 30th day of December, 1895, an assessment (No. 3) of one (1c) cent per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 8, Floor 8, Mills Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of February, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 27th day of February, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. E. NAYLOR, Secretary.

Office, Room 8, Floor 8, Mills Building, San Francisco, California.

ANCHOR COAL AND DEVELOPMENT COMPANY.—Location of principal place of business, San Francisco, California. Location of Works, Kelso, Cowlitz county, Washington.

Notice is hereby given, that at a meeting of the Board of Directors held on the second (2d) day of January, 1896, an assessment (No. 6) of three (3) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 632 Market street, Room 5, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the third (3d) day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the fifth (5th) day of March, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. D. FARISH, Secretary.

Office, No. 632 Market street, Room 5, San Francisco, California.

# MINING SHAREHOLDERS' DIRECTORY.

## ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alta S M Co, Nev | 51 | 10c | Jan 13 | Feb 17 . Mar 9 | J E Jacobus, 309 Montgomery |
| Andes Silver M Co, Nev | 42 | 15c | Jan 30 | Mar 6 . Mar 28 | J W Twiggs, Nevada Block |
| Anita G M Co, Cal | 7 | 8c | Dec 7 | Jan 18 . Feb 4 | L F Reichling, 404 Montgomery |
| Challenge Bend M Co, Cal | 1 | 25c | Jan 13 | Feb 21 . Mar 13 | W E Davis, 39 Sutter |
| Challenge Con M Co, Nev | 20 | 5c | Dec 20 | Jan 22 . Feb 12 | C L M Coy, Mills Building |
| Clara G M Co, Cal | 1 | 3c | Dec 17 | Jan 30 . Feb 20 | C M Cross, Chronicle Building |
| Con New York M Co, Nev | 14 | 5c | Dec 10 | Jan 15 . Feb 6 | C E Elliot, 309 Montgomery |
| Crown Point G & S M Co, Nev | 66 | 25c | Jan 16 | Feb 20 . Mar 12 | Jas Newlands, Mills Building |
| Evening Star M Co, Cal | 2 | 1c | Dec 14 | Jan 22 . Feb 15 | M G Loefler, 137 Montgomery |
| Gray Eagle M Co, Cal | 42 | 5c | Jan 6 | Feb 7 . Mar 3 | W J Gurnett, 308 Pine |
| Hale & Norcross S M Co, Nev | 108 | 15c | Dec 10 | Jan 15 . Feb 7 | A B Thompson, 309 Montgomery |
| Haskell G M Co, Cal | 1 | 1c | Dec 11 | Jan 18 . Feb 8 | G W Osborn, 309 Montgomery |
| Hite G M Co, Cal | 2 | 10c | Dec 17 | Jan 20 . Feb 10 | H E Mathews, 120 Sutter |
| Home G M Co, Cal | 9 | 5c | Dec 24 | Feb 1 . Feb 19 | O E Johnson, 315 Front |
| Julia Con Co, Nev | 27 | 5c | Jan 17 | Feb 20 . Mar 11 | J Stadtfeld, Jr, 309 Montgomery |
| Justice M Co, Nev | 60 | 10c | Jan 13 | Feb 17 . Mar 9 | R E Kelly, 309 Montgomery |
| Lady Washington Con Co, Nev | 11 | 5c | Jan 16 | Feb 17 . Mar 10 | J E Jacobus, 309 Montgomery |
| Mono G M Co, Cal | 36 | 10c | Dec 30 | Feb 2 . Feb 25 | M E Willis, 309 Montgomery |
| Occidental Con M Co, Nev | 21 | 15c | Dec 17 | Jan 20 . Feb 10 | Alfred K Durbrow, 309 Montgomery |
| Orleans Mining Co, Cal | 1 | 10c | Jan 21 | Feb 29 . Mar 24 | W Olney, 101 Sansome |
| Red Jacket Con M Co, Nev | 3 | 1½c | Dec 18 | Jan 27 . Feb 17 | S M Capp, 413 Montgomery |
| Savage M Co, Nev | 88 | 20c | Jan 4 | Feb 6 . Feb 26 | E B Holmes, 309 Montgomery |
| Silver King M Co, Arizona | 13 | 25c | Jan 28 | Mar 9 . Apr 6 | J W Pew, 310 Pine |
| Union Con M Co, Nev | 52 | 20c | Jan 14 | Feb 17 . Mar 17 | A P Swain, 309 Montgomery |
| Ybarra Gold M Co, Lower Cal | 3 | 50c | Dec 26 | Jan 27 . Feb 12 | T G Cantrell, 132 Market |

## MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Amalie M Co, Cal | C W Smith, Mills Building | Feb 1 |
| Holmes M Co, Nev | C E Elliot, 309 Montgomery | Feb 11 |
| Lady Emma M Co, Cal | W W Boughton, Mills Building | Feb 5 |
| Watt Blue Gravel M Co, Cal | G A Berton, 323 Montgomery | Feb 17 |


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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR WEEK ENDING JANUARY 21, 1896.

553,146 —SEPARATOR—Barnard, Moore & Atkinson, Seattle, Wash.
553,187 —DRAWBAR—J W Boggs, Huntington, Or
553,196 —DOOR FASTENER—A B Cammetti S F
553,210 —CURRY COMB—J Carden Carpinteria Cal
553,214 —TOOTH CROWN—C A Davis, Pasadena Cal
553,237 —RAIL STRAIGHTENER—W Hainsworth, Seattle Wash
553,248 —ROTARY ENGINE—S P Ingram, San Jose, Cal
553,252 —GAS ENGINE—S M Miller, Stockton, Cal
553,271 —FILTER—H L Ricks Eureka, Cal
553,278 —ROTARY ENGINE—J G Rosling Oakland, Cal
553,285 —CHUCK—G A Sholer, Spokane, Wash.
553,316 —MILK AERATOR—F C Stephenson Green Meadows Cal
553,271 —FRUIT SLICER—J H Stewart, Chico, Cal
553,307 —DOOR LOCK—E S Sutton, Snohomish, Wash
553,326 —BEER DRAWING APPARATUS—G Wil Hams S F
25,062 —DESIGN INSCRIPTION PLATE—E. K. Jones, Portland, Or.

NOTE.—Copies of U S and Foreign patents furnished by Dewey & Co in the shortest time possible by mail or telegraphic orders. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ROTARY ENGINE.—Sterling P. Ingram, San Jose, Cal. No. 553,408. Dated Jan. 21, 1896. This invention relates to improvements in rotary engines. It consists essentially of a cylindrical case having annular piston chambers side by side; an axle shaft passing through the case with disks fixed thereto and pistons fixed to the disks in pairs so as to be carried around within the respective piston chambers; a transversely movable abutment is slotted so as to allow either pair of pistons to pass through it when the slot is in line with the piston chamber and is closable behind the rear piston. A steam chest has parts leading into the piston chambers upon opposite sides of the line of travel of the abutment, and a valve is fixed to and in unison with the abutment, having parts corresponding with those in the steam chest; a diaphragm separates the steam chest into two parts, in each of which one-half of the valve is movable, and by means of an inlet passage and valve, steam may be diverted to either of the valve chambers for the purpose of reversing the engine. Exhaust passages at the lower sides of the piston chambers correspond with the inlet passages, and a valve is provided whereby one pair of said exhaust passages is opened and the other closed upon each reversal of the engine. The inlet and exhaust valves are so connected as to be reversed simultaneously.

ROTARY ENGINE.—J. G. Rosling, Oakland, Cal. No. 553,428. Dated Jan. 21, 1896. This invention relates to improvements in rotary engines, in which a piston is revoluble within an inclosed annular case. It consists of an annular piston chamber, a central shaft with a disk fixed thereto projecting into the piston chamber, a suitably packed piston fitting in said chamber, abutments slidable radically, and mechanism driven from the shaft whereby the abutments are alternately reciprocated to the open chamber for the passage of the piston and to close behind it. Steam valves open into the piston chamber adjacent to the abutments, and exhaust ports correspondingly open outwardly from the chamber with controlling valves. A mechanism is connected with a cam fixed upon the engine shaft whereby the steam valves are reciprocated, and a second lever connects with the steam valve mechanism and with the exhaust valve mechanism so that the two are actuated in unison.


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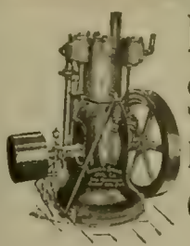
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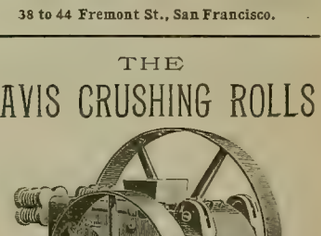
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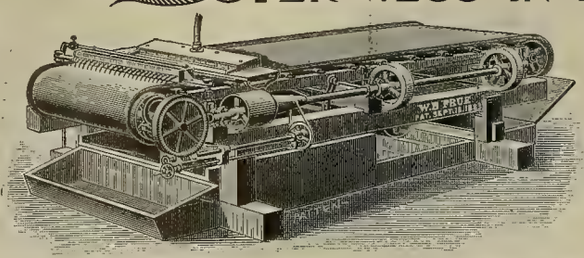
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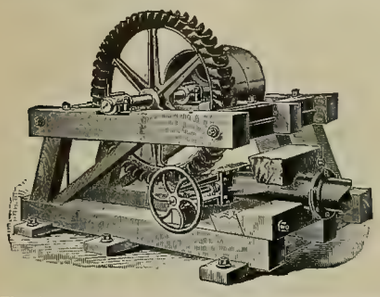
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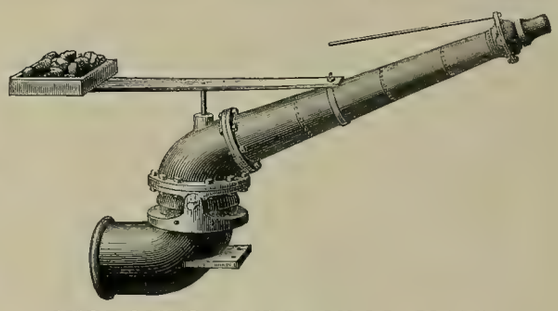


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VOLUME LXXII. Number 6. WHOLE NUMBER, 1862. SAN FRANCISCO, SATURDAY, FEBRUARY 8, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

## The Nevada County Electric Power Company's Dam in the South Yuba River.

This dam is located on the South Yuba river, about seven miles from Nevada City, Cal. It is a crib dam weighted with broken granite. An effort was made to dam the river at this point some three years ago; but the freshets coming before the dam was completed, it was carried out. In designing this dam, the intention was to have the construction such that, in the case of early freshets before the completion of the dam, no serious accident could happen to it. To attain this end, the river was cleared to solid bedrock and the logs bolted securely to bedrock. The inequalities of the bedrock, on the up-stream side of the bottom logs in the face of the dam, were then filled in with concrete, so that these logs are fairly buried in the concrete. The logs composing the various cribs were then bolted securely to each other, and, from each set of logs, bolts were carried back to bedrock. The dam was loaded with broken granite as the construction progressed. When completed, the dam, including the entrance to headgates, is 206 feet long on the top, 28 feet high and 40 feet in depth. The dam was loaded with about 9000 tons of broken granite.




DAM OF THE NEVADA ELECTRIC POWER COMPANY.

The first freshets filled the dam with slickens and fine gravel, and made the face of the dam perfectly tight. The work of constructing the dam was begun in the first week of September, 1895. A storm on the 10th of September carried out the temporary river flume and filled the dam location with gravel and debris, the removal of which caused a delay of about ten days. The dam was completed November 10, 1895.

During the late freshets there have been over nine feet of water over the crest of the dam, and none of the construction has been in any way affected. The dam is used to divert water into a flume 6 feet by 5 feet 4 inches, which is carried a distance of 18,340 feet, where a fall of 206 feet is obtained. A 48-inch pipe line conducts the water to a power-house, where two Pelton water wheels operate two 300 K. W. Stanley transformers, which generate a current at an E. M. F. of 5500 volts. This power will be transmitted to Nevada City and Grass Valley and to the mines in their vicinities for furnishing power and light. On January 26th water was run through the flume and full pressure attained at the power-house and a preliminary run made with the machines. The sub-stations at Nevada City and Grass Valley are complete, but the final starting of the machinery is delayed for a few days awaiting the arrival of station transformers. The plant will probably be put in permanent operation about February 12th. It is of present interest because of the general movement in the Sierra foothills of this State to electrically utilize the gravity force of the westward water flow.

Although the machinery of a number of mines in this State is operated by electricity, this is the first plant installed to supply power for a great number of mines, as well as for the lighting of two cities. The entire water-power plant is so designed as to allow the increasing of the generating capacity of 3000 horse power.

The engineers of construction of the company are William R. Eckart and Hasson & Hunt. The construction of the dam and flume was personally supervised by Mr. A. Tredidgo of Grass Valley.

## A Book for the Prospector.

It was recently stated in "Concentrates," on the third page, that a handy reference book for California prospectors would meet with ready sale. There are plenty publications intended for the prospector, but from the number of letters received, and from the comments in journals published in other mining communities, it is manifest that an addition to mining literature would pay in the shape of a plainly written practical little book that would be of use and value to the prospector and metal miner. Of course, nothing can take the place of personal observation and experience, and no one can learn much of geology or mining by solely reading books; but a compendium of generally known facts would save many a one weeks of toil, if nothing else, and would be a godsend to many a one who wants to start prospecting, but doesn't know how. Prospecting is not a business in which there is rivalry or competition, and old experienced prospectors are never disposed to sneer at "greenhorns" or "tenderfeet." It is a pursuit in which practical knowledge is a great help and saving, and a compilation of knowledge on the subject would meet with ready sale to those who know and those who don't, the former buying to increase their stock of knowledge, the latter to get some points as to what to do and how to do it. The book need not be a pretentious concern, full of technical descriptions and abstruse scientific discussion, but a small, compact condensation of up-to-date popular mineralogy, with a general application to prospecting and mining for gold, silver and copper; practical points of use to those in the field. Besides stimulating prospecting and doing considerable good, it would be a source of profit to its compiler. There are beginners in everything, and the thousands of beginners in the art and mystery of mining form a good field for present supply in that direction.

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LAST Monday, through the courtesy of Mr. Ford, now in Washington, we received an official copy of H. R. 4080, being the newest and latest mineral land bill, providing for the examination and classification of mineral lands in this State. It supersedes the "compromise" bill and is in every way acceptable to the miners and mining interests of California. It is the bill published in full on the editorial page of this paper in the issue of Dec. 21,'95, when extended editorial comment was made thereon, with slight modification as to the number of commissioners, which is increased. The bill was endorsed last Wednesday by the House committee on public lands, the California delegation is unanimously in favor of the measure, and the sub-committee of the House on mineral lands has reported it favorably. At this writing it is believed that Congressman Bowers will be able to report it to the House with a favorable recommendation from the full committee. President Neff, of the California Miners' Association, and other prominent members of the association, including the old mineral land committee, endorse the present measure, and it is believed it meets the wants and wishes of the miners of the State. The only difference between this measure and the one endorsed by the miners' convention last November is that that bill provided for the appointment of three commissioners; this one divides the State into four sections and provides for the appointment of three commissioners from each section. In some respects the new measure is an improvement on the "Idaho-Montana" bill endorsed last November, and it is in order for every one in any way interested in the outcome to forward by every means at their command the efforts of Mr. Ford and the California congressional delegation to have such legislation secured.

IN these days of tramp corporations, where the capital stock is ten million dollars and the amount subscribed is barely enough to pay the requisite incorporation fees, it is a pleasure to note the incorporation in this city of the Mayflower Gold Mining Company with a capital stock of $3,000,000, all paid up. The mine is at Canada Hill, Nevada county.

As the crowning glory of a forthcoming California exposition in New York City is announced the reproduction of a "'49 mining camp." Mute memories of the Midwinter fair make mental protest against such a hideous caricature and belittling of the State. The projectors of the show should be induced in some way to suppress the menagerie.

## Of Great Present Importance.

Twenty years of difference and discussion have not altered the present and pressing requirements regarding proposed Government aid in the Sacramento and Feather rivers. There has been considerable crimination and recrimination, and meanwhile the hydraulic mining industry of the State has been crucified. But 'tis useless to hold post mortems or discuss what is past. That should be left to the paid agitators of the Anti-Debris Association, whose salary ceases whenever the people most affected adversely agree to unite and secure aid instead of fighting those who want to help their neighbors and themselves. Things are as they are: we all, whether working in the valley or on the hillsides, propose to remain here, and it is puerile to keep harping forever on the causes of the present trouble. Of more effect would be concerted effort to overcome the present untoward situation.

Briefly, the facts are these: The Sacramento, Yuba and Feather rivers are obstructed. Disinterested and competent men distinguished for experience and ability, high in the Engineer Corps of the U. S., after careful personal examination and long study and observation, have three times sent official reports and recommendations to Congress that $300,000 be appropriated to begin a plan agreed upon and designed by the U. S. Engineer Corps for reclamation. In anticipation of favorable action thereon this State has made a contingent appropriation of $250,000 for the same work. Whenever Congress appropriates a like amount the State Treasury is unlocked and $500,000 is at once available. The recommendation of the U. S. engineers has all along met with favorable response; but now at the crucial moment, when the argument is all in and the matter has been fully discussed; when all that is needed is unanimity and acquiescence on the part of all concerned, a factious and implacable few who fear that their petty salaries as promoters of troubles and apostles of discontent will cease oppose the only favorable chance for aid that can possibly be utilized. Their opposition will be seized upon as an excuse for inaction by a Congress that, for political reasons, wants to make a record for economy, and the present miserable muddle will continue. These valley residents are aided by a few newspapers that for a variety of reasons find pleasure and profit in opposition to the effort for the common good and seek to convey to Congress the idea that such opposition correctly reflects public sentiment. At best, California's influence in securing needed Congressional appropriation is weak; when small, and then divided, the probabilities for success are greatly lessened. Not a single California Congressman is on the Ways and Means Committee, the River and Harbor Committee, the Mines and Mining Committee. At best the fight is a hard one; the opposition referred to makes the fight still harder. In the 53rd Congress a $100,000 appropriation passed the Senate, but was defeated in the House. Eastern and Southern Congressman with no great interest either way said: "Well, we hear from members of your California Anti-Debris Association that they don't want this money appropriated; and if you people can't agree, we do not feel like voting public money away." The same excuse will be heard in the 54th Congress if the same opposition continue. The ostensible reason or excuse for this valley opposition is "we are opposed to Government aid to hydraulic mining." There are many good logical reasons why Government aid should be given the hydraulic mining industry of California as a matter of business, apart from reciprocity or justice; but waiving all that, it is plain that the senseless opposition displayed by the Anti-Debris Association has different reason for its existence, or at least must make different plea. About all there is of this association is its Executive Committee, that is run by men whose salary depends upon their activity. These men say that they are opposed to any work being performed under the direction of the State of California or the United States except done as designated by them, and under no consideration will they consent to the construction of dams in the streams. Here is where their inconsistency is most conspicuous. No money is asked for the hydraulic miners. They are faithfully and patiently complying with the provisions of the law. The Government engineers in '93 and '94 made recommendation that restraining works be constructed at Government expense by building a wall or dam or restraining barrier at Deguerre Point, in the Yuba river, above Marysville. In making this recommendation, these Government engineers say that such work is not intended to facilitate future hydraulic mining, but to restrain former accumulations of debris; they assert that the sole idea is to aid in solving present difficulties regarding overflow in the Sacramento and Feather rivers, yet this measure is attacked and opposed on the ground that "it furnishes Government aid to the hydraulic miners," when the U. S. engineers, disinterested and impartial, officially say it does not, and the opposition to it comes from the very men most benefited by the measure.

These men have prepared and forwarded a new scheme of their own, creating a new U. S. Commission and carrying an appropriation; and though they know they have not the slightest chance to pass the measure, or even have it favorably considered, they declare that that measure of theirs, and that alone, shall receive their support, and any other bill, however meritorious, will be strenuously opposed by them. They know that Congress never makes appropriation of a dollar for such work except upon the official recommendation of U. S. engineers; they know that such recommendation was twice made by the U. S. engineers regarding the project now favored by the miners; they admit that that project was agreed to, acquiesced in and favored by themselves in the convention of the California Miners' Association four years ago when all these matters were fully discussed; but with strange fatuity and perverseness, they continue to say "we will now oppose any such proposition."

Meanwhile their interests and those of every one else are retarded and prosperity destroyed by such opposition.

The right of these people to change their minds is conceded; they are no doubt self-justified in retracting their former adherence, in opposing what they formerly favored and in seeking to ruin where they cannot rule. We look beyond them, however, and appeal to the public opinion of the Sacramento valley. It is within bounds to say that if the present foolish opposition of a few factious fighters continues, it will destroy any probability of success in this Congress for measures in which the people of the Sacramento valley are vitally interested. The miners have acted in good faith throughout; they are acting in good faith now; they have faithfully followed the provisions of the Caminetti act, and were it not for that act there would now be no opportunity to do much of practical avail in the way of present necessary legislation. The present project has received Government sanction; it is the only project that has or can. Why continue to encourage by silence or money contributions the men who are to-day the worst foes of the valley—the men who, because desirous of holding petty positions, are willing to sacrifice their neighbors?

This is a matter of tremendous importance to the valley. It is folly to assume that hydraulic mining in California can be stopped. Every dictate of business suggests a wider policy; the horizon is a broader one than that viewed by those who oppose the present movement. Take the city of Marysville, the home of the most bitter opponents of the measure we advocate. We have personally known of heavy taxes there for over twenty years to keep up a necessary expensive levee system; of yearly requirements in the way of removing obstructions to navigation in the Yuba and Feather. A few miles up the Yuba from that city are millions of cubic yards of deposits, the result of mining many years ago at Smartsville and Timbuctoo. Near Deguerre Point, eight miles above, these deposits are sixty feet deep; they are continually moving down stream. They are a constant expense and menace to Marysville. Five years ago a commission of Government engineers described all this to Congress after personal examination, and recommended an appropriation for a restraining dam at Deguerre Point; three years ago Cols. Mendell, Heuer and Benyaurd, the three U. S. engineers of highest rank and longest service here, made similar recommendations; two years ago the same disinterested and impartial examining board renewed that recommendation. The question of hydraulic mining does not and did not enter into

the matter at all. It was and is solely a question of preservation of valley residents in and around Marysville. Yet, hoodwinked by the specious arguments of a few who see their salaries disappearing, the very people in and around Marysville to be benefited by the proposition now before Congress oppose it and favor beginning all over again by the introduction into Congress of a bill creating a commission "to inquire into the condition of the rivers," etc. Was ever seen such fatuous folly!

There isn't the slightest chance of their bill passing, but were it to go through to-morrow, and every governmental wheel greased to utmost expedition, it would be four years before they could get matters in as favorable shape for national legislation as they now are. There is a constant clamor, and a just one, from the valley that the Government take charge of this matter of reclamation and river improvement. Yet, now when an opportunity exists to start such Government work after twenty years talking about it, a few followers of discontent jump up and demand that the whole thing be begun over again. They find allies in the Sacramento Board of Supervisors and the Sacramento papers, which take delight in opposing any measure of relief for corporate reasons not necessary to here dilate upon.

The sole excuse proffered by these obstructionists is a fear that compliance on the part of the Government in the report of the Government engineers will be taken advantage of by the hydraulic miners. This fear is unfounded; such excuse or reason has no cause for existence. The California miners have always acted in good faith, and they could not, even if they would, mine by hydraulic process in the region under discussion except under the provisions of the Caminetti act, which protects the valley residents by provisions uniformly observed. This is not a question at all relating to hydraulic mining; it is a matter of self-preservation to valley residents, and any attempt to divert thought from that point in arraying antagonism that should be allayed is but a specious plea for continued obstruction and delay.

Present stress is laid upon present damage occasioned by the recent great rainfall, when, as a matter of fact, the present condition of much of Yuba, Sutter, Yolo and Sacramento counties is due to causes that the proposed national legislation can best obviate and most quickly remove.

Congressman Johnson's bill to create a Sacramento River Commission has not the slightest possible show to pass the present Congress. The measure that went over from the 53rd Congress has. It should be the province and purpose of every dweller in the region affected to aid in the passage of this measure to which Congress is practically pledged. The only mutually satisfactory work ever done in this regard has been that accomplished by the U. S. Debris Commission under Federal direction. It is of prime importance that that Commission be empowered to continue such work of supervision; it is equally important that proper appropriation be made for the maintenance of that Commission. The original appropriation for the creation and support of that Commission will be exhausted in a few weeks. Prompt, united and harmonious effort is needed to secure national legislation that will result in mutual good and aid in satisfactory settlement of the problem. Stolid opposition, change of front and appeals to prejudice must result disastrously to all. We appeal to the mistaken Sacramento and Marysville opponents of the present measure to consider the gravity of the case, to realize the great importance of the situation, and to withdraw their opposition to the only bill that can afford them protection or relief.

This intestinal strife should cease. Were every hydraulic mine to close down to-morrow and stay closed for the next century the regular winter rains would still annually fill and overflow the river beds. If we all act in unison we can do some good. The only effective way is to stop wrangling and work together. The miners and those representing the mining interests want to help the valley residents. It is at least in order for the valley residents to want to help themselves. The first necessity, if they do, is to disregard their self-constituted leaders and do some thinking for themselves. Let them not forever look back. The whole question has advanced. All we ask is that those interested will stop shouting long enough to allow a fair, just presentation of the matter to Congress, with due regard to their interests. Frantic appeals to prejudice should have no weight with sensible men. If the present honest effort to get this great matter properly before Congress for final solution and permanent relief should fail the blame will lie on those who are now mistakenly opposing the very plans most conducive to their own prosperity.

## Concentrates.

JANUARY disbursements on the Comstock aggregated $69,-239.66.

THE Colorado Springs, Colo., mining exchanges are about to consolidate.

THE roadway for the Iron Mountain railway, in Shasta Co., is completed.

THE daily 100-ton capacity of the De Lamar, Nev., mill is being doubled.

TRINITY RIVER was higher during the recent storm than it had been before since 1861.

THE Calaveras *Chronicle* of Oct. 20, 1860, announced that eighty mills were crushing quartz in Calaveras Co.

IF all the "proposed" smelters are built there will be a supply of facilities in that respect fully equal to the demand.

THE present monthly coinage of the San Francisco mint is about $3,000,000. It has a monthly capacity of over $5,000,000.

THE Gold Mining Exchange of this city has completed its organization, appointed its committees, and is now ready for business.

THE Virginia *Enterprise* says: "Nearly twenty families have left the Comstock for Butte, Mont., since the beginning of the year."

AS in White Pine, Nev., in '69 and '70, and at Leadville, Colo., in '79 and '80, pneumonia is now reported to be cruelly fatal at Cripple Creek, Colorado.

TO-DATE the rainfall in this State has been just about what the miners want; a little too much of a good thing in some cases, but plenty everywhere for all purposes.

LOCAL PAPERS say that under the proposed management the Boise City, Idaho, Mining Exchange will be more of a detriment than a benefit to legitimate mining in Idaho.

THE La Candelaria Mining Company is about to increase its capital stock from 2688 shares of the par value of $1000 each, or a total value of $2,688,000, to 268,800 shares of $50 each—a total value of $13,440,000.

IN the construction of the Mountain mine smelting furnace at Keswick, Shasta Co., over 150,000 pounds of iron and steel has been used; the reducing capacity of the smelter will be 200 tons of ore each 24 hours.

AT Coulterville, Cal., this week, P. Matsen, an employe of the Merced G. M. Co., met a terrible death by falling 200 feet in a chute, about fifteen tons of rock being dumped thereon before the accident was discovered.

BETWEEN Salton lake and station, San Diego Co., and Yuma, nearly 500 mining men and prospectors are reported in the mountains locating gold mining claims or preparing to erect mills to work gold-bearing quartz already located.

THE trial of John Hays Hammond began at Pretoria, South Africa, last Wednesday. He was formally accused of having openly avowed opposition to the Transvaal Republic. The trial was adjourned, and he was liberated on bail.

ON Nov. 3, 1860, the MINING AND SCIENTIFIC PRESS offered $2500 reward for a "mode or process of separating the gold from the sulphurets as found in the mines of this State." On Dec. 1, 1860, the amount of the offered bonus was increased to $5000.

THERE are six mills at Murray, Idaho, running seventy stamps, as follows: Golden Chest, twenty stamps; Mother Lode, ten; Yosemite, ten; Daddy, ten; Golden King, ten, and the Jenkins claim, ten, all of which are reported to be making money.

THE new woman is in evidence in Denver, where Mrs. Mary E. Phelps has organized a woman's mining company. She says "no man on earth shall own one share of stock." The board of directors are all women. It is probable, however, that as work progresses men will be found necessary.

IF the miners working in the Winthrop mine, near Ishpeming, Mich., get out 18,000 tons of ore this month, they will be paid $3 a day and the wages of other laborers will be advanced proportionately. This will be a return to the wages of four years ago. Some of the men at the Lake Angeline property earn $75 a month.

DAILY REQUESTS for back numbers of this paper are filled. This week came from Arizona and British Columbia requests for copies issued in 1862 and 1864 respectively. The MINING AND SCIENTIFIC PRESS of those days is interesting reading. The 1862 numbers of this paper contain a complete history of the mining, mechanical and industrial progress of this coast since May, 1860.

IN the present House of Representatives there are five miners. Speaker Reed has seen fit to keep all Pacific coast Congressmen off any committee having anything to do with mining. There are in the present House three civil engineers, thirty-eight manufacturers and twenty-seven editors. There are also 233 lawyers, fourteen college professors, forty-one farmers, twenty-five bankers, and two insurance agents.

THE Rollins lead mine, Lincoln mining district, Beaver county, was the first mine patened in Utah. It was located in 1859, and consisted of 3,000 linear feet by 100 feet in width, the maximum allowed under the then prevailing laws. Locators were then permitted one claim of 200 feet for discovery and one by pre-emption, and subsequent locators one claim of 200 linear feet upon the same ledge.

ATTORNEY-GENERAL FITZGERALD is of the opinion that State Debris Commissioner J. F. Kidder is entitled to compensation for actual work performed only, and that he is not entitled to appoint a secretary until such work begins, as the act which creates this office provides that the State must give an appropriation of $250,000, to be met with a like appropriation by the United States Government for the purpose of restraining dams.

THE Virginia, Nevada, *Enterprise* says: "Mr. Frank Sharon recently was on the Comstock in the interest of the Corral Hollow Coal Co., which is situated near Stockton. The Corral Hollow Coal Co. is about to erect extensive works, and Mr. Sharon came to examine the new Yellow Jacket hoisting works, with a view to purchasing and removing them to Stockton. Mr. Sharon also examined a large steam shovel at Dayton, the property of the Carson River Dredging Co., with a view to purchasing that also for the same company. It is understood that Mr. Sharon will report that the machinery at the new Yellow Jacket is much larger than the requirements of the Corral Hollow Coal Co., and that the expense of moving the cumbersome castings would be too great. It is understood, however, that an offer was made for the works which may possibly be accepted. Mr. Sharon made a favorable report on purchasing the steam shovel at Dayton."

JOHN DISTELHORST of Siskiyou Co. is in this city, having built one of the dredging machines of which he is the inventor, which, upon his return, will be placed in the Klamath river. A large part of Klamath river, from Beaver creek down, has been secured by the Distelhorst brothers and a number of their bedrock scrapers will be put to work in the spring. Four of the dredgers were operated in the upper Sacramento river last season, one of them cleaning up about $20,000.

THE Sacramento Board of Supervisors has received a letter from Congressman Barham in reply to resolutions sent to the California Representatives respecting the bills introduced in Congress relating to hydraulic mining, in which he desires the navigability of the rivers maintained and the interests of the farmer preserved, and adds: "I think it is the duty of the Government to construct dams, impound the debris and do all things necessary to allow the mines to be fully operated."

AS ON THE COMSTOCK, where Virginia, Nev., is mined and undermined, so in Butte, Montana, where a company having for its object tunneling under the City of Butte has been formed by C. H. Palmer, J. A. Coram, L. Merrill and other stockholders in the Butte and Boston Mining Company, which will drive tunnels under the entire city, it being their opinion that rich copper and silver ores are directly under the city and that Butte is built over mineral deposits richer and larger in extent than those of the Anaconda.

A ST. LOUIS, Sierra Co., Cal., subscriber writes, asking that "Concentrates" decide a bet. "A. claims that a boy who supports himself can locate mineral land. B. claims that nobody but a citizen of the United States twenty-one years of age can locate mineral land." A legal friend who is authority on those matters makes reply as follows: "Locations of minerals upon the public domain are confined exclusively to citizens of the United States, but in this matter a corporation is considered a citizen, and so are a woman and a minor, and they may each make valid locations."

IN the case now on trial where the Carson City G. & S. M. Co. sue the North Star M. Co., Nevada Co., for $825,000, value of ore alleged to have been removed from plaintiff's ground, Judge Beatty, in the U. S. Circuit Court in this city, holds that defendant may introduce its U. S. patent as evidence of its extra-lateral rights in the matter. Incidentally Judge Beatty holds that a patent furnishes conclusive evidence of facts involved, without prejudice to the legal questions involved, and that under the law an owner of contiguous mining claims can include all his purchased locations under one patent.

UTAH'S LEGISLATURE is about to create a State Mining Inspector, who must have practical knowledge of the modern methods of working, ventilating and timbering mines, and an experience of at least three years in mining in the mines of Utah. He shall examine the condition of the mines, inquire into the causes of accidents, if necessary require the owners to provide against recurrence of such accidents, examine the condition of all machinery, the methods of timbering the workings, the manner of ventilation, supervise the storage and care of explosives and is forbidden to reveal any information concerning the character of ore bodies, under penalty of a fine not exceeding $500.

THE wholesale incorporation of colossal "mining companies" in Cripple Creek, Colorado, is so great that the *Mail* in publishing the column lists of them shows unusual disregard of the dignity usually conferred by capital letters, the dollar mark, the names of the distinguished incorporators, the scene of their proposed operations, the honored site of their offices, etc., but bunches the business this way: "manchester g & m co 10,000,000" "metropolitan g & m co 2,000,000" "gold stamp m co 2,000,000," and so on by the dozen. The idea of dismissing the advent of a $10,000,000 company or even a $2,000,000 company by a brief abbreviated lower case bobtail "manchester g & m co 10,000,000!"

THE Denver *Republican* of the 30th ult. represents California as being "jealous" of Colorado, and that the recent enterprising efforts at gold production in that State have aroused a spirit of "rivalry" here. Not at all. There is no "jealousy" in California; rather a pleasure in the knowledge that Colorado has so bravely weathered the recent financial stress. As for "rivalry," there exists none but a friendly determination to keep in the lead of gold-producing States. Gold mining is the one business on earth in which there exists no business "jealousy" or "rivalry," for there is no competition; the product is eagerly sought by the customer, and there is no present fear of overproduction or want of consumption.

DURING the week the U. S. Circuit Court of Appeals has made a modifying decision in the case of Austin Walrath, appellant, vs. the Champion Mining Co. This litigation regarding two adjoining mines in Nevada Co., it will be remembered, resulted in the lower court in favor of the Champion Mining Co., reported in full detail at the time. Judge Ross now decides as follows: The opinion of the lower court, in so far as it limits the extra-lateral right of the complainant to follow the vein called in the record the back or central vein in its downward course, is erroneous. It is conceded that whatever right the complainant has in or to the ledge in controversy is derived from the act of May 10, 1872, embodied in the Revised Statutes as section 2322. Unless that ledge has its top or apex within the lines of the surface of the location of the Providence claim the complainant has no extra-lateral rights to that ledge at all. But that it does have its top within the surface lines is an uncontroverted fact and was so found and adjudged in the court below. The complainant, therefore, has the extra-lateral right conferred by the statute, which is the right to follow the dip of the ledge in its course downward outside of the vertical side lines of the surface location of the Providence claim wherever it goes until it comes to the vertical planes drawn downward through the end lines of the location continued indefinitely in the one direction. Beyond those points of intersection the extra-lateral right did not go. In no case can the extra-lateral right of a first locator in respect to a vein, lode or ledge, having its top or apex with the lines, be bounded by the side lines of the surface location extended downward or otherwise.

## Mines, Miners and Monopolies.

Written by J. A. EDMAN.

NUMBER IV.

As determined by customs and practices based upon the fifty years' record of gold mining on the Pacific coast; from the letter and spirit of legislation up to the present day; from the etymology of the term and its universal acceptation in this country, the words "mineral land" must be taken as denoting an inherent and intrinsic quality, not dependent on time or on external conditions, and expressed in other words as "land containing mineral" and, as a necessary distinction, as "land containing useful minerals." Land containing mineral must always contain it until exhausted by industrial processes or the ever active forces of nature, and this fact remains whether abundant mineral was discovered previous or subsequent to a land grant. To limit by time of actual discovery, or qualify the term in degree by amount of mineral or by relative value of product, is as impracticable as it is absurd, as will appear by applying the same reasoning to agricultural land. Under such construction much of the land of the Sacramento valley, which by nature may be sterile and has not been improved by the hand of man, should be classed as "desert land" and be amenable to the laws affecting such land. The ultimate values of mineral land when improved depend upon conditions so manifold and various that they cannot be formulated by any human laws; the estimate even of what would constitute profit differs so widely that such a rule of definition would be absurd; the estimate of profit by the laboring man striving for an existence and working his small claim in a mountain ravine, can furnish no comparison with that of the wealthy owner of a large and well-developed quartz or hydraulic mine. Who then shall say that the former should lose his all, while the latter should have accorded him the full protection of the law?

To except minor portions in the interior of a mineral belt as agricultural because profitable mines are not in evidence thereon would be as absurd as to proclaim as mineral land such portions of the Sacramento valley where profitable farming is not prosecuted. Its absurdity becomes patent where the even-numbered sections within a land grant are accepted as mineral, while beyond the section line the land identical in mineral and geological character is, on the belief of a railroad land agent, taken to be agricultural land. The only logical basis for a segregation must rest upon geologic character, by observing which the outward boundaries of a mining belt may be established, and all within it be classed as mineral land, for it is an established fact that within the before-mentioned metamorphic schists and associated igneous rocks constituting the main gold belt no area of a square mile can be found without evidences of valuable mineral in veins or in gravels. The relative value of mineral land should be estimated not only from its actualities but from its potentialities, to greater extent than the values of farming lands are so estimated. In a country where land fit for tillage is comparatively cheap and abundant, the State can have no pretext for or derive any benefit from allowing mineral land to be occupied and held as agricultural. The reverse practice has obtained in some of the older countries, where a belief in the importance of free lands for mining has led to the enactment of laws allowing the entry by the miner upon private land, under certain conditions, as in Germany and Scandinavia, and the general practice by nearly all the older governments of jealously guarding the mineral lands of their public domains.

That the prosperity and expansion of mining, specially in the noble metals, are dependent upon free land is fully proven by the records of history both in the Old and the New World, and never more so than during the period subsequent to the Spanish conquest of America. It was due to the wise mining laws and regulations in force for some centuries, even more than to the innate energy and boldness of the old Spaniards, that the gold and silver mines of the Spanish-American colonies reached such marvelous development, and yet to this day, after nearly four centuries of successful exploration, present vast and promising fields to the miner. The Spanish policy was to preserve the mineral land to the miner, subject to a tax to the Government, and large holdings were discouraged and made impracticable. Even the largest of the grants made by the Spanish crown bear but an insignificant proportion to the grants made to the railroads in the United States. As a result, good placer mines yet abound within the Spanish-American countries, although the wise policy of Spain has of later years been set aside by the present rapacious and unstable governments of Central and South America, as well-as by Mexico.

That private ownership of large tracts of land is inimical to gold mining is strongly evidenced in this country by the relative insignificance and slow progress of gold mining in Virginia, Georgia, North Carolina and Alabama, although many of the mineral areas of these States offer in the gold values of their ores fully as great promise as our southern gold belt. To come nearer home, we have striking evidence of the incapacity of wealth alone to wisely develop large tracts of mineral land and make them productive in the records of the Mariposa land grant and the Natoma grant at Folsom, the former rich in gold-bearing quartz veins, the latter covered by auriferous gravels; yet what are their products in gold to-day contrasted with that of similar areas free and open to the miner?

Another potent factor in national development, which in these days of inflated speculation, of corporate greed and power, and of popular worship of wealth, has been almost lost sight of, is the rights and the capacities of the individual as contrasted with the demands, the privileges and the abilities of associated capital. In gold mining more than in any other class of mining, individual skill, exertion and energy are essential to success, and in no department is this more called for than in prospecting, by which term the exploration of new mines is generally implied. Without skilled prospecting there can be no expansion in gold mining, no new mines found to take the place of those exhausted or abandoned. But even in old mining fields the services of the prospector and explorer are needed to discover resources overlooked or neglected during the flush periods of mining. The prospector's life is so full of hard work, of privations and of dangers, that the promise of wages alone has for him no allurements; he longs for freedom and hopes for some splendid reward for his labors, and he shuns the land over which some non-resident speculator or owner claims title or control, or from which the railroad land agent tells him to move on. These true pioneers of mining are every year becoming rarer in California, but are now found in the lead in the new States and Territories, and it is to them we owe the development of Alaska's gold resources as well as Arizona's, the extension of civilization in the Arctic as well as in the Torrid Zone.

The prevalent delusion that capital alone is omnipotent has led to innumerable disastrous schemes in agriculture as well as in mining, all in disregard of the confirmed experience of nations that small holdings of land, both agricultural and mineral, are one of the safeguards for the true prosperity of a country. Admitting all the proper uses and benefits of capital in mining, it has frequently signally failed of results in California from lack of the individual skill, energy and integrity which ownership chiefly engenders and fosters. In parallel lines with the superior production of small farms, individual miners or small companies have been more successful in California than the larger mining corporations, and this becomes most evident in a higher percentage of product from a given area of land or amount of material treated, as large and rapid operations, specially in gravel mining, disregarding apparently trivial details, often entail enormous waste. Even in quartz mining, where capital can be applied to great advantage in perfecting milling and metallurgical operations, the absence of individual skill and probity is constantly causing waste and loss, generally unknown or guarded against in smaller operations.

The so-called old and worked-out mines of California, both quartz and gravel, present this day the most inviting field not only to the investor but to the working miner, and in this field alone, in which he writer has had a large experience, profitable employment can be found for twice the number of miners now employed in California, if possessed of some skill and energy. This field, as well as our virgin lands, is becoming every year narrowed for the purposes of mining, while offering no appreciable quota to the wealth or well-being of the State when so withdrawn or claimed for other uses.

In its permanent effects upon the prosperity and welfare of the people, the policy of the British Government in relation to mines and gold mining has been in marked and favorable contrast to that of our own, and as a result we find yet in Australia, as well as in British Columbia, the largest part of the mines operated by individuals or small partnerships, and scarcely any instance where property rights are at the mercy of a greedy corporation. The unwise departure from this sound policy in the British possessions in South Africa, caused by the grants to the South African Company, has already brought its natural consequences and will no doubt soon find its correction in the common sense of the English people, and will have reached a solution long before our own long-suffering citizens will rise in their strength against their oppressors.

In the British colonies the miner deals directly with the crown, represented by a Commissioner of Mines, and his license, lease or patent fully protects him; the American gold miner is not recognized by the General Land Office or his mining property protected by the Government until he applies for a patent, and even when this is issued, after great expense and vexatious delays, he is not safe against the attacks of the railroad corporations, as the records of our courts bear witness. It is this absence of official recognition, denied the citizen but lavishly accorded to the corporations, that has laid at the root of the just complaints of the miner, and has enabled the land-grant railroads to control the situation. This recognition should be had immediately and be fully defined by statute, and should take its inception from the time when a mineral location is made and put on record, and be fully established and shown on the records of the General Land Office when one hundred dollars' worth of labor or improvements had been made on a mining claim and had been properly certified to the local land office. The perfecting of title by proceedings for patent should be optional as now, or if the costs and difficulties of procuring it were reduced, may be made obligatory within a certain number of years, for instance five years. In this simple way full evidence of mineral character would always be available, and the promise of our Government in opening the public land for miners would be honestly fulfilled. The question may be asked, Why do not miners patent their claims? The answer to this is that in many instances the expense is prohibitive, and the involved and impracticable rules in force, magnified in importance to the mind of the unlettered citizen, makes it necessary for him in nearly every instance to employ a professional attorney instead of dealing direct with the local land office or a Government agent, as should be provided by law. The cloud thrown upon a valid title to any mining claim within land-grant limits by the pretensions, however unfounded, of the railroad companies has largely been instrumental in preventing the exploration and development of mines thereon, as was evidently the purpose and policy of the corporations. This, while apparent everywhere, is most evident within the main gold belt.

The physical conditions of the main belt are to a great extent reproduced in the northern gold belt. Its topography is still more rugged and irregular, and, excepting the portion adjacent to the railroad, its means of internal communication are scant and inferior. With the exception of some valleys in the coast division, nearly the whole area is covered by high mountains, cut by deep and almost inaccessible canyons. Its eastern half rises above the winter snow line and averages over 4000 feet in altitude, reaches at many points over 7000 feet and culminates at Thompson's peak with 9100 feet, while on the eastern edge of the belt Mount Shasta lifts its snowy summit 14,500 feet above the sea. Except along the coast, the climate is even more rigorous than in the northern portion of the main belt. Much of its eastern half is covered with snow for many months, and even the railroad, penetrating its fastnesses along the deep cleft of the Sacramento river, is frequently impeded and blocked by snow and snowslides. Practically the only arable land contiguous to the railroad is in the volcanic region east of the road, of which a comparatively small part is known as mineral; beyond this but a few small, elevated valleys and basins west of the railroad offer but a subsistence to the farmer or dairyman. No low and gently rolling ridges reach here into the milder climate of a semi-tropical valley as in the main belt; the aspect of nature is rough and inhospitable, but in wealth of mineral it rivals if it does not exceed the best now available land of the main belt. But even here, among the snow-covered and almost inaccessible mountains that tower some thousands of feet above the railroad in the region west of the line and within its land-grant limits, the far-seeing eye of the Southern Pacific land department has discovered vast tracts of agricultural land on the odd sections, and the areas where the expert surveyor can scarcely find a foothold are now to be found described at Washington on the lists of land selected by the company, certified to by the railroad agents as agricultural and accepted as such by a more than complaisant Commissioner and a compliant Secretary of the Interior, in spite of the remonstrances of the Miners' Association. The lands thus wrongfully sought to be absorbed are situated in Shasta, Trinity and Siskiyou counties, and comprise some of the most valuable vein and placer mines of California.

The southern gold belt differs so much from those described in climate, topography, geology and conditions of development as scarcely to be comparable with the other gold belts, except perhaps the portion within San Diego county. In this belt the mineral areas are often intersected or concealed by evidently agricultural land. Exploration has done but little to develop its resources, and among the chief causes of that condition the numerous private land grants scattered over its western half is most prominent. Peculiar climatic conditions and the resulting light rainfall have also retarded the development of its mines. In the northern portion the Tehachapi, with the San Gabriel and San Bernardino ranges, contain most of the mineral land, while that of the Coast Range within the southwestern part of San Diego county approaches nearest to the physical features of the main belt.

But even this region, blessed with so many and varied natural resources, has not escaped the curse of railroad land grants, which, added to the incubus of the old Spanish grants, bids fair to prevent any extended development or great economic benefit from its mineral resources. Viewing the map of southern California, with the broad belt of Southern Pacific grants depicted thereon, the question will naturally arise whether it was accident or design that caused the serpentine folds of the land grant conferred by a generous Congress thus to enfold

within its limits the best mineral land of this belt, as well as some of the fairest agricultural land of California.

The Great Basin mineral belt, as being comparatively little explored and in most of its extent happily exempt from the land-grant curse, need not here be particularly discussed.

Meadow Valley, Cal, Jan. 25, '96.

*(To be Continued.)*

## The Butterfield Tunnel Scheme.

Written for the MINING AND SCIENTIFIC PRESS by ALEX HYSLOP.

One of the most daring mining enterprises ever undertaken in Utah, and one which presents many unique features, is the big tunnel of the Butterfield Mining Company, which has crosscut at nearly right angles for a distance of 8200 feet the formation of the south end of the Oquirrh range, in which the famous mining camp of Bingham, Utah, is located. Other important tunnel schemes have been inaugurated in Utah, and some have been carried through to completion, notably the big drain tunnel of the Ontario, which is over three miles in length, but where the Ontario tunnel was run to tap the lowest workings of the mine at a depth of 1500 feet below the neck of the shaft, the Butterfield tunnel can be more properly designated as a prospect hole. The Ontario tunnel tapped the lowest workings on the vein of that property, but the lowest workings on any of the veins crosscut by the Butterfield tunnel is more than 1000 feet above the level of the tunnel, and the greatest depth reached under the surface by the Butterfield tunnel is 2200 feet.

The tunnel was started with hand work in February, 1892, and in August of the same year Ingersoll - Sargeant drills were put to work, a Rand compressor which obtained its power from a thirty-six inch Pelton wheel, run by the stream of Butterfield canyon, having been erected at the mouth of the tunnel. In order to provide against shortage of water a steam engine and condenser were also provided, but since the tunnel attained any depth the flow from the formation has been sufficient to preclude the possibility of a shortage of water. From the time the drills commenced working the tunnel has made a record in underground work that has probably never been excelled. For 400 days succeeding August 11th, 1892, the average daily run of the tunnel was 13.39 feet, but when this depth was attained the average commenced to decline, and when work was suspended last September had decreased to 11.40 feet per day.

The tunnel is 5x8 feet in size, with a waterway under the track two feet deep and three feet wide, so that for every four driven forty-six feet of formation were removed, and on the maximum runs about 616 cubic feet were mined and discharged every day. The exact altitude of the mouth of the tunnel is 6000 feet above sea level, the grade is five inches to 100 feet; the gauge of the track is nineteen inches, laid with steel rail weighing sixteen pounds to the yard, the track being placed to the right-hand side of the tunnel to provide space for the two air pipes and the water pipe for the drills, which in this tunnel are laid on the ground, instead of being suspended from the timbers, as has been the practice in most such enterprises. The air pipe is of sixteen-inch galvanized steel. The pipe that carries the compressed air for the working of the drills is five-inch Kalomine with a lock joint and a leaded flange every sixty feet, and the pipe that conveys the water to the drills is one inch. This receives its supply from the outside, being connected with the source that supplies the Pelton wheel for the machinery, and which is 440 feet higher than the mouth of the tunnel. In addition to the machinery mentioned, all of which is run from the power obtained from the Pelton wheel, the company has a 110-volt dynamo, which furnishes light for the office buildings and the power house, but as yet the light has not been introduced into the tunnel. The latter, however, is provided with telephonic communication from the face to the mouth, with two intermediate stations. Horses are used for hauling the loaded cars out of the tunnel, and one animal pulls sixteen cars of a capacity of 3000 pounds each.

This remarkable work was undertaken by Mr. George W. Keel, the manager of the Butterfield Mining Company, who was assisted by A. P. Hanson, a civil engineer of Utah. The tunnel is on a right line through its entire length of 8200 feet, and so true has been the line that daylight is in view from the face of the tunnel. The work was commenced in blue lime, which after a few hundred feet changed into porphyry, and then quartzite, which was again succeeded by porphyry. At a depth of 3000 feet the white lime commenced to come into the formation, and continued for a distance of 1000 feet in the tunnel, to be followed by porphyry. At this point the ledges began to be in evidence, and ore of the same character as the croppings on the surface was encountered. The vein of the Lucky Boy mine, in Black Jack canyon (which property does not belong to the Butterfield Company), was cut on its regular dip of 35 degrees that had been indicated by the upper workings, but at a depth of 1000 feet lower than any previous workings on the mine. It is also proper to state that the tunnel was run through the mountain at a point considerably to one side of the end lines of the Lucky Boy, so that there is no chance for litigation on the score of cutting a vein that the tunnel company did not own. The next vein to be cut was that of the Queen, the title of which lies in the Butterfield Mining Company. The upper workings showed this vein to have a dip of 45 degrees, and where it was intersected by the tunnel this dip was maintained, and in addition the character of the ore was identical with that of the upper workings, more than 1000 feet higher. The ore of the Queen is in the form of ruby silver, running from 700 to 1000 ounces and higher, and it is not only remarkable but is a setback to those who always maintained that the veins in the Oquirrh range had no depth and no values, that the ore in the vein of the Queen cut by the tunnel is of the same character as that extracted from the upper workings and that the values are the same.

After passing the Queen vein, the tunnel again got into the porphyry, before it reached the ground of the Northern Chief, another of the properties owned by the Butterfield Company, and the vein of which has not yet been cut. It will have been noticed that the difference between the dip of the Lucky Boy and the Queen veins is ten degrees, the latter being more near the vertical. The vein of the Northern Chief is much more nearly vertical than that of the Queen, and it is expected that when it is cut in the tunnel it will be much closer than it is where it crops out and has been worked in the upper workings. This gives rise to the theory, which Mr. Keel admits was one of the reasons that actuated him in undertaking the work of running the tunnel, that the veins of the Black Jack side of Bingham tend toward one common source, and as the journey is prosecuted toward the north the relative position of the dip changes, first to the vertical and subsequently to a line almost at right angles with the original dip.

When work was suspended in the tunnel its face was in porphyry, and the established flow of water was in the neighborhood of 1200 gallons per minute, although at times, when some new feature of the formation was encountered, the flow has risen to as much as 5000 gallons, and has swept everything out of the tunnel on more than one occasion. The question is asked, why the enterprise should be brought to a standstill just at the time when the tunnel was commencing to do some good, and was tending to the drainage of the mines on the Bingham side of the range. Mr. Keel himself admits that the dyke porphyry that he is now in is, in his belief, the main dyke of the range, and that when it is cut, the waters that have troubled the Old Telegraph in its deeper workings, the Spanish, Utah, Niagara and South Galena mines, will drain off, and pumping will be discontinued. It may be that this is the reason to be assigned for the suspension of work, and that the Butterfield Company do not propose to drain the properties of other companies without recompense. If this is the real reason (and no other is apparent, as the Butterfield Company is not in lack of means) it is to be regretted that the various companies cannot enter into an agreement that will be satisfactory to all concerned.

The tunnel project is important in more than one sense, and its ultimate ends have not yet been mentioned. In addition to cutting some strong veins at great depth, it has demonstrated the existence of those veins at a depth that has frequently been declared impossible by some of the best mining authorities that are operating in that region. More than that, it will be a working tunnel for all the mines on the north side of the range, which are among the heaviest producers of the district. The flow of water from the tunnel has increased so that almost unlimited water power can be obtained, and when the enterprise is completed it is among the probabilities that the output through Bingham will go via Butterfield; that large concentrating mills and electrical plants will be erected on the Butterfield side, and that the total output of that vast region known as Highland will go through the tunnel of the Butterfield Mining Company.




THE HOMESTAKE MILLS.

## The Homestake Mills.

The engraving on this page of the Homestake mills, for which we are indebted to the courtesy of the Black Hills *Mining Review*, has little out of the common to distinguish it from thousands of similar constructions in the country. It is interesting mainly as the mill of the old reliable Homestake, owned largely in this city, and which last week paid its 120th dividend, making a total of dividends paid of $5,748,000.

PERHAPS there is nothing that so clearly explains the intense ignorance of the Turks as the fact that the Censors of Turkey prohibit the importation of all educational books, this state of affairs being brought about in one book by the discovery in one book of the formula $H_2O$, which the wise men of the court interpreted to mean: "Hamid II is naught—a cypher—a nobody.—Digest of Physical Tests.

ALL bottled mineral water—artificial as well as natural—have been found by a German pharmacist to contain bacteria. The waters are mostly germ-free, when taken from the earth, the bacteria being introduced by carelessly washed bottles, corks, etc

## Recommendations for Safety Appliances in Colorado Mining.

From Harry A. Lee, Commissioner of Mines for Colorado, is received Bulletin No. 1 of the Colorado State Mining Bureau, containing recommendations for safety appliances in mining in Colorado:

The bill establishing the Colorado Bureau of Mines provides that the officers of the department "shall inspect and determine the safety of devices and methods used in mining" * * * and "take necessary measures to make them safe." * * * "On receipt of notice * * * shall enquire into the cause of accidents." "Shall exercise sound discretion in the enforsement" of the act; shall give notice of any defect or practice found "to be dangerous," and "order the same to be remedied." It further provides a penalty for non-compliance with such orders and imposes a mandatory duty, viz.: "Any owner, agent, manager or lessee having charge or operating any metalliferous mine, whenever loss of life or serious accident shall occur connected with the workings of such mine, shall give notice immediately and report all facts thereof to the Commissioner of Mines." In the belief that all mine operators desire to strictly comply with legal requirements; to avoid fatal accidents and throw every safeguard around their employes, Commissioner Lee makes sundry recommendations:

*Explosives.*—Explosives must be stored in magazine provided for that purpose alone, to be placed far enough from working shaft, tunnel or incline to insure their remaining intact in event the whole stock exploded.

All explosives in excess of amount required for a shift's work must be kept in the magazine. Under no conditions will the storage of powder in underground workings where men are employed be permitted.

Each mine must have a suitable device for thawing powder and keeping it in condition for use. The water or steam bath is the only absolutely safe device. By a water bath is meant the surrounding of the vessel containing the powder with another vessel containing water which can be kept at desired temperature. The thawing of powder with dry heat is unsafe. Dry heat, under the most favorable conditions, may exceed a temperature of safety.

Miners should not be permitted to carry powder in their boot legs or elsewhere about their person. A suitable place or places should be provided for preparing charges. At these points there should be a box or cupboard for caps and fuse. This should be securely fastened and so arranged that the caps cannot be jarred out or anything fall into the caps. A cap-crimper should be attached to the side of the cupboard with a small chain.

*Oils, Candles, Etc.*—The storage of oils, candles and other inflammable substances demand the erection of a house for that purpose and at a safe distance from the main buildings. They must not be stored with the explosives. Their removal for use, like the explosives, should be only in such quantities as are necessary to meet the requirements of a day.

*Fire Protection.*—All plants using steam, and especially small ones where boiler, engine, blacksmith shop and shaft are all under one roof, must have a hose and hose connection to injector or feed pump and keep same ready for instant use. The line of hose should be sufficient to reach the farthest point of the plant. As a rule the water supply in small plants is limited and safety is largely dependent upon quick action. A few hand grenades hung about the plant in convenient places are great safeguards and should be indulged in. Heating stoves placed in shaft houses should receive even more care in safety equipments than is common in dwelling houses.

*Timbering*—Next to explosives, inadequate timbering causes more fatality than anything about a mine. The general inclination is the use of too frail and few timbers. No rule can be fixed for use of timber: the conditions must be met as they arise and economy in timbering lies in doing well what is done. Strange as it may appear, taking districts as a whole, the best timbered mines are the most inaccessible and above timber line, and the poorest timbered mines are those located in the woods. Temporary work which endangers life is criminal, and mine operators who supply their timbermen with material below the standard asked for assume very grave responsibilities.

*Code of Signals.*—1 bell—hoist (when not in motion); 1 bell—stop (when in motion); 1-1 bell—lower; 1-1-1--1 bell—with care—hoist (man on); 1-1-1--1-1 bell—with care—lower (man on).

Other signals to meet individual demands can be arranged, but the code in full must be plainly printed and placed in the engine-room, at the collar of the shaft, and at each station or level, together with a notice and penalty for wrong or improper signals.

Wrong or improper signals should be treated vigorously. An employe ascending upon one bell or descending upon two bells should be discharged. In mines working more than one level, signal gongs or speaking tubes should be placed from level to level. The danger of an employe signalling the engineer without first knowing the location of cage or bucket is apparent. Where more than one level is being operated, special signals from lower to higher levels should be established. When established, the stopping of an up-going cage or bucket should be abolished. To illustrate this point: A. signals to hoist from sixth to second level; as cage or bucket passes fourth level, B. stops it. The engineer is at a loss to understand; before executing one he has received another order. Let this be repeated several times and he becomes nervous. A rattled engineer is a dangerous attachment. It should be borne in mind that one bell does not mean "hoist until stopped," but "hoist to surface." Down-going buckets or cages are always "slowed down" at each level, and can be stopped with impunity, but on up-trips no one knows what signal is being obeyed and should not interfere.

*The Bell Line.*—The bell line should be so constructed that signals can be sounded clearly and easily from any station. This essential device is much neglected and should receive more attention. A few iron shieve wheels or rollers so placed that the line will stand clear of timbers is often all that is required.

At stations or levels where the line is used from both sides of the shaft, an attachment should be made so that reaching across the shaft for the line is unnecessary.

*Hoisting and Lowering Men.*—The hoisting or lowering of employes with a cage or bucket should be permitted or positively prohibited. If permitted, a notice must be posted near collar of shaft, stating the maximum number who may use cage or bucket at one time. This limit is not jeopardized when the men go "on shift;" but, unless fixed, may be exceeded at the end of the day's work.

The handling of men with a bucket is very dangerous, and its use is discouraged by this department as much as possible. To issue an order stopping the use of the bucket for handling men would, at the present time, work a hardship in some districts upon both the miner and mine owner. But should the work of the bureau demonstrate the necessity, action will be taken and the practice stopped.

It is to be hoped that the next Legislature will enact a law compelling all new enterprises to use a cage in shafts 200 feet deep and over.

A strict compliance with the section of this bulletin entitled "Daily inspection" will be demanded of all mine operators hoisting and lowering employes.

*Dump Guards.*—At the end of each dump track, when a car is used, there should be a device to prevent the car going over, whether the load clears or not. It is generally supposed that a trammer can let go, but records show that, while some do, the majority go over the dump with the car.

*The Shaft Collar.*—The shaft collar must be covered and so arranged that persons or foreign objects cannot fall in the shaft. When a cage is used, a bonnet, which raises with the cage and falls back to place when the cage goes down, must be arranged. This bonnet or shaft cover need not be tight beyond what would stop a small animal from falling in; but the cage in turn must be supplied with a steel bonnet, oval in shape, if solid, and if divided in the middle and hinged at the sides to admit sending down long timbers, the angles of the sides must not be less than 45 degrees, nor the steel less than three-sixteenths of an inch thick.

When a bucket and wooden doors are used, the shaft must be housed in and covered with doors which stand at an angle not less than 45 degrees pitch, hinged at the lower corners and opening upward or outward. These doors should not be less than four inches thick.

*Stations.*—All stations should have a passageway around the shaft, so that crossing over the working department can be avoided. Where flat doors are used, a guard rail must be kept in place across the shaft and in front of the level, so that it will stop anyone walking or pushing a truck or car into the shaft.

Across the track at some convenient distance an obstruction should be placed, so that cars or trucks cannot run by it and into the shaft, or trammers push cars by without removing same.

*Sinking Shafts.*—Shafts equipped with mechanical appliances must be of at least two compartments and the timbering kept well up with the work.

When sinking and work upon levels above are being prosecuted at the same time, especial care must be taken to protect men in bottom of shaft by placing close-fitting and strong doors in the working compartment and covering the ladder compartment with a plat, which will insure protection.

*The Ladder Way.*—All shafts over fifty feet in depth should be divided into at least two compartments, and one compartment set aside for a ladder way. The ladders should be sufficiently strong for the purpose demanded, and in vertical shafts should have landings at not more than twenty feet apart. The landings should be closely covered, except an opening large enough to permit the passage of a man, and the ladders should be so arranged that by no means could a person fall from one ladder through the opening to the next ladder. The ladders should be firmly fastened and kept in good repair. In incline shafts the landings should be put in as above described, but a straight ladder on the incline used.

The ladders in "upraises" or "winzes" from level to level should be likewise provided and kept in repair. Winzes and upraises are, after abandonment, very essential for ventilation, and, in case of accident, very essential as a means of escape. Just so long as they are necessary for the one cause and needed for the other, they should be kept in repair and ready for use, if required.

*Mill Holes and Winzes.*—All winzes and mill holes running from level to level should be covered or surrounded with guard rails, so that persons walking along cannot step or fall in. Winzes, as a rule, are upon one side of the main drift, and usually timbered a few sets above the drift level. Guard rails are easily placed about these. Mill holes, on the other hand, are often in the center of the drift. These must be securely covered with a door and kept covered.

*Exits, Ventilation, Sanitary Condition.*—As soon as practicable, all mines should have double or triple exits. Levels driven each way from the shaft must be connected by upraises or winzes, equipped with ladders and kept in good condition. These connections aid ventilation and provide exits or means of escape in case of accident. Connections from first levels to surface should also be made, unless underground connection is made with adjoining properties.

Proper ventilation is of such vital importance to mine operators that it is well looked after, as a general rule.

The sanitary condition about mines should receive careful attention. The use of abandoned stopes or drifts for closets should not be tolerated, and, where meals are eaten underground, the scattering of scraps and refuse matter about levels or stopes should not be permitted.

At the isolated mine boarding-house, arrangements should be made for the disposal of slops and refuse matter. It should be the duty of the foreman in charge to look well to the sanitary condition of the bunk-house and the cleanliness of his men. A large proportion of the miners are cleanly, but some are not, and a few filthy men injected into a bunk-house soon infect the whole, or cause the cleanly men to quit rather than submit to the filthiness of his enforced associate. The condition of a bunk-house is almost a sure index to the class of men employed. A cleanly and orderly condition predicts a thrifty, wide-awake and healthful crew and vice versa.

*The Indicator.*—Upon all plants handling men the engine should be supplied with a positive indicator. By a positive indicator is meant a device that is geared positively to the drum shaft and moves a target or indicator just as certain as the revolution of the drum raises or lowers the bucket or cage. Indicators arranged to move a target by the use of a string or wire cannot be depended upon, and are not as safe as marking the cable with a hemp wrapping or paint.

*Mine Visiting.*—The desire of persons to go underground, unaccustomed to mines and mining ways, should be discouraged. It is a novelty—an experience to relate to friends at home—but an experience in which the dangers are little appreciated, and of which it may be truly said, "Ignorance is bliss." Were it within the province of this department to say who should and who should not enter mines, the line would be drawn sharply and no one but employes or those having business would be admitted. Such a law would meet the hearty approval of all large mine operators, who appreciate the danger, trouble and expense to a company to be courteous, while the superintendents of smaller mines, whose better judgment is often overcome by a desire to please, would gladly take refuge and not assume the risks entailed.

*Underground Surveys.*—Each and every mine should keep an accurate plat of underground workings and have same brought up to date at least once a month by competent engineers. No greater false economy can be practiced in mining than working upon the supposition that those in charge know just where drifts are. Where mines are adjacent, or working upon the same vein, and water is encountered, the necessity is apparent and imperative.

*Boilers.*—The bill creating the office of State Boiler Inspector makes mandatory provisions regarding the care of boiler or boilers, and necessary reports to inspector. It further provides severe penalties for failure to comply with requirements. Mine operators using steam or other pressure should familiarize themselves with this law and its mandates, and thereby insure the safety of all concerned.

*The Mechanical Plant.*—In the equipping of a mine with machinery, safety is too often sacrificed to false economy. When the expense of stops and repairs are taken into consideration, the very best machinery of a given capacity to be had, regardless of first cost, is the cheapest. It is well to bear in mind that competition in the mechanical line is so close that skilled labor, iron and steel, have a fixed market value, and that in accepting a plant of a given capacity from one firm, because its bid is $500 or $1000 cheaper than another firm, the purchaser is

simply buying that much less material or skill, and endangering the success of his enterprise.

*The Mine Superintendent.*—The duties and responsibilities of a mine superintendent cover a scope of requirements unequaled in any other professional calling. One of his most important duties is the formulating of a set of standing orders, the compliance with which will insure the safety of all under him. Fatal accidents can be too often traced to lack of mine discipline. Laws governing the employes about a mine should be as inexorable as in the regular army. Let the fact become established that failure to comply with regulations, however trivial, means loss of position, without recourse, and the safety of all concerned is almost assured.

*The Mine Foreman.*—The mine foreman is practically the working superintendent, and upon him devolves the detail of practical mining. The welfare of his employers and the safety of their employes is largely dependent upon his good judgment, and he must of necessity be a thorough miner, a good timberman, and a fair mechanic.

*The Engineer.*—Too much care cannot be exercised in the choice of this officer. His responsibilities are grave and his work more wearing upon the nerves than the muscles. His cargo travels an invisible track and must be guided by hearing and feeling. Safety demands that his whole senses be on the alert and concentrated on his work. His surroundings should be comfortable in a room by himself, and under no circumstances should he be permitted to converse with visitors while his engine is in motion. A law should be enacted compelling all engineers to undergo an examination, grading them by certificate according to ability. Engineers upon mines who handle men should all carry first-grade certificates.

*Daily Inspection.*—All properties using mechanical appliances should be thoroughly inspected and reported upon daily. Some one man should be detailed to perform this duty at a given hour and make a written report. These reports should be filed and show that proper precautions are being taken. His duties should commence with the engineer, who will report the condition of the boiler, engine, cable, fire apparatus, etc.; then commencing at shieve wheel and testing all bolts and nuts on boxes and gallows frame, the cable fastenings and all things connected with cage, bucket, doors or bonnets; descending shaft slowly, examine the bell line, timbers, lining boards, stulls, skids, rollers, guard rails at stations, doors, etc. He should also ascertain the amount of powder and condition of warmers. Ascending shaft by ladders, the same care as to details should be exercised; also the condition of winzes, upraises and ladder-ways kept open for ventilation and exit in case of accident.

The observance of this provision will prevent accidents and prove economical. It does not debar those in charge from "keeping their eyes open," but they are less apt to see danger than one whose especial duty it is and whose position is dependent upon not overlooking it. This inspection can be made in comparatively short time and at a time not to discommode the working of the mine.

Most of the important requirements of the Colorado mine official are observed in the mines of California. The bulletin as published herewith carries its own comment and is an interesting addition to current mining literature.

## A Talk About Giant.

Giant powder plays fantastic tricks and smashes things sometimes on the slightest pretext. The citizens of Butte, especially, says the *Inter-Mountain*, should have a venerable respect for its powers, but unfortunately "familiarity breeds contempt" in this as in other things, and distressing accidents occur.

The greatest danger with the explosive is when it is too old or too new. In giant over a year old the glycerine in it is liable to crystallize after that time and the presence of a crystal in a stick of powder makes its handling dangerous. A scratching of that crystal, a jar of the stick or a rubbing of one stick against another is likely to produce an explosion. The best powder is that about six months old. Before that time the glycerine is almost too soft, and a new danger comes when it is being warmed for use. It is considered necessary to soften the powder before firing, in order to get the best services from it.

There is danger of getting new powder too warm and melting the glycerine. A drop falling an almost imperceptible distance will at once explode and its concussion will be enough to explode all. Giant will burn up at times without exploding, but the starting of a single drop of the glycerine it contains, either by exciting the crystal when it is too old, or the melted drop when it is too new, is what does the mischief.

A careful miner working on prospect work will sit by the fire with the powder near him, where he can watch it and note its condition constantly and work a stick in his hands, until it is mellow enough to suit him; then take another and go through the same operation, until what he needs for shooting the holes of his shift is warmed to his satisfaction. Then, if the weather is cold, he places the stick down his bootleg, so that the flesh will keep it warm, and go to work. It is out of the way in the boot and in less danger of being struck there than it would be in any other part of the clothing.

The boot is the usual receptacle for the powder, and few miners going from the cabin to the prospect hole will carry it in any other place. In the pocket there is danger. If the boot is too tight, which is not probable, the miner will place it under his shirt, rather than trust to dropping it out of his pocket.

Many mine accidents come from picking out missed holes. Now and then it happens that the miner has in some way failed to load his hole properly. The fuse may not have been properly attached to the cap or the cap may have been pulled out of the cartridge by the tampering bar and failed to explode the powder. One of a dozen possible things may have happened to make it a "missed hole." Something must be done to get out the cap and the powder that the hole may be reloaded and this something is the most dangerous work the miner undertakes. If he is careful and takes time to draw out the charge with his "spoon," a long scraper that reaches to the bottom of the hole, he can generally get all out without damage, but too often he goes at the work roughly and loses an eye, a hand or the top of his head as a penalty.

Carelessness in loading, indifference in picking out the hole, combined, have made cripples and filled camp graveyards all over the mining country, and carelessness in handling and warming powder has done much to contribute to the dangers of the work. Neither frequent accidents nor the sight of companions mangled beyond recognition appears to have any beneficial effect in reducing the number or exciting miners to greater caution. The State has done what it can by law to reduce the danger, but it remains a matter of individual caution and care for each man who has the handling of powder in any form.

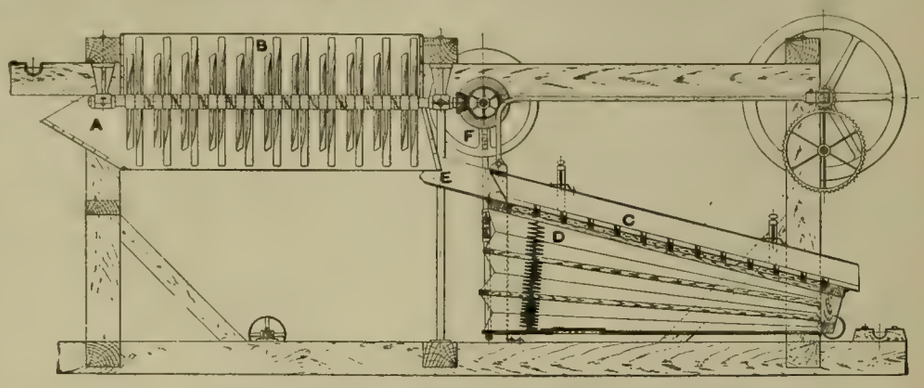
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A LONDON paper, known as *To-day*, informs its readers that the soldiers in the German army have wooden shoe pegs replaced with platinum nails on account of the extreme lightness of this metal, which the newspaper says is as light as leather. A reference to "Curtman's Chemical Lecture Notes" shows that platinum is 22.1 times as heavy as water.

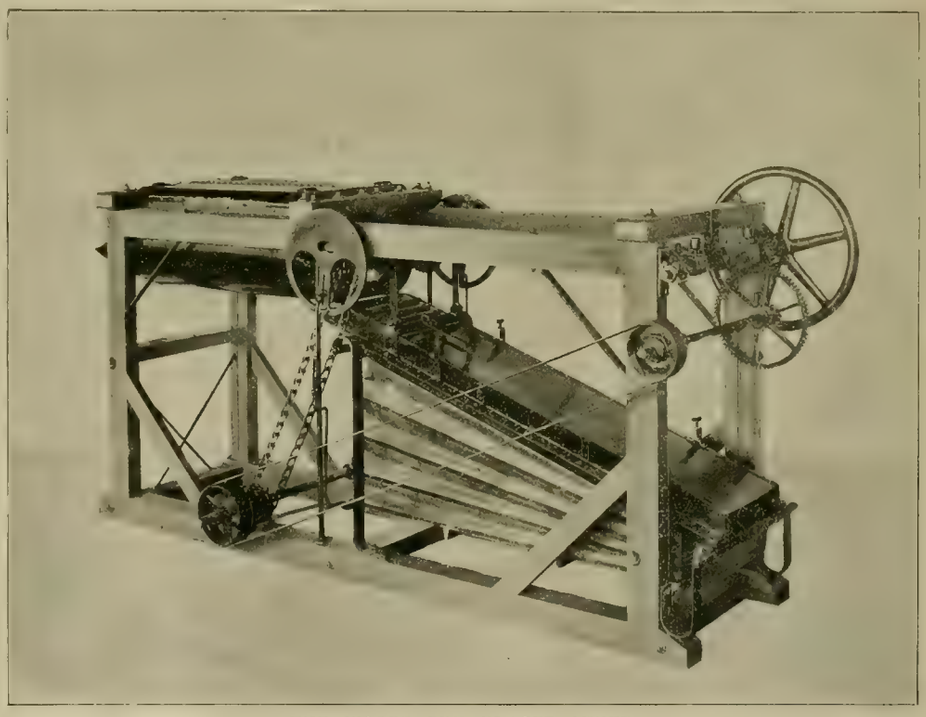
## The Woods Dry Placer Miner.

This dry placer machine is claimed by the manufacturers to be effective in the treatment of placer ground. The method presented may be readily followed by reference to the accompanying illustrations.

The ground is conveyed by scrapers to a platform placed over a hopper at the lower end of a charging elevator, and is dumped into a grizzly or screen, which lies level above the hopper, and any boulders that may be left upon it are readily removed by the man in charge. From the hopper the material passes to the elevator or conveyor, which is of the double chain or link bolt and pan type, and is carried up and falls into the feed hopper (*A*) of the disintegrating or pulverizing cylinder of the machine proper. The disintegrator or pulverizer (*B*) consists of a cylinder containing two horizontal shafts arranged side by side and parallel to each other, each shaft carrying a number of beaters, the blades of which are set at an angle something like the blades of a propeller. The shafts carrying these beaters revolve in opposite directions, so that the material is not only pulverized by the impact of the blades, but is also carried forward continuously towards the table of the machine. The disintegrator thus feeds the material in a constant and uniform stream to the table on which separation is effected. This table (*C*) is inclined and forms the upper part of a bellows (*D*), the whole thing being suspended on flat steel springs, allowing a shaking or panning movement, which is imparted by means of side rods with eccentrics upon a shaft, the rods being so bent as to permit ready access to the sides of the table for cleaning up. The table consists of a plate of perforated metal, forming the top or upper frame of the bellows, and upon it is placed a layer of carpet or cloth of such texture as will allow air to pass through without permitting any particles of pulverized material to drop into the interior of the bellows. Copper riffles are placed at intervals upon the diaphragm of cloth or carpet, and extending across the table. These are secured by means of side boards provided with clamping screws so that they can be




SECTIONAL VIEW OF THE WOODS DRY PLACER MINER.



THE WOODS DRY PLACER MINER.

readily removed for cleaning up. The table is covered with a sheet steel slide, leaving about six inches space above its surface. The material, leaving the disintegrator at (*E*), passes to the table, over which it is distributed and borne downward towards the tail end of the machine, assisted by pulsating blasts of air from the bellows. The vibrations of the table cause the larger and lighter particles to find place at the top of the stream of material, the blasts of air from the bellows force the fine sand and dust up and out of the machine, and the fine gold gravitates downward, settling on the cloth back of the riffles. The gold is thus saved, while the light, coarse gangue rolls down the incline, over the riffles, and is discharged as tailings. A leather flap valve is placed across the table at the upper end, so that while allowing the material to pass from the disintegrator to the table it prevents the dust from coming out at the feed end of the machine. The bellows is worked by means of a connecting rod and disc crank (*F*), the crank disc having a slotted hole to receive the crank pin, so that the stroke of the bellows may be adjusted, regulating the blast according to the fineness of the gold. The tailings pass from the machine to an elevator or conveyor similar to that employed at the feed end, and are thus carried out of the way, either to a car or directly to the dump. A clean-up should be made at least once a day, and may be accomplished by stopping the machine, removing the dust cover and carefully taking out the riffles. The concentrates that have accumulated behind the riffles are collected by the use of a common brush. Commencing at the top, they are brushed down the incline into a receptacle placed to receive them.

Fraser & Chalmers, corner Union and Fulton streets, Chicago, Ill., are the manufacturers. The claim is made that the machine will handle material not dry, provided the moisture be not sufficient to cause it to clot, and that it will save gold from magnetic black sand quite closely without any means of removing magnetic particles.

## Notes on Gold Milling in California.

NUMBER XII.

By E. B. PRESTON, M. E., Field Assistant State Mining Bureau.*

TYPICAL CALIFORNIA GOLD MILLS.

As the details in milling practices of the several counties of the State vary greatly, the following typical mills have been selected to indicate the practice under varying conditions:

No. 1. *Amador County.*— The ore is a soft, easily crushed quartz, with about 1½% sulphurets, and is largely mixed with slaty material, which, to the extent of 25%, is found mixed with the concentrates. The stamps weigh 750 lbs. each and drop 6 inches about ninety-five times per minute, discharging through a No. 8 slot screen, at the rate of 2½ tons per stamp in twenty-four hours. The stamps drop in the following order, 1, 2, 3, 5, 4, Nos. 1 and 2 having ½ inch more drop than the other stamps; in the adjoining battery the order is reversed. Iron shoes and dies are used. There is an inside plate used in the battery, which retains about 75% of the amalgam. The apron is 48x13 inches, set on a grade of ⅜-inch to the foot, and the double sluices below are 9 feet long by 14 inches wide, with a grade of 1½ inches to the foot. From these sluices the pulp passes to vanners. To clean the sulphurets from the slaty admixture, a cradle, 12 feet long, 20 inches wide, and 4 inches deep, has been placed in the mill, run by an eccentric. The dirty slimy sulphurets are taken from the washing-boxes beneath the vanner and placed in a half barrel standing on the floor of the mill, into which a hose is lowered, and the sulphurets are raised from the barrel to the cradle by creating a vacuum, through a small jet of water under pressure forming an ejector. The pulp in the cradle is stirred vigorously toward the head; the grade is from 7 inches to 8 inches in 12 feet. This washing in the cradle relieves the pulp of about 25% of waste material. Twelve tons can be washed in a day. The canvas-plant below the vanner has some interesting features. The canvas strips are only 12 inches wide. The pulp as it leaves the vanner is carried to a mercury-trap, consisting of a box of diminishing width, with three upright divisions, under and over which the pulp flows. From the mercury-trap the pulp falls into a long box, about 1 foot square at the ends, in the bottom of which are ten holes, whose size is regulated by experience; they must equalize the discharge with the inflow from the mercury-trap. The pulp introduced into the long distributor-box sizes itself to some extent by gravity; the finer material, being held in suspension longer, finds its way out at the end of the box, while the coarse quickly passes through the holes in the bottom, nearer the center of the box.

There are twelve strips of canvas, 100 feet in length, each strip having a width of 12 inches and a grade of 4½ inches in 12 feet. The coarse material is all found on the six center sections, the two outside sections, on each side, carrying the finer material. An additional series of tables, with 20 inches wide sections and a grade of 9 inches in 12 feet, receives the pulp after passing over the first.

No. 2. *Amador County.*—The practice of this mill in handling their tailings may be taken as an example of the better methods now practiced in the State. This mill has 900-lb. stamps, dropping 85 times per minute, with a 6-inch drop and a 7-inch discharge, kept constant by the use of lower chock-blocks. No. 30 brass wire screens, 4 feet long and 4 inches wide, set vertical, are used, given a duty per stamp of 2½ tons in twenty-four hours. The batteries are supplied with inside front plates. The apron-plates are 46x30 inches, set on a grade of 1¾ inches to the foot. These are followed by 18 feet of sluice-plates, 15 inches wide, the first 10 feet of which are double. About 66% of the amalgam is recovered in the battery. The loss in quicksilver, which is introduced into the battery every half hour, amounts to about 1½ cents per ton. The total cost of milling at these works is given as 70 cents per ton. The mill is supplied with three vanners to each battery, with 4½-foot belts. The pulp from the plate-sluices passes directly to the spreaders of the vanners, a division into thirds being first effected. After leaving the belts, the pulp flows through sluices to a flume, where it is divided into two equal streams by the insertion of an adjustable division plate in the flume. The divided pulp passes to two steel screens with perforations of ⅛-inch and 1/16-inch respectively, which from the bottom of two 4-foot boxes, 1 foot wide, set on a reverse grade of 6 inches in 4 feet. These boxes prevent any foreign substance from passing through into the sizing-box below, and clogging the outflow pipes. After the passage of the screens the pulp falls into a separator, consisting of a wooden V-shaped trough, 6 feet long, 15 inches wide on top and 2 inches at the bottom, with a flat, funnel-shaped discharge pipe of galvanized iron attached at one end, ending in a round 2-inch pipe. As more pulp enters the separator than can be discharged through the 2-inch pipe, it fills and flows over the end into a launder; the heavier and larger particles sinking down and passing through the pipe. The overflow passes on a spreader that delivers it to a canvas-table, with ten sections; a second similar table, placed below, receives the waste from the first one. The tables are 12 feet wide, 13 feet long, and set on a grade of 1½ inches to the foot, and to secure a proper grade for the waste-sluice, each section is set 4 inches below its predecessor. All the waste water passing from the tables is used a short distance off as power on an overshot wheel that runs a vanner, on which are worked the concentrates taken from the tables.

No. 3. *Butte County.*—The quartz carries considerable sulphurets. When hoisted from the mine it is dropped immediately over a grizzly with the bars placed 1½ inches apart; the coarse rock crushed is loaded into cars, and trammed to the mill, distant about 150 yards, and dumped into bins which are calculated to carry 1,500 tons. From here chutes convey the ore to the Challenge self-feeders. These are operated from the center stamp in each battery. The stamps, which are supplied with steel shoes and dies, weigh 850 lbs., drop 7 inches, and about 100 times per minute; the discharge is 7 inches; the screen is No. 8 diagonal-slot, 8 inches wide; each stamp crushes 2½ tons per twenty-four hours. The screens, which last about four weeks, are used later in the chlorination works for the recovery of cement copper. From the mortar the pulp passes over a 14-inch mortar-plate; thence to a 4-foot apron and 12 feet of sluice-plates; aprons and plates are set to a grade of 3 inches to the foot. The pulp then passes over the vanners, two for each battery, after leaving which, it is conveyed to the canvas-platform house. The canvas-platform is 24 feet wide and 60 feet long, covered with x 2 0 0 canvas, and below it are 150 feet of settling-boxes. The plates are scraped every day, and dressed besides, when required.

(*To be Continued.*)

* Bulletin No. 6, California State Mining Bureau.

# Scientific Progress.

### A Giant Among Inventions.

The Government has recently granted two patents which cover probably the most intricate and complex machine ever constructed. It is claimed that before the first machine was perfected the company constructing it had expended $1,300,000. The first application filed contained 204 sheets of drawings, having over 1000 separate views. During the eight years the case was pending in the office before the allowance, the number of sheets was reduced to 163. When it is remembered that the majority of pateuts have but a single sheet of drawings, and that to require as many as ten sheets is quite an exception, the magnitude of the invention can be understood.

The fees charged by the Patent Office are uniform for all cases, no matter how complex or how simple, $15 on filing the case and $20 additional on allowance of the patent.

When this case was filed it was turned over for examination to an examiner who received a salary of $1800, and he spent six weeks in studying the case before being able to make the first action. The entire specification was twice rewritten, each time by a different attorney. How much this cost the inventor is not known, but it is rumored that the attorney who first prepared the case received a fee of $10,000, and an allowance of $2000 extra to pay for drawings.

While the case was pending the examiner who first had charge of it resigned, and it was turned over to another assistant of the same rank. This assistant went over the entire ground three times, consuming several weeks, and finally he was authorized to go to Chicago and spend a month in examining a working machine. When the request was first made of the commissioner that the examiner be permitted to make the trip it was promptly refused. The chief of the division then carried the papers, making a pile two feet thick of unfolded drawings and typewritten specification, to him, and the commissioner said: "He can go."

The invention is a machine for setting, justifying and distributing type, and comes as near being a substitute for the compositor's intellect, as well as hand, as any machine can. It comprises no less than 18,000 separate parts, and has 800 bearing shafts, about half of the shafts rotating continuously and the rest intermittently, as required to perform their various functions. The justifying part of the apparatus was made the subject of a second patent, which contains eighty-one sheets of drawings, giving a total of 244 sheets for the entire apparatus.

The Patent Office is a money making institution. It earns above expenses about $200,000 per year, and has now deposited in the Treasury a neat little balance of over $4,000,000. On this job, however, it lost heavily.

In a recent address before the American Association for the Advancement of Science, Mansfield Merriman said that during all the development of static testing one impact test has survived and everywhere held its own. This is the cold-bend test for wrought iron and steel. In the rolling mill it is used to judge of the purity and quality of the muck bar; in the steel mill it serves to classify and grade the material almost as well as chemical analysis can do, and in the purchase of shape iron it affords a quick and reliable method of estimating toughness, ductility, strength, and resilience. It is true that numerical values of these qualities are not obtained, but the indications are so valuable that if all tests except one were to be abandoned the simple cold-bend test would probably be the one which the majority of engineers would desire to retain.

The discovery that heat influences one set of nerve points in the skin, while sensations of cold are received by another set, has been followed by an interesting investigation by two Italian physiologists, whose experiments seem to indicate that the various tastes result from the exciting of distinct sets of nerve fibers in the tongue. The prolonged application of ice removed the sensibility for all tastes—sweet, sour, salt and bitter. Cocaine destroyed—temporarily, of course—sensibility for bitter only. Other substances, such as caffeine and morphia, reduced the power of discriminating between different degrees of bitter. Dilute sulphuric acid had a peculiar effect, causing distilled water and even quinine to taste sweet at the tip of the tongue, although the bitter of the quinine was elsewhere tasted as usual.

Science advises the use of fruit as an aid to digestion of other foods, such, for example, as apple sauce, little sweetened, or, still better, sour apples baked, or, for more developed digestive action, the raw apple or other fruit. The mandate of science is that fruits should be used as an aid to digestion much more than they are now. The fruits supply acids which particularly assist the acids of the stomach. On the same ground, lemon juice in tea instead of sugar is helpful to digestion. Physicians now largely prescribe lemon juice to help weak digestion. A great many persons who get up with bad feelings in the morning would find themselves cured if they regularly ate an apple with a slice of bread or other plain food a little while before bedtime.

It is curious to note how the progress of knowledge causes the medical profession to change its opinions. It has always been thought that the use of new bread is most unhealthy, a doctrine which is religiously believed in and acted upon in most households. But a Russian doctor now asserts that new bread is far more beneficial to the consumer than that which has been cut and exposed to the air, and has had time to gather the numerous germs which find in the material a nutrient medium. The heat of the oven is destructive to these germs, and hence new bread is found to be perfectly free from them.

A balloon filled with automatic instruments was sent up recently in Paris and came down safely. The instrument showed that it had risen to 17,000 meters, 56,000 feet, or over ten miles and a half. At that height the temperature outside the balloon was 102° below zero, while inside it was 12° above. The apparatus for taking in a sample of the air seems to have worked satisfactorily, but the result will not be known until the analysis of its contents is made in M. Barthelot's laboratory.

# Electrical Progress.

### Acetylene Gas From an Electrical Standpoint.

On the 15th ult., at the Milwaukee meeting of the Northwestern Electrical Association, J. C. M'Minn, in a paper on acetylene gas, thus summed up the situation from an electrical standpoint:

This is a new gas, having an illuminating power much greater than common gas. No investment for street mains is necessary, hence the gas companies must use it either as an enricher or as an adjunct to their present system to supply isolated buildings and residences which can be reached neither by their present mains nor by electric lights. If they obtain the rights for this gas, they will have a weapon which will be as much stronger than the Welsbach burners as the acetylene flame is stronger than the Welsbach light. To produce this gas or calcium carbide the gas companies must put in electric plants, which when not in use making carbide can be placed in competition in electric lighting.

There are places, and many of them, where nothing will ever supersede the use of electric lights, but when you consider that only five per cent of the residents of southern Wisconsin are reached by gas and only thirty per cent are reached in Milwaukee, that even less can be supplied with electric lights, there is a field open which is wonderful in the possibilities for successful investments and large business.

Most of your lighting plants are idle during at least half the time, and could thus be made producing plants for the whole time, and you could reach a territory which cannot be reached by either the gas companies or yourselves without large outlays for extensions, and in most cases not reached at all.

Of the following facts I am certain:

1. The gas is intensely brilliant.

2. It has a decidedly disagreeable odor if it escapes without being burned, and when burned emits no odor nor smoke.

3. The gas can be distributed for much less cost (considering the interest on the investment) in cities and also to every resident of the State, whether in the city or country.

4. The same amount of light can be produced for much less cost than by ordinary gas or electricity, for one-third cubic foot of acetylene gas burned per hour gives more illumination than a sixteen candle power incandescent light or five cubic feet of ordinary gas. Allowing a maximum cost of $50 per ton for carbide, delivered either as a liquid or as carbide, sixteen candle power with acetylene (one-third cubic foot per hour) costs .0016; sixteen candle power incandescent costs practically .006; sixteen candle power ordinary gas, at $1.76 per 1000 cubic feet, with four-foot tip, .00704, or acetylene costs $\frac{1}{100}$ of a cent per hour as compared with electricity at $\frac{6}{10}$ of a cent and ordinary gas at $\frac{7}{10}$ of a cent.

The above figures are based on the present method of manufacture and maximum cost, and no allowances are made for the improvements which must necessarily follow experimentation by practical men.

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THE project to put in a large electric plant in Mariposa county, previously noted in this column, is in active process of development, it being proposed to begin active work the latter part of next month. The Big Bend Power Co., incorporation of which was announced some weeks ago, with a paid up capital of $500,000, is not a mining corporation per se. The idea is to generate and sell electrical power to the fifty or more gold mining concerns in the neighborhood. At Horseshoe Bend, near the geographical center of Mariposa county, on the Merced river, is the point selected for the erection of the plant. A dam sixty-five feet in length on the top, and thirty-five feet high, will be built about 6000 feet above the site of the buildings, a ditch and flume to have a fall of ninety-five feet, capable of carrying 10,000 miners' inches of water and generating 1700 H. P. It is proposed to put in three 500-H. P. generators, with all the usual accompanying apparatus, including nearly twenty-five miles of No. 2 copper wire. It will probably be six months before active work on the dam will begin, it being, of course, necessary to build that at the lowest stage of water. The corporation is credited with intention to supply power at $5 per H. P. per month, and figures its ability to make considerable profit at that rate, while furnishing power at considerably less cost than under any other method and enabling many mines to operate at lessened expense. If all the present outlined plans of the projectors are put into actual existence, Mariposa county will have the second largest electrical system in the State.

### A New Electric Lamp.

In the use of the common arc lamp a serious item of expense is the wasting of the carbons, and the necessity of renewing them. What is called the Jandus lamp is one in which, by a peculiar construction, the consumption of the carbons is lessened to such an extent that carbons will last 160 to 200 hours which in the common lamp are consumed in eight or ten hours. The Jandus lamp has the carbons enclosed in two glass globes, one within the other. The outer one has a valve which permits outflow of air or other gas, but does not permit much or any inflow of air. The inner globe is very soon free from oxygen, with the result that the carbon lasts twenty times as long as it otherwise would; proving that the wasting of the carbon is not by the electric current tearing its atoms apart, but is through the oxygen attacking it. The oxygen eats away the carbon, tears away its atoms, atom by atom, twenty times as fast as the electric current will do it. The illustration of the attacking energy of oxygen, of its superior electrical work, is as conclusive as it is striking. The intensity of the oxygen in tearing away the carbon atom by atom exceeds that of the electric current passing through the carbons.

### Cementation of Steel by Electricity.

This has been effected by J. Garnier as follows: Two steel rods, whose proportion of carbon was only 0.001, were placed in a fireproof tubs so that their extremities were one centimeter apart. The intervening space was filled with powdered charcoal, and the tube heated in a small blast furnace, while an electric current of thirty-five amperes and two and five-tenths volts was passed through the rods. The temperature of the tube was brought up to 900–1000° C. After three hours the rod forming the positive pole remained essentially unaltered; the other rod, however, as deeply cemented with charcoal. Hence it follows that iron, by this process, might be very easily converted into steel.

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THE *Investor* says that the scheme for bringing power from the Kern river to Los Angeles, a distance of 108 miles, is still in an active state, so far as preliminary work is concerned. The company has obtained a franchise from the Kern county supervisors and also one from the supervisors of Los Angeles county costing $25. A right of way across the Government Forest Reserve is also required, for which an act of Congress is necessary, which will no doubt cost more. The plan of the works is of a very extensive kind, and the commercial success of the undertaking depends upon a number of factors that have yet to be considered. At the proper time the promoters intend to make the experiment of raising funds by floating a two million six per cent bond issue, when the scheme will assume a more definite character than at present.

# Mechanical Progress.

### The Inspection and Testing of Materials.

Written by ALFRED P. BOLLER.

With the vast development of constructive engineering during the last twenty-five years has arisen the necessity for a thorough knowledge of the strength of materials, to be gained only from actual experiment. As increasing knowledge always opens vistas of the unknown, the testing of materials has grown from simple methods of procedure into an elaborate scientific system of means and methods, calling into play various apparatus of power and precision. This has given rise to a class of specialists who make a business of testing and inspecting materials, and to a branch of mechanical engineering devoted to the designing and manufacture of testing machines and various recording devices. No important work is now undertaken without careful provision for testing all materials which enter into it, and under specifications evolved from the recorded experience of experimenters continually at work throughout the civilized world. With the improvements of apparatus, new light on the behavior of materials under varying conditions is continually obtained, and specifications are from time to time modified accordingly. Few railways of any importance are without a testing bureau in charge of careful experimenters. To these bureaus are brought samples of all sorts of materials required in the conduct and maintenance of a railway, and upon the bureau report of quality, application and endurance the standards are determined and specifications for purchase issued accordingly. Minor railways and other corporate and private interests are served by various testing laboratories and testing bureaus established in the different centers of manufacturing and engineering activity.

The result of such a close watch over constructive material has been to force manufacturers into scientific modes of manufacture and to pay close attention to quality and uniformity of product as the price of their very existence. Such work has made possible the great engineering triumphs of the day, in which the humble testing machine has played a no inconsiderable part. While the time has passed when testing and inspection of materials was regarded as a luxury or an engineer's fad by "the financial interest," there is a tendency to incite too much competition among the laboratories, resulting, in many cases, in a price for services and the use of machines below what such work can be efficiently performed. The consequence is, the testing is not thorough and inspection perfunctorily gone through with, resulting in unreliable reports. In this business, like any other, work and services are worth all they cost, plus a reasonable profit, and it is no evidence of business smartness on the part of an employer to beat down rates and prices below which he can get efficient service. If done at all, testing and inspection should be thoroughly done, or it is worse than useless, as it is misleading in creating a confidence on a basis that does not exist. No money is better invested in public or private work on which life depends than that paid in carefully looking after it, to see that it is well done, of good materials for the purpose, and efficiently made and put together.

### Gun Manufacture.

There seems to be reason to suppose that the art of gun manufacture will be revolutionized by the Maxim plan of manufacturing guns from one solid integral forging. In the Maxim system the forging is roughly turned and then annealed in a slow furnace. It is next carefully turned, smooth-bored and rifled. Then it is mounted vertically in a special furnace and rotated slowly while a current of cold gas is forced through the bore. The carbon in the gas combines with the steel of the bore, hardening it and improving the quality of the steel. While the gun is red hot the coal gas is shut off and a very large stream of cold oil under high pressure is forced through the bore. This cools the bore and the inside shrinks to its finished dimension. The outside body of the gun then gradually shrinks upon the cooled interior portion, thus throwing it into the state of high tension which is necessary to enable the gun to resist instantaneously with its whole mass the shock of discharge. It is believed that by this method heavy ordnance can be manufactured in half the time and at half the expense of the present system.


## The Works of Stephen Roper.

**Engineer's Handy-Book:** Containing a full Explanation of the Steam Engine Indicator, and Its Use and Advantages to Engineers and Steam Users. With Formulæ for Estimating the Power of all Classes of Steam Engines; also Facts, Figures, Questions and Tables for Engineers who wish to qualify themselves for the United States Navy, the Revenue Service, the Merchant Marine, or to take charge of the Better Class of Stationary Steam Engines. Tenth Edition. 630 pages. 16mo., tuck, gilt edge.....$3.50

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# Mining Summary.

## CALIFORNIA.

### Amador.

ONEIDA. — *Republican:* The heavy rains have brought mining operations to a temporary standstill. The ground is so thoroughly saturated with water that it was found impracticable to continue sinking operations, owing to the trouble with surface water.

A ten-stamp mill is being erected for the Matson mine, at Butte City.

The big tunnel to tap Butte basin is making slow headway. It has reached about twenty feet under cover.

The Gover mill of twenty stamps has started up again, after a rest of nearly two years.

The Anita Company has posted notices calling for bids for sinking its shaft 100 feet deeper; contractors to furnish powder, fuse and caps.

The last cleanup of the South Eureka mill, it is said, averaged $7 per ton. This, if it can be taken as a fair criterion of the grade of the rock, leaves a good margin of profit, and places the South Eureka among the list of steady producing mines of the county. There is little probability of a mine on the mother lode closing down while it surrenders rock that yields $4 to $5 per ton. Such ore can be milled at a profit on this lode, unless the conditions are unusually unfavorable for economical working. The Plymouth Consolidated in the height of its prosperity mined and milled rock at an average cost of $1.80 per ton. We believe with a forty-stamp mill ore can be worked at a cost of from $2 to $2.50 per ton, under favorable circumstances. And this is by no means to be regarded as the minimum limit. In Alaska, at the Treadwell mine, they have got the cost down to $1.20 per ton. In Australia they are successfully working quartz that yields only a dollar per ton. So there is plenty of margin left for reduction of cost in the extraction and treatment of gold ores in California.

There is nothing doing at the Amador Queen mine in Hunt's gulch. Everything has been at a standstill since the mill was cleaned up several weeks ago. Mr. Dye, the manager, realized that to prove whether they had a paying property it was necessary to sink two or three hundred feet deeper.

### Calaveras.

INFORMING THE UTAHNS.—Salt Lake, Utah, *Tribune:* E. S. De Golyer returned to the city yesterday morning, and has since been enlightening an attentive audience at the Alta Club upon the riches of Calaveras county, Cal., and the "Mother Lode."

At present Mr. De Golyer is devoting his own attention to the Donnellan mine on the big lode, for which a mill has just been completed that is capable of handling seventy-five tons of free milling ore a day, with 200,000 tons in sight. In designing the present plant, said Mr. De Golyer, it was more to aid him in the dig for lower levels—the values improving as depth is attained—than to handle the ores that are now quarried from an immense zone. When the lower level is reached a plant of adequate capacity may be looked for. Calaveras county, he says, was the biggest gold-producing locality in California last year, and with more territory now under active development than ever the record of 1896 will, in his opinion, eclipse that of all former years.

Of the present producers the Utica, which has a bullion record of many millions, is the largest, and of the total output of 1895 it produced more than any other, with the output increasing and the ores growing richer as depth is gained.

Among other Utah miners who are actively engaged in the district the name of A. N. Butts, one of the former owners of the Golden Gate at Mercur, is mentioned. He has purchased and is developing the Bolitho, situated near the Utica, and which presents a very fine showing.

It was before Mr. Butts parted with the Golden Gate that Mr. De Golyer sought to induce Henry Wolcott and Jake Saunders to purchase the property, which has been made to develop enormous ore bodies. That the Coloradoans did not take it marks a disastrous day in their career. On his last journey into Calaveras county Mr. De Golyer met George Arthur Rice coming out. The latter had secured a foothold on a property near West Point which promises to enrich him.

"As strange as it may appear," said the narrator in conclusion, "there are no more enthusiastic friends of free coinage of silver than are to be found in California. I say strange because the production of silver there last year did not exceed 500,000 ounces. The production there is almost exclusively gold, but they have learned that for their other industries to prosper there must be an expansion of the currency. Without that hard times must continue, and when California registers its vote it will be for a silver man."

Mr. De Golyer will remain in the city some days, and may visit Mercur and the Golden Gate, that when he again meets Henry Wolcott and Jake Saunders he may convince them of the full magnitude of the mistake they made in refusing it.

### El Dorado.

(Special Correspondence.) — The ten-stamp mill on the Franklin gravel mine, 1½ miles from Placerville, is among the continuous operators and regular bullion shippers. It is the property of Thos. Clark and others of Placerville.

The Philadelphia and Gold Note mines, situated twenty miles east of here, which was closed for several months owing to the failure of an Eastern partner to meet his obligations, started up again this week. Sacramento and San Francisco parties have joined Messrs. Polk and Parker, the original owners. The shaft is down 140 feet. The ledge is seven feet wide and has high grade ribbon rock. The ten-stamp mill will be increased to double its present capacity.

The new hoist frame in course of erection on the Big Sandy is rapidly approaching completion. Machinery for pumping out the shaft preparatory to sinking to a depth of 500 feet is on the ground ready to be put in position. The sandy formation (from which the mine took its name) having been worked out, and the property belonging to Ohio men, it is contemplated rechristening the mine and calling it the Buckeye. Present indications warrant the prediction that this will be a rich and long-lived producer of gold. The ledge is large and high grade. The fact that Mr. Beardslee, of the neighboring Lady Emma, after his thorough examination of the property, persuaded the Toledo people to rehabilitate their property and put it in operation, will prove to his credit and to their gain. Jas. T. Kelly is acting local manager of the construction work.

The Spring Tunnel mine, owned by G. J. Carpenter, was leased by a French syndicate and work was commenced opening the 1500-foot tunnel last week.

Mining capitalists animate our hotel corridors this week to a degree that gives the town the appearance of a Capital city State convention.

Hospitality, business enterprise, and the general good nature concomitant with metropolitan manners and methods on the part of Placerville people greet visiting mining men on all sides. This is certainly a desirable spot as a center for the great mining camp that El Dorado county will soon prove to be.

John Melton, the millionaire mining man of Brown Bear (Trinity county) fame is branching out in new mining investments in El Dorado county. He is also adding new territory to his Gentle Annie group, near Placerville, which is giving substantial proof of becoming one of the richest gold producers of California.

Placerville, Feb. 3, '96.

### Nevada.

NEVADA IRON DEPOSITS. — (Special Correspondence).—The cost of manufacturing iron depends on the cost of fuel and ores. Furnace expenses vary with the difference of wage here, which is trifling. If San Francisco would manufacture its own iron and steel, the freight now paid would offset the freight on fuel. It takes less than a ton of fuel to smelt a ton of iron. This would give the city the advantage in manufacturing her own iron and steel. One hundred and thirty miles from the city there is a body of hematite ore assaying 54 per cent metallic iron. There is sufficient in sight to run a 30-ton furnace fifty years within 25 feet of the river, which is navigable to the city. A road can be economically constructed, as three-fourths of the distance is level. In itself it would be a paying investment. San Francisco is not manufacturing her own iron and steel. The millions exported for this necessity would have made the city rich. The failure at Clipper Gap is still felt. There is but one place in the northern part of California where you can manufacture iron and be successful—that is San Francisco. First, the consumption in the city itself is large, and when you produce a molten iron many things can be made which would save the cost of remelting. Molten iron can be converted into a homogeneous steel at a cost not to exceed from $2 to $3, depending on the character of steel needed. All mining supplies can be furnished for one-half the present cost and leave a large margin of profit. Shoes and dies require extra per cent of carbon to make them the required hardness. Steel plate for ship building can be produced from this molten iron at a cost not to exceed $8; steel rails, carwheels and all other castings at about the same rate. San Francisco can produce a molten iron for $14, steel plate for ship building for $22; steel rails, carwheels and other steel castings at about the same figure. It would be a victory in the right direction. Instead of impoverishing the State importing those things building up other cities, our own city would flourish with cheap iron and steel. Other industries will spring into existence. Ship building will not remain in the bud, but will blossom. With cheap iron and steel Huntington's shipyard captured the contract from the Government of between four and five million dollars. We had a recommendation from Congress, but the discrepancy was too much. San Francisco may gridiron the State with rail; what will it benefit you unless the city gets the trade from the interior? Can you compete with those from whom you purchase your goods? This is the present outlook and it is getting worse every day. Therefore, the sooner you face the situation the better. Regarding the iron deposit referred to, its location is in the western portion of Nevada county, close to the Marysville stage road, eleven miles from Grass Valley and one mile below Indian Spring, on Robinson's ranch. The hill is about 300 feet high, with an open cut. This ore can be loaded on cars for 10 cents per ton. The ore body is from 100 to 300 inches in width. M. C. T.

Grass Valley, Cal., Feb. 3, '96.

ERRONEOUS STATEMENT.—*Tidings:* The Anti-Debris Association will make the most it can of the disasters which befell the restraining dams during the late storm. In respect to the Omega dam it has an unconscious ally in the Associated Press, which in its report of the meeting at Sacramento made erroneous statements concerning that dam. The report stated: "But the worst disaster was that to the Omega mine dam. This was the largest restraining dam yet built in the State and was considered perfectly safe. But it had to succumb, and the debris which a few days ago was deposited in tons behind the restraining wall is now scattered over miles of river bed."

In the original accounts of this accident, it was stated in all the local papers that no debris had yet accumulated behind the Omega dam. The company had not yet begun operations. There was an accumulation of water, and in letting off this excessive supply, the error was made of cutting a channel through loose earth at one end of the dam. This channel widened by the caving of adjacent earth, and soon one end of the structure was undermined and the dam was swept away. There is nothing in these facts to indicate that the dam might not have stood, had wise counsels prevailed in drawing off the surplus water. We regret to note that false statements about the accident to this dam are given currency in our very midst.

### Placer.

*Sentinel:* There are at present 150 men on the payroll of the Hidden Treasure mine. Twenty-five of these men are working at the Dam tunnel and four miners are busy retimbering the old Mountain Gate tunnel.

### Plumas.

*Independent:* Superintendent Wm. McGilivary had a force of six men completing preliminary work last week on the Plumas Imperial and on Friday commenced piping.

The Elizabeth Shaft shut down Saturday night, the pumps proving incapable of handling the large flow of surface water with which they had to contend. It is uncertain when they will again resume, as it is probable a reorganization of the company will first be made.

### Riverside.

*Investor:* The chief mining activity in this section is now in the Perris country, where a number of promising claims are being steadily developed. Efforts that have been made to interest capital in this section are likely to prove successful in several cases during the next few weeks, and there is a prospect of important developments in this gold region very shortly. Mines around Perris are within five miles of a railroad, with country roads running to them that are far better than some of the streets of Los Angeles have been for the past week or two. Then, again, the cost of fuel and supplies is less than half what it is in many mining camps which have paid millions of dollars in dividends. When ore can be milled and mined for $2 a ton, or even less, as can be done in Riverside county, it is easy to see what a great advantage this gives the mine owner over sections where fuel, transportation and supplies all cost from two to five times as much.

SHIPPING CONCENTRATES. — *Record:* The Good Hope Company recently worked over a lot of its tailings and as a result this week shipped 32,000 pounds of concentrates to Pueblo, Colo. This makes the second shipment that has been made within the past two months. Under the Sigafus regime the Good Hope concentrates netted about $75 to the ton, and if this can be taken as a criterion, the last two shipments will net the company quite a revenue.

### San Diego.

ESCONDIDO AND VICINITY.—(Special Correspondence).—I will endeavor to give you an authentic report of the mining interests at this place, as they now exist. We came to this locality the first of last April and have been carefully prospecting the country for our interests, our only object being to discover a deposit of gold that would pay to work. Our attention was first attracted to this locality last winter, while on a visit here, and having had several years' experience in mines and mining at Aspen and Leadville, Colorado, and over four years of prospecting and investigating through California, we were thoroughly convinced that gold existed in this locality in paying quantities. Our first investigation was at the old Spanish mines, that are situated about three miles southeast of town. For the last forty years the Indians and a few white men have been taking out free gold at these mines. The gold is in particles or broken pieces of quartz, which is deposited in narrow stringers through the loose earth of the hillsides; these stringers of quartz having a roofing of granite that slopes to the west with a dip of 45°. Some very rich pockets have been found, but up to the present time the "mother ledge" has not been found. Having discovered that the gold in this quartz was deposited in spots of black manganese and brown hematite, and that the formation was of the old primary or glacial age, and that the secondary rocks came up from the north and formed a junction with the primary, which circles the valley in the form of a horse shoe and extends in length for a distance of about twelve miles in this shape, with a spur of the same formation jutting into it from the southwest and extending to the ocean, some ten miles away, and that the granite that capped the mountains in the primary range was showing fissures both large and small that were highly impregnated with iron and zinc, and that these fissures ran parallel with the granite ledges, as well as at right angles, and that the base of the mountains and the low range of hills that lie between the primary and secondary showed fissures of spar and quartz, we concluded that our time would not be lost if we made a thorough and intelligent investigation. Our first discovery of importance was made after thirty days of careful prospecting at a point about four miles southwest from the old Spanish mines and on the banks of the Bernardo river, a stream of considerable size, that cuts through the old primary on the east and follows base of the mountain in a southwest direction, where it enters into the ocean. This first discovery was situated almost directly in the center of the mineral belt, which at this point is about one mile wide, and consisted of a well defined chimney of apparently volcanic origin. This chimney is about 50 feet across at the top and is filled with a decomposed quartz, carrying large quantities of brown hematite and red oxides of iron, with manganese and a trace of tellurium. Several quartz ledges intersect this chimney, varying in width from 2 to 6 feet. All the veins of quartz at this place, as well as the vein matter in the chimney proper are decomposed by the action of chlorine. This chimney was situated on private land, formerly a Spanish grant, so that it was necessary to purchase the land before sinking. We secured 45 acres and sunk a shaft 30 feet from the chimney between two ledges of quartz. We are down 60 feet and have a drift 20 feet long at the 25-foot level. The assay from this shaft ran $9 in gold and 47c silver at the grass roots, and has increased satisfatorily as we went deeper. All the matter from this shaft is chlorides, and no colors could be horned until after passing the forty-foot level. At the present writing we have just tapped a ledge of solid quartz, the body of which only assays $3 in gold, but the seams are coated with brown hematite, which is covered with oxidized gold and silver, apparently deposited by the action of electricity on tellurium. Specimens from these seams are very beautiful, showing all the colors of the peacock; but the green, blue and purple are of the brilliancy of emerald, sapphire and the richest amethyst. By applying nitric acid and blowpipe we produced beads of gold from these colors. No assays have yet been made from these specimens, as they were too valuable as cabinet specimens. This chimney is known as the Mountain Lion mine and is owned by Messrs. H. C. Brown, J. M. Best and C. Dewitt Chapman.

The next discovery of importance was north of the old Spanish mines, some three miles, and about the same distance from Escondido, and consists of a large body of quartz. Situated at the foot of the mountain of the primary range, and at the exact junction of the primary and secondary formations, this body of quartz is of such immense proportions that it took months of study and careful investigation to determine that it was in place, and that it all carried gold and silver. The vein matter is exposed for over half a mile and has an average width of 300 feet. It is constructed of numerous fissures, varying from ten inches to twelve feet in thickness. These veins are grouped together so closely that they have the appearance of a solid ledge. The entire vein matter is quartz of various colors and structure, and over fifty assays from different portions of the deposit all show gold from $1 to $27 per ton at the surface. The north end of this property is filled with sulphurets, while the south end of the ledge, where it is exposed, shows few sulphurets. Iron oxides and a black substance, supposed to be manganese, show in the seams. There is a layer of micaceous slate about four feet thick that overlaps the quartz where it runs under the granite at the base of the mountain. This immense ledge lies parallel with the mountain, which bounds it on the east, and although a width of 300 feet of this ledge is exposed, it still seems to continue under the mountain. This property has recently passed into the hands of the Geneva Gold Mining and Milling Co., whose main office is at Santa Ana, Cal.

After leaving the above property, we will pass on down to Bernardo river to a point half a mile below the "Mountain Lion" property. Here the formation still shows the primary granite as the cap or body of the mountains. The base of the mountains on each side of the river is gashed with veins of quartz and beds of chlorides, some of the latter showing immense quantities of brown hematite and red oxides. Down to this point there has been no development work done, excepting where Mr. Ables has a shaft 12 feet deep. His last assay was $500 per ton in the red oxide. The land down to this point was home-steaded years ago and the valley used for farming, the owners little dreaming that they were the possessors of mineral deposits. Half a mile down the river from this shaft the Government land comes in and the granite changes to syenite of a close-grained structure, showing a slight greenish tinge and filled with small particles of hornblende, sprinkled with yellow sulphurets of the flat and round variety. This rock forms the body of the mountain, while the summits are crowned with round boulders and ledges of blue granite. The bed of the river at this point shows narrow fisures filled with black lava. On the north side of the river a kind of black, hard slate crops at the water line. These mountains on the north are literally filled with large ledges of quartz, running in various directions, ranging in thickness from 6 to 100 feet. Some of them are broken at the top, but all are in place and vary in structure from the hardest syenite quartz to the finest sugar-loaf. Up to date no ledge has been assayed that failed to assay gold with some silver, the assay running from $1.50 to $12. All these ledges carry sulphurets in profusion. An assay of the syenite caprock gave a result of $1.13 gold, 11 cents silver. This formation continues to exist for a distance of about five miles in width on the north side of the river and for about eight miles toward the ocean from this point. No free gold has been discovered, with the exception of a small quantity that has been washed from the bedrock of the river and from the bedrock of one gulch. The land here for many miles is still Government land. Some 150 claims have been staked out by the ranchers, but as none of them are miners and no nuggets are in sight they are doing very little development work. Perhaps the most remarkable find in this locality is what is known as the "Jolly Boy" claim, situated at the border of the valley, half a mile west of the river and at the foot of the mountain on the east side. Here an immense ledge of sugar-loaf quartz 100 feet wide runs under and into the mountain in a southwest direction. This ledge is so solid that it was impossible to break into it without blasting, and as the outside where it is exposed was discolored by iron, that settled from the water flowing over it, it has up to the last three weeks been taken for granite. The end of this ledge is exposed for something like 300 feet on the top and is cut square down next to the valley, exposing a face 50 feet high. This quartz is so completely filled with bright yellow sulphurets that it would require four concentrators to handle the output of ten

stamps. This ledge assays $4 in gold and 30 cents in silver at the top.

There was a blast put in a few days ago which dislodged some ten tons of the ore, and assays are now being made. On the north of the ledge, next to the mountain, is a granite wall, while on the south, where the land slopes for some 300 feet before the ledge enters the mountain, is a bed of decomposed matter of gray and yellow. The discoverers of this claim cut a tunnel into the body of chlorides near the surface, and struck the ledge at the end of the mountain. Just before reaching the ledge, and lying directly against it, was a vein of dark blue clay. This body of matter is so highly charged with chlorine at the present time that on entering the tunnel one can smell the gas arising therefrom. All the walls of the tunnel are now, after a few weeks, covered with crystals, and samples of the decomposed matter taken from the sides of the tunnel are being saturated with water and boiled. The chlorine was of sufficient strength to dissolve gold and silver. Assays of ore gathered from this tunnel ran as follows:

| | Gold. | Silver |
|---|---|---|
| At the entrance | $26 | 11 |
| Ten feet from entrance | 51 | 13 |
| Twenty feet, next blue clay | 86 | 16 |
| Blue clay | 103 | 13 |
| Ledge, back of clay | 206 | 16 |

The ledge rock was broken from the outside with hammers, as no blast has been put in. The top of the tunnel is in no place more than ten feet below the surface. The bed of chloridized matter is of an average width of 100 feet, and if the surrounding formation is taken as a guide it reaches hundreds of feet deep. This property, along with the Oxide claim, which adjoins it on the north, was purchased last week by Q. R. Smith, a capitalist of Santa Ana, Cal., for $20,000. He expects to commence operations as soon as he has demonstrated the proper treatment for the ore.

Near the river, directly east of Mr. Smith's property, is a shaft forty feet deep, owned by Mr. Worthing. They have been digging through a decomposed quartz colored with red oxide, but have now struck a ledge of solid quartz of a dark blue color, filled with sulphurets. The ledge is between granite walls and has a layer of hard blue clay about four inches thick. Between the south wall and the quartz this clay hardens on exposure to the air. There has been no assay made of the blue clay and I failed to get the assay from the ledge. A double shift will be put on the shaft next week.

Aside from what I have mentioned there is no work being done. It is rumored that the Geneva Co. will begin development work in a few days.

At the present time this is no place for those seeking employment, as the camp is too new, and it will require capital to develop and open up the bodies of ore; and until something more is known as to the richness of the deposits I would advise all poor people to keep away. C. DEWITT CHAPMAN.

Escondido, San Diego Co., Cal., Feb. 1, '96.

**Shasta.**

REPORTED SALE.—It is stated locally that the Bully Hill mines at Copper City, on Pitt river, twenty-five miles northeast of Redding, have been sold by Hugh McDonnell and James Sallee to a syndicate of New Jersey capitalists for $300,000. They had a bond on the Bully Hill mines, and did considerable development work. The ore carries gold, silver and copper. It is also reported that a smelter will be erected and a railroad built up Pitt river from the Southern Pacific line to the mines. Mr. McDonnell denies the report.

**Sierra.**

*Herald*: The North Fork drift gravel mine, near Forest City, is in rich gravel. Superintendent J. O. Jones says the gravel is four feet thick, that it prospects well and is getting coarser as he runs into it. He will build a dump and flume and go to washing at once. The North Fork Company has spent a year and a half in running this tunnel, and while such an operation costs a good deal of money, it is said that this tunnel was run cheaper than any of its size in the State. It was quite an undertaking and required considerable nerve to run a tunnel for 2000 feet, much of it in bad ground, and take chances on "striking it" or not striking it.

LATEST MINING NEWS.—*Enterprise:* There are thirteen men working at the Sierra Buttes and four in the Bigelow quartz mines near Sierra City.

More men are being put on at Thistle Shaft, and 100 men employed. The mine is yielding good dividends.

There was a cave in the main tunnel of the Bald Mountain Extension drift mine last week, and some of the workmen were laid off temporarily until the right of way was again secured.

The Rising Sun and Early Dawn Consolidated drift mine, just below Sierra City, has been bonded by S. Uren of that place to R. E. Neil of San Rafael and G. W. Hansbrough of San Francisco, and 7600 feet of channel were located by them. Six men are employed. Incline is down 60 feet and will double this distance. The channel is 500 feet wide, five-sixths of the width of the Thistle Shaft, or Feather River Co.'s, near Gibsonville, owned by Scotch capitalists. G. W. Hansbrough is superintendent.

**Siskiyou.**

GENERAL NOTES.—*Journal:* The Distlehorst Mining Co., comprising J. and C. Distlehorst and H. J. Barton, has been formed and will commence operations in the Klamath river as soon as possible. The Distlehorst Bros. have been working their dredger in the Sacramento river for the last four years, and have been very successful. Last summer they cleared about $8000 in the Sacramento river above Redding, and say the Klamath river may be just as easily worked as the Sacramento. The new company is to be furnished with 30,000 feet of lumber by LeDuc & Maltby, with which the dredger will be built. The machinery will be made in Redding, and will be finished so work can be commenced on the boats, just above Oak Bar, by the first of April, and by the first of next August the plant will be ready for operation. The dredger will handle one cubic yard of dirt at each trip, and if it pays 15 cents to the yard it is a paying proposition, but all who are familiar with the rich deposit of gravel in the Klamath know that it will average much better than that. It takes three men to operate the plant, who will be at work on eleven hour shifts. The dredger will make forty trips an hour at a depth of twenty feet. The great difference between this new plant and the old derricks, which the China claims along the Klamath have used, and which have heretofore been considered the most practical way of mining the river, can be noted, as it takes eleven men to run one of those derricks, which will hoist only twenty tubs an hour, with one-half cubic yard to the tub. The new plant will be operated by a twenty-five H. P. engine, and the entire expense will be $500 a month. H. J. Barton, who is a member of the new company, visited Redding a short time ago, and after seeing the dredger in operation knew it would work in the Klamath, as he is thoroughly familiar with the river. This will doubtless be the means of making the Klamath the greatest gold-producing section in the county.

The Eastlick Bros. are about to start up their hydraulic mine at Oro Fino. They will have plenty of water and will keep a large force busy, every indication pointing towards a most prosperous season. This mine paid exceedingly well last year, but the owners hope to do even better this season.

The Wright & Fletcher mine, which adjoins the Eastlick mine, will also be enabled to do more work with an abundant supply of water. These claims are among the best hydraulic mines in the county.

The Mabel mine, owned by Chamberlain & Timmons, and over which there has been some trouble regarding the claim of a former partner of Chamberlain, will be started up when the matter is settled, which will probably be some time yet. The Mabel mine paid exceedingly well last year, and will doubtless prove as rich another season.

All the other miners in the vicinity of Oak Bar and Scott Bar anticipate a prosperous year, and will commence operations early in the spring.

The miners on Beaver creek have been unable to do much yet, as the supply of water is not very plentiful. Some ground sluicing has been done, but very little other work. It has snowed considerably in that vicinity, and, although it does not furnish much water now, will be of great benefit in the spring.

None of the miners along the Klamath river have been able to do anything yet, owing to the high water. If no more storms occur they will be able to start up in a short time.

C. B. Jillson of Henley has four men at work at his blue gravel mine near that place, but has been unable to make much headway yet, owing to the storms and cold weather.

**Sonoma.**

Messrs. Burton and Hopkins in Dry Creek valley, are reported to have struck a ledge yielding sufficient gold to justify them in talking of putting up a mill.

The Healdsburg paint mine is shut down; the machinery is being overhauled and put in shape for a season's run.

**Trinity.**

COFFEE CREEK.—Amos Hill has a tunnel in 250 feet on his mine on Coffee Creek, Trinity county, near Carville, and is taking out some rich ore.

Mr. Bighouse has erected an arrastra on his mine. He and his company are running two tunnels on the property. The ledges are paying well.

The Rainbow Mining Company has been working two years with discouraging results until within the last two weeks.

George Carr on his mine on Coffee Creek has an arrastra. The ore mills $85 per ton.

The deal of the Bloss & McCleary placer mine will be closed this week. It will go into the hands of a wealthy Eastern company.

The Nash placer mine, owned by an English syndicate, at the head of Coffee Creek, is being developed. Fourteen men are employed and bright prospects ahead.

**Tuolumne.**

Talking of Tuolumne county's rich mines, a newly formed development company says: Among the fine mines now in active operation within a radius of 12 miles of Sonora are the App mine, situated on the "mother lode," with a quartz vein from 5 to 20 feet wide; ore, very rich; mine considered worth several million dollars.

The Rawhide mine, three miles from Sonora; $2,200,000 were refused for this mine within the past three months; owned by W. A. Nevills and others.

The Golden Gate, a purely sulphuret mine; no free gold in sight; is yielding hundreds of thousands every year; owned by Golden Gate Mining Company, Sonora.

The Dead Horse mine, vein 5 to 25 feet wide, has yielded over $11,000,000, and is considered as good to-day as ever; situated nine miles from Sonora; owned by Haywards & Co., San Francisco.

The Golden Rule mine, four miles from Sonora, is also one of the rich mines of that locality.

The Confidence mine, seven miles from Sonora, has yielded over $6,000,000; shut down years ago; worked only about 700 feet below the surface; vein lost; owned by Baker & Hamilton, San Francisco.

The Green mine, Sonora, paid $100,000; closed down with vein lost; mine only worked to a depth of 240 feet; worked in early days.

The Excelsior, eleven miles east of Sonora, turned out $420,000 during 1866-7 and 8; was only worked 200 feet below the surface; vein lost; mine lying idle since 1868.

The Soulsby mine, location Soulsbyville, eleven miles from Sonora, yielded over $6,000,000, owned by William Sherwood, Soulsbyville, California.

The Bonanza mine, in the town of Sonora, has yielded over $2,000,000.

The product of Table Mountain alone, which runs through a portion of Tuolumne county, is estimated at $15,000,000.

**NEVADA**

LINCOLN COUNTY

Montgomery district contains about 100 tents. All the mining property there is owned by a Utah company, which pays $3.50 a day wages.

EAGLE VALLEY.—A *Tribune* correspondent says the Eagle valley discovery is a continuation on the southeast of the Spring Valley, and prospectors who have gone over the country say the ledge is now discovered and located for twenty miles. At the miners' meeting held here last Monday for the purpose of organizing a mining district, it was decided to organize on the Utah side and call the district "Line." The by-laws were framed and patterned after the Ely district code, and Nelson Millett was elected district recorder. Wood and water in great abundance in the new mining field add to the anticipated activity with a little more development of the properties. A town has been laid out, part of it in Utah and part in Nevada.

**OREGON.**

COPPER MINES.—The Kerby *Union* says that "owing to the fact that the trail to the lower copper mine is in bad condition, the men will soon be moved to the mines at Waldo, where they will work this winter. Having smelted a few twenty-five-pound mattes of copper, the company is satisfied with its progress so far. The men in charge of the work on this claim and at Gold Basin seem to have grown rich and deserted the mines. Foreman Simmons has left the copper company and will take charge of work on the Yank gold ledge. C. E. Phillips, of the Gold Basin, has purchased a claim for himself and is now working it, while C. C. Russ has given up his superintendency of that mine and will locate in Kerby. It evidently pays to have charge of development work for big companies."

BAKER COUNTY.

A Baker City dispatch says: Superintendent McNally is in from the Virtue mine with several sacks of the richest ore ever taken out of the mine. Fifteen thousand dollars is said to be their value. He also brought in a $13,000 gold retort. The Bonanza the same day sent in a $4500 gold brick.

**WASHINGTON.**

About thirty men are employed in getting out silver ore in the North Star group of mines. They are extracting from twenty-five to thirty tons a day, and expect to have over 3,000 tons ready for shipment in the spring. The property consists of four 1500-foot claims, situated about twenty miles northeast of Fort Steele. The works extend over 400 feet of the lode, and one drift shows solid galena and carbonates for the remarkable width of 65 feet. Assays run from 48 to 85 ounces in silver, 67 per cent lead.

The Cowlitz *Advocate* says the St. Helens Mining Company will spend $20,000 on its mines in the St. Helens district this summer, and that a number of other companies will develop their properties.

**UTAH.**

A GREAT PRODUCER.—*Tribune*: With yesterday's distribution of 10 cents a share, or $15,000, among the stockholders, the dividends paid by the Ontario Silver Mining Company reached a total of $13,190,000, and but for the slump in silver, to which so many bonanzas succumbed in 1892, the amount would have reared itself to over $15,000,000.

The story of the Ontario is the story, perhaps, of no other bonanza. It was located by a prospector, who, like a wandering minstrel, walked, fiddle in hand, into what has since developed as Park City, one day and drove his stakes. At the outcrop rich ore was to be found, but without means to go down upon it, the minstrel sold it out for practically the song that his improvident expenditure of the few hundreds he obtained for it inspired at the bar that night. Then it went into the hands of John Wallace and Al Guiwitz. These gentlemen began its development and had disclosed pay ore when R. C. Chambers, its present superintendent, detected what he conceived to be a promising thing, and after several weeks he procured an option on it for $30,000. He commended it to George Hearst and J. B. Haggin, and these gentlemen, relying on his judgment, scooped it in. Then the systematic development of the property was begun. In a few weeks the production of ore was begun, the purchase price was restored to the pockets of those who had paid for it, and without an assessment having been levied on its owners dividends began. Millions piled upon millions until October, 1892. Then the market went to pieces. The month before its stockholders had divided $75,000. Silver, prior to that time, had averaged about $1 an ounce, but began to steadily decline, and Superintendent Chambers recommended that dividends be suspended and that the energies of the company be concentrated on the plan which had been previously outlined by him to produce the ores at a less cost. The main feature of this was the driving of the great drain tunnel to connect with the 1500-foot level in the mine, which was accomplished in October, 1894, after 15,494 feet of rock had been penetrated at a cost of $30.12 a foot, or a total of $466,753.79.

All the while this was being done the extraction of ore was going on, but with the market value of silver at less than 70 cents, dividends were then out of the question and the operation of the mine was confined to the exploration of new ground and the acquirement of facilities for the more economical handling of the ores. It is estimated by Superintendent Chambers that through the decline in silver since 1892 the company has sustained a loss of $1,588,796, which would have otherwise gone to the stockholders. At present the ore bodies are intelligently blocked out, the means for handling them are perfect, and the bonanza may be relied on for a repetition of yesterday's dividend with the assurance that it will be increased as the price of silver justifies. A bid of nearly $10 a share was made for the stock on the local exchange yesterday, but the only offering was at $11.50.

**IDAHO.**

FORTY MORE STAMPS.—The Wood River *Times* hears that George A. Williams will the coming summer add forty stamps to the mill of the Atlanta Gold Mines Company. This will give employment, at good wages to a large number of men.

IN POSSESSION.—A Silver City dispatch states that the men in the Morning Star mine have driven off Superintendent John Nugent and taken possession. They claim that a large sum is due them for wages and they propose to take out the ore and pay themselves. H. W. Barry, principal owner and manager, is in Denver negotiating for a mill to erect on the property.

**MONTANA.**

CLOSED DOWN.—A Butte dispatch says the Bluejay, Silver Bow and Gray Rock mines of the Butte & Boston group have closed down and over 300 men are thrown out of employment. It is understood that the management is after some high-salaried heads that are not needful. The pumps have not been withdrawn from the mines, which shows that the shut-down is only temporary.

SELF-DUMPING SKIPS.—*Inter-Mountain*: With the new and improved hoisting machinery in use at the mines of the Anaconda Co. the need is felt of some apparatus for hoisting and unloading the ore more speedy and economical of labor than the old slow-going cages, which require the services of several topmen and carry but a limited quantity of ore.

It is understood that the future will witness some important changes in the present methods, and it is said that the company will very soon introduce self-dumping skips or "giraffes," as they are called in the Lake Superior country, where they are largely in use in such mines as the Calumet, Franklin and Quincy, and also in the iron mines of the same region.

These skips are the full size of the shaft and are mounted on solid wheels, which revolve in guides on railroad iron. The only mine in this district in which anything like these skips are in use is at the Gagnon, and, as employed at that mine, are said to give much better satisfaction than the old-fashioned cage.

It is said that the first test of the new skips will be made at the Green Mountain.

**COLORADO.**

MINES SOLD.—The Easter Bell group of mines on Bull hill, near Colorado Springs, are reported purchased by a New York firm for $100,000. The Little Johnny has also been bought by Eastern capitalists for $80,000.

**NEW MEXICO.**

At Pinos Altos all its mines and mills are either at work or preparing to commence operations. The Bell and Stephens, Pacific, Western, Atchison, Deep Down, Mountain Key and Golden Giant are working full handed and with gratifying results. The Golden Giant shaft is now down 320 feet and good ore is in sight. The Mammoth mill has been put in and will start up this week. There are fully 200 miners at work in the camp and times have not been so prosperous for the past ten years.

MOGOLLON.—The new ore body in the Confidence is turning out as good as first indications promised. The mill is daily crushing seventy-five tons.

**ARIZONA.**

MOJAVE GOLD CO.—T. S. Bailey has been opening the Mohawk mine, near Tucson, for the past three years for Eastern capitalists and is completing a twenty-stamp mill, which he expects to start up about the first of March.

AT GLOBE.—*Belt*: The United Globe mines blew in their first furnace last week; 9000 pounds of copper were run out the first day. Sixty-five tons of ore is the daily requirement, supplied from the various mines owned by the company; the Buffalo is now supplying three-fourths of the ore smelted. The ore averages from ten to fifteen per cent copper. Within a few weeks a new furnace will be erected; the present force numbers more than 100 men. E. H. Cook is general superintendent.

AT CONGRESS.—Corr. *Miner:* The Planet-Saturn is down 125 feet on the main shaft. The ore streak is 3 feet wide in the bottom and goes $20 per ton. The shaft is equipped with a large hoisting engine and a 50-horse power boiler, besides a Westinghouse engine to run an 18-inch blower. They expect to sink the shaft 600 feet. Shaft No. 2 is down 200 feet, and the ore streak is from 4½ to 5 feet wide. They have drifted 200 feet west toward the main shaft, and the ore body is about the same width as in the shaft. The second shaft is equipped with a Davis horse whim. There are between 700 and 800 tons of ore on the dump, which is all of a good milling grade; they also have many tons sacked ready for shipment, which runs about $150 per ton. All this ore was taken from sinking these shafts and drift. These mines could keep a large mill going when stoping is begun. They employ 24 men and run eight-hour shifts.

The Yarnell mill is running night and day. They employ eighteen men. The workings are down 375 feet on a streak of ore from 6 to 8 feet wide. The Juniper is also showing up well. They are working ten stamps on it.

## Coast Industrial Notes.

—Discouraged by various frosts, there is an exodus of Florida orange-growers to California.

—An agent of the Chinese Government is reported to have arrived on Puget Sound to place an order for 50,000,000 feet of lumber.

—Tucson, Ariz., has petitioned Congress to authorize an issue by that city of $100,000 five per cent bonds for municipal improvements.

—Mr. Hammond, the builder, says he will have the railroad, 56 miles from Gobel to Astoria, Oregon, completed by the first of next October.

—The new electric railway from this city to the Cliff House on the ocean beach was formally opened last Saturday and is now in successful operation.

—The Ilwaco Railway will be extended along the north side of the Columbia river, Washington, from the present ocean terminus to Knappton, a distance of ten miles.

—The Continental Motor and Traction Company has incorporated in this city. Directors, Philip La Montague, W. R. Smedberg, A. J. Bowie, G. I. Ives, W. B. Harper; capital stock, $1,000,000, of which $35,000 has been subscribed.

—The Pacific Coast Trading Company reports having shipped from Fairhaven, Wash., during 1895, nearly 300,000 pounds of fresh fish, for which the fishermen received $7000. The principal shipments were of silver and steelhead salmon.

—Dr. E. H. Stanley of Port Angeles, Wash., who has given the subject considerable study, proposes to undertake the propagation of Eastern oysters on a branch of Puget sound, and has leased 400 acres in which he will plant a carload of Eastern oyster seed.

—The capital stock for the new Santa Cruz Electric Power Company on Big creek has been subscribed. Contracts for grading the flume line and placing the poles between Santa Cruz and Big creek will be let next week. The woak is to be completed by July.

—In San Diego the proposed bond issue is $1,575,000, which, with interest at 5 per cent, would mean $78,750 per annum, and, as one-fortieth of the principal must also be paid each year, the first payment necessary for the redemption of bonds would be $39,375, making a total of $118,125, but with a reduction thereafter of interest as the yearly installments of principal were paid.

—A. W. Jones, president of the Monterey and Fresno railroad, is in the East to effect the sale of $200,000 worth of bonds in New York. It is stated that $400,000 worth of bonds have been sold locally, on condition that he sells $200,000 worth more in the East. It is also stated that an Eastern firm has agreed to undertake the construction and equipment of the road from Monterey to Hollister.

—"The Central Lumber Co. of California" is the title of the lumber trust or combine of the coast lumber dealers, which is represented to have a combined capital of $70,000,000 and which now includes the principal lumber mills and wholesale and retail lumber dealers in Washington, Oregon and California. An advance of $2 per M feet is the first thing reported to be in order. The output for '95 was 600,000,000 feet. The proposed advance would represent on that output the comfortable addition of $1,200,000.

—The following is clipped from the current issue of the *Railway World:* "The Pacific Mail Steamship Company, which is owned by the Southern Pacific Railroad people, has issued a new tariff sheet announcing an advance of seventy per cent in freight rates from this port to New York. This advance marks the end of the war which the shippers of San Francisco began several years ago against what was considered the extortionate charges of the Southern Pacific, and rates will go back to the old figures."

—The action of the State Architect and the Capitol Commission specifying that oak be used in the State Capitol has thoroughly aroused the lumbermen of Washington. One bidder said an oak floor would cost $15,000 more than fir and would not last as long. What makes the millmen angry is that, in all Eastern States, Oregon and Washington fir is in great demand for the very purposes for which oak is supposed to be desired. The Gray's Harbor Company declares it will be an everlasting disgrace to the coast if the specifications are not changed to admit the use of native woods.

—Over 800,000 olive trees have been planted in California since '94. As many more young olive trees will be planted this year. The total olive orchard area of trees is 21,000 acres, valued at $5,000,000—5,000 acres being in full bearing, with a yield for the last year valued at over $200,000. The crop is gathered in November and December, and the processes of pickling the fruit or extracting the oil at once put under way. The demand for California olive oil has been such since 1889 that the whole product has been sold almost as soon as offered. Last year's product was about 75,000 gallons. The United States has been importing annually 850,000 gallons of olive oil, with a great deal of cheap adulterated oil.

—In northern and central as well as southern California the importance of the beet-sugar industry is being understood. New factories are projected and considerable capital is being invested in machinery and land. The crop of beet sugar in Europe for the season of 1894–1895 reaches 4,800,000 pounds. This is an increase within less than twenty years of about 350 per cent, due to the fact that the industry is more profitable to those engaged in growing the beets and in manufacturing sugar from them than are other easily available industries. Every leading continental nation in Europe has legislated carefully to foster their sugar industry. It is estimated that France has paid in bounties on sugar produced $10,000,000; Germany nearly $6,000,000; Belgium $5,000,000, and Austria $2,000,000. Russia, Sweden and Denmark have also paid bounties. The consumption of sugar in Great Britain and the United States is seventy-nine and seventy-seven pounds, respectively, per capita, while the consumption figures for France, Austria, Germany and Belgium are, respectively, thirty, twenty-nine, twenty eight and twenty-two pounds. Statistics for the last four years show that the production of beet sugar has advanced enormously, while that of cane sugar has made but little gain.

—Mexico shows an increase in imports of cotton goods during 1895, as compared with the previous year. The imports for 1895 were 51,470,100 yards, against 29,471,400 in 1894, and during the past year cotton mills and prints works are running extra hours to supply the demand which they could not meet. The importation of print goods rose from 9,748,700 yards in 1894 to 17,368,400 in 1895. Railway iron and steel imports are about the same, but will increase this year, owing to renewal of every construction. The Government has approved plans for a portion of the new extension of the Mexican Central railway west from Guadalajara.

—During '95 there were 649 commercial failures in California—519 in the State and 130 in San Francisco. The greatest number of failures, 160, occurred in the general merchandise business. There were 139 failures in the grocery business, 55 in the furnishing goods, 48 in the dry goods, 33 in the hardware business, 21 in the boot and shoe business and 18 in the liquor business. The failures occurred in the leading counties as follows: San Francisco 130, Alameda 36, Butte 12, Fresno 14, Humboldt 12, Los Angeles 25, Sacramento 19, San Bernardino 11, Santa Clara 12, Santa Cruz 10, Solano 10, Sonoma 16, Yolo 10, San Mateo 1, Orange 1, Marin 6, Contra Costa 6, Amador 4, Calaveras 5, Siskiyou 6.

—The following bids for completion of the Washington State Capitol were opened this week: Brigham & Lillis, Tacoma, $781,555; Nichols & Crothers, Tacoma, $795,728; Anton Berens, Tacoma, $806,112; John Keenan, Spokane, $818,000; F. H. Goss, Tacoma, $822,951; Fotheringham & Huber, Spokane, $828,000; Huestis & Barrett, Olympia, $839,500; L. L. Teach & Son, Chicago, $886,983; Vulcan Iron Works, Seattle, $892,070; Philip Buehner, Spokane, $903,000; N. J. Blagen, Portland, $997,000. The contract for the completion of the State Capitol was awarded last Wednesday to Fenton H. Goss of Tacoma for $822,951. The structure will cost $1,000,000, of which about $80,000 has already been expended on the foundation and other work. The building will be of white sandstone, quarried near Tacoma.

## Commercial Paragraphs.

THE old established Nevada Metallurgical Works, Taylor & Ward, proprietors, have removed to more commodious quarters, 71 and 73 Stevenson street.

A SCHEDULE of the course of the School of Mechanical Engineering, the Lehigh University, South Bethlehem, Pennsylvania, practical in its nature, illustrated, has been received.

THE Scientific Machinist Co., Cleveland, Ohio, sends a handsome 52-page illustrated catalogue descriptive of the Institute for Home Study of Engineering and of electrical apparatus for its students.

THE Colorado Iron Works, Denver, has issued a neat pamphlet, designed especially for engineers, "Explaining Ore Crushing Machinery for Concentration, Amalgamation, Cyanide and Chlorination Plants."

THE Westinghouse Electric and Manufacturing Company of Pittsburg has received a number of awards at the Atlanta Exposition for the handsome exhibit of electrical apparatus made. Several gold and silver medals are among them.

THE Pelton Water Wheel Co. report the usual activity in their business. Among recent shipments may be mentioned a 1000 H. P. wheel for operating an electric transmission plant in Mexico, a 300 H. P. wheel for an electric power plant in Japan; also six wheels of various capacities to the new mining districts of British Columbia, as well as several to Idaho, Montana and Colorado.

## New Mining Incorpoations.

THE Deer Park Gold Mining and Milling Company, San Diego: capital stock, $100,000; subscribed, $98,000; C. W. Byler, C. M. Walker, J. F. Forward, E. E. Shaffer, T. J. Storey, of San Diego, directors.

THE Mother Lode Gold Mining Company: directors, W. Irelan, A. H. Ricketts, L. C. Parke, L. Neuman, L. Slesinger, M. M. Stern; Crocker Building; to develop the Vulture, Price and McNamara mines, Amador county.


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Have you ever heard of a Double Pipe Air Compressor? It has one disadvantage. It needs twice as much piping as is needed with the ordinary makes of Air Compressors. On the other hand, it has more real, genuine advantages than you can shake a stick at. It will do the same work as the ordinary Air Compressors, such as are in general use throughout the mines on this coast, on 30 per cent less power. We will guarantee this and prove it to your satisfaction, else you need not pay for the Compressor. It weighs less than half as much as the ordinary Air Compressor. It costs less for freights and is more easily carried up into the hills. It shows the same high efficiency at all altitudes, high or low. It takes no more fuel to do the work if located on the highest peak of the Sierras than it would take if located at the sea level. It enables you to buy a smaller boiler than you can use with any other Air Compressor to do your work. It does not overheat the air at the Compressor and freeze it at the rock drill. In short, it is the ideal Air Compressor. It has been tried in practice, and we can show you the highest recommendations and endorsements. We sell it on a strict, positive, iron-clad guarantee If your power costs you anything, you want the Double Pipe Air Compressor, because you can buy it on a guarantee that it will run on 30 per cent less power than any other make of Compressor. If you have to take a Compressor to your mine over bad roads, you want the Double Pipe Air Compressor, because it weighs less than half as much as any other Compressor. It is cheapest to buy, cheapest to run, cheapest to transport, cheapest to carry anywheres. For pumping it beats the world. You can run it with steam or water.

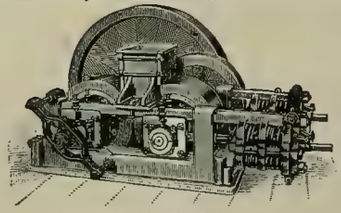
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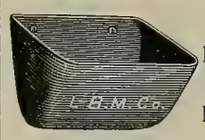
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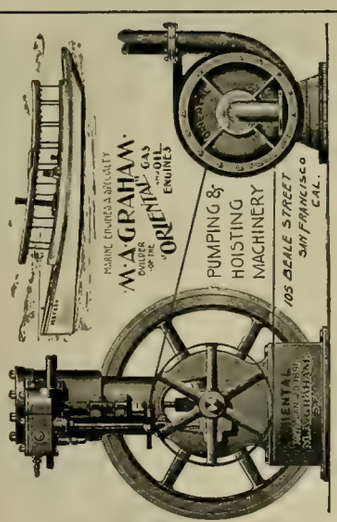
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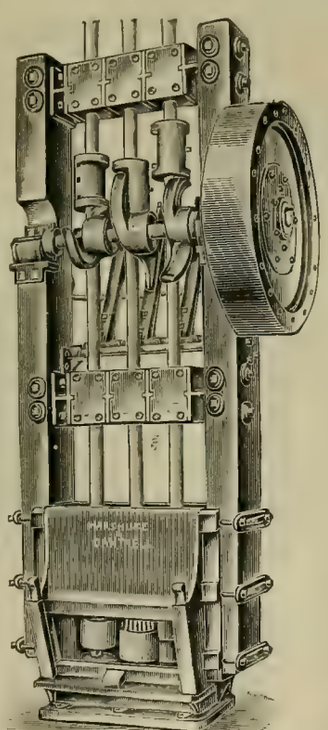
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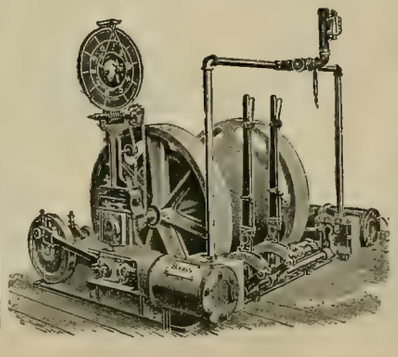
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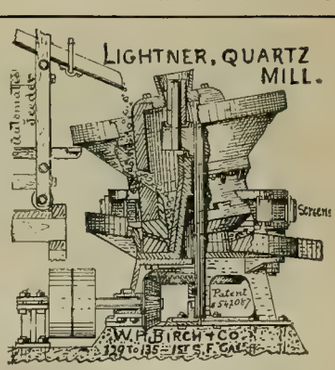
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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING JANUARY 28, 1896.

553,636.—LOW WATER ALARM—O. J. Backus, S. F.
553,639.—SEWING MACHINE—E. O. Bennett, Haywards, Cal.
553,796.—WHEEL—Di Vecchio & Coward, S. F.
553,613.—ENGINE—E. W Hammon, Davisville, Cal.
553,649.—FRUIT PITTER—A. Harpold, Los Angeles, Cal.
553,571.—SEED RACK—J. Sproule, S. F.
553,795.—SNAP HOOK—W. G. Tower, Murietta, Cal.
553,631.—SCHOOL DESK—C. B. Towle, Vallejo, Cal.
553,727.—SPRINKLER.—J. P. Van Sickle, Los Angeles, Cal.
553,633.—TELEPHONE DIAPHRAGM — E. Wescheke, S. F.
553,634.—AMALGAMATOR—S. A. West, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GAS ENGINE.—Samuel M. Miller, Stockton, Cal, assignor to Kroyer, Mayes & Jackson of the same place. No. 553,352. Dated Jan. 21, 1896. This invention relates to improvements in gas engines. The object is to provide in an engine of this class, means to produce a practically double-acting engine. It consists essentially of a cylinder or cylinders closed at both ends; a piston reciprocating therein and connected with the crank shaft; air inlet and outlet valves and passages connecting with one end of the cylinder, whereby the piston acts as a pump to draw the air in during the in-stroke, and to force it out through the outlet valve during the out-stroke; a carburetor and receiver into which the air is forced under pressure, and in which the explosive compound to be used in the engine is produced; a valve chamber communicates with the opposite end of the cylinder, and is provided with a suitable valve and mechanism by which it is operated so as to admit a charge of explosive gas from the receiver to that end of the engine cylinder, this gas being admitted under such pressure that it will serve to start the engine by pressure alone. In conjunction with this are stationary and movable electrodes forming an igniting device by which the charge is exploded so as to force the piston to the outer end of its stroke. The engine is also constructed with two cylinders in line, each of which is constructed similarly to the above, and their pistons and piston rods being connected by suitable slide rods they operate together, and alternately receive an impulse so that the operation of the engine is more regular and continuous.

BEER DRAWING APPARATUS.—George Williams, San Francisco, Cal. No. 553,376. Dated Jan. 21, 1896. This invention relates to the class of devices for handling and dispensing effervescent beverages, particularly beer. Its object is to draw beer or other effervescent liquid directly from the keg or other receptacle into the tumbler without foaming and without loss of too much gas, thereby keeping it lively and sparkling. The apparatus consists of a frame having a fixed plate provided with a valve port, a vertically movable support below, means for clamping the tumbler and sealing it between its support and the fixed plate, a hermetically sealed chamber standing in line with the tumbler, and a circumscribing wall, said chamber communicating with the tumbler through the valve port in the fixed plate and a tube passing through the chamber and fixed plate, whereby communication is established between the source of supply and the tumbler.

SCHOOL DESK.—Charles B. Towle, Vallejo, Cal. No. 553,631. Dated Jan. 28, 1896. The objects of this invention are to increase the capacity of the desk, to afford comfort to the pupil and to provide for economy in its manufacture. Other objects are to detachably fix the desk to the floor so that it may be perfectly stable while in use, and yet may be readily removed by the janitor, to avoid noise in the manipulation of both the seat and sliding top, and to avoid any loose parts which may be taken from the desk. The several improvements in the desk have in view these objects and relate generally to the adjustable seat, to the adjustable back rest, to the manner of mounting and manipulating the sliding top, and to the shoes by which the feet of the desk are detachably connected with the floor.


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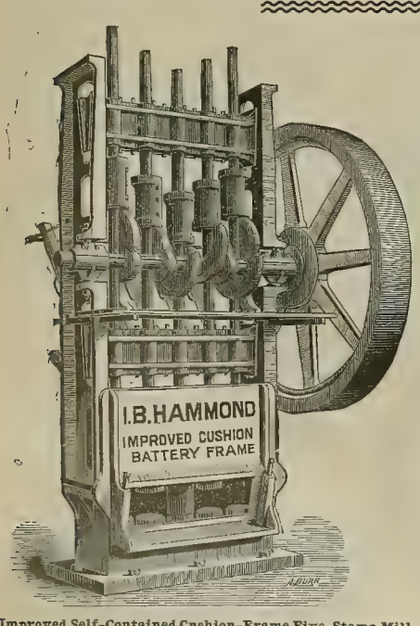
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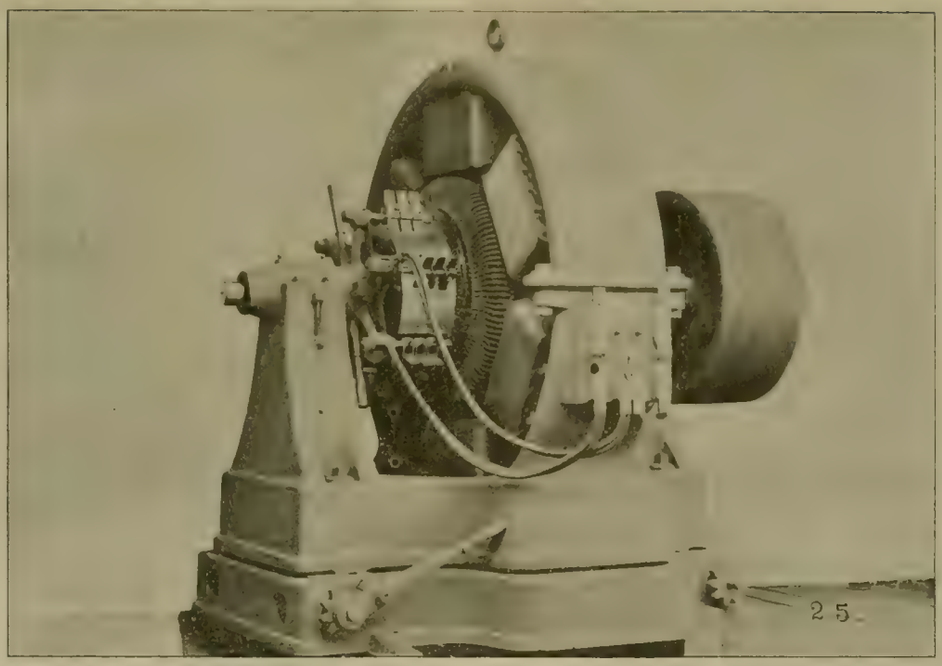
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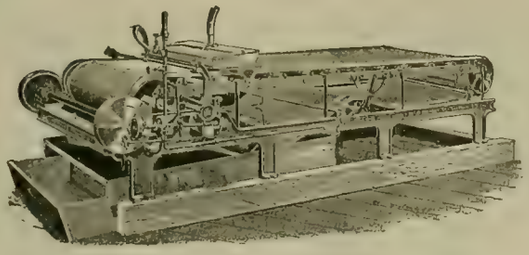
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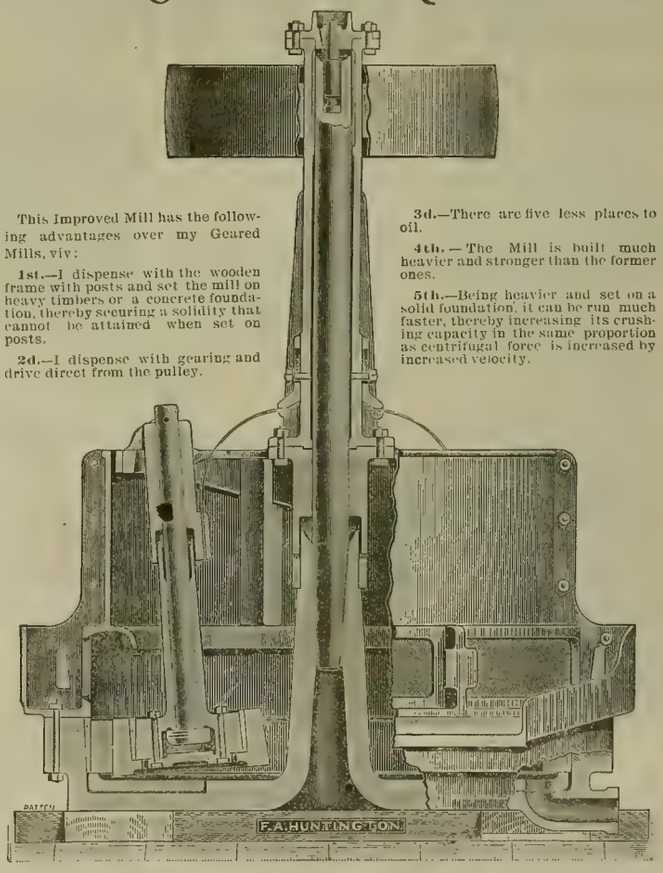
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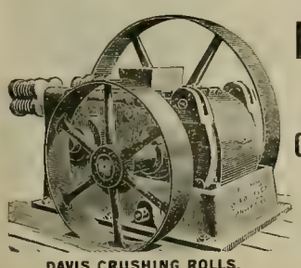
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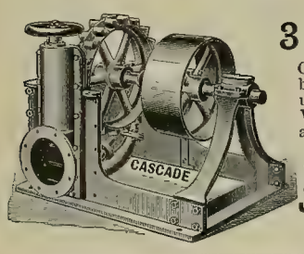
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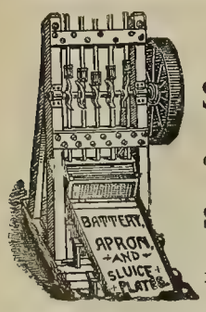
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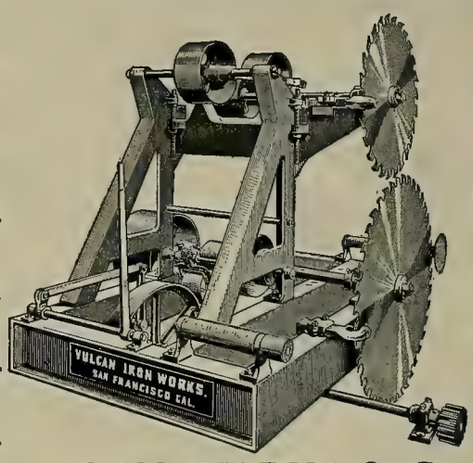
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BOSTON, Exchange Building.
CHICAGO, New York Life Building.
TACOMA, WASH., 102 S. 10th Street.
PITTSBURG, Westinghouse Building.
BUFFALO, Erie County Bank Building.
PHILADELPHIA, Girard Building.
ST. LOUIS, American Central Building.
CHARLOTTE, N. C., 36-38 College St.
SYRACUSE, N. Y., Bastable Building.
WASHINGTON, D. C., 1333 F. St. N.

# RISDON IRON WORKS,

SAN FRANCISCO, CAL.

READ WHAT MINERS THINK OF THE BRYAN IMPROVED ROLLER QUARTZ MILL AND JOHNSTON CONCENTRATOR.

OFFICE OF THE CASDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 40 mesh screen. Our mills run 35 revolutions per minute, and each crush through 20-mesh screens 12 tons in 24 hours; through 30-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 2000 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.

The mills require very little attention. At our mill an ordinary peon, earning one dollar per day, has complete charge.

In regard to slimes, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a much less amount of slime is created. A three years' experience teaches me that in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.
SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY,
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly,

JOHN BECK, Pres.
SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY,
S. BAMBERGER, President and Manager.
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,
[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO,
C. C. MCIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year.

CHAS. C. MCIVER, President.

# MINING, IRON AND WOODWORKING MACHINERY AND SUPPLIES

INGERSOLL-SERGEANT PISTON INLET AIR COMPRESSORS AND ROCK DRILLS

ENGINES AND BOILERS

PARKE & LACY COMPANY

21 AND 23 FREMONT STREET, SAN FRANCISCO, CAL.

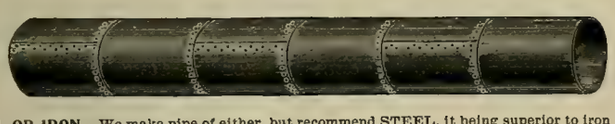
# RIX COMPRESSED AIR MACHINERY CO.

MANUFACTURERS OF

AIR COMPRESSORS AND ROCK DRILLS,

OFFICE AND WORKS — 11-13 FIRST STREET, SAN FRANCISCO.

# Mining Pipe!



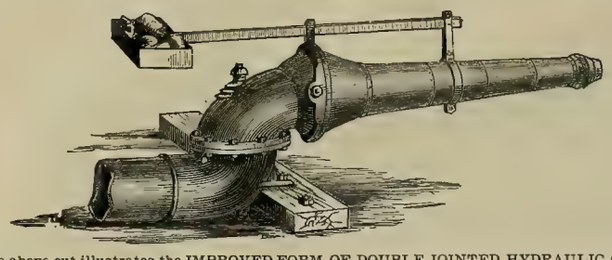
STEEL OR IRON.—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.
COATING.—We use great care in COATING our pipe with a HOT solution of Double Refined Asphaltum and Maltha.
COMPETITORS.—Our competitors say we have the best appointed Pipe Shop on the Coast.

SCHAW, INGRAM, BATCHER & CO., Hardware Merchants,
SACRAMENTO, CAL.

# DEWEY & CO., PATENT SOLICITORS.

220 Market St., San Francisco, Cal.

IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture, and which are pronounced far superior to the SINGLE-JOINTED style. The latter, however, we furnish when requested. Prices, Discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent upon application.

JOSHUA HENDY MACHINE WORKS, 42 Fremont St., San Francisco.

# Market Reports.

## The Markets.

SAN FRANCISCO, Feb. 6, 1896.

Metals are steadier and prices firmer. In structural material California's dependence upon the East militates against the State's industrial progress. Elsewhere is given extended notice to a Nevada county iron deposit. A silver free coinage bill has passed the Senate, but it is meaningless, as it cannot pass the House and the inevitable presidential veto. Still, silver is all right and will win yet. Copper shows renewed strength. All the other metals are practically unchanged, lead showing the least life of any on the list. At the recent secret meeting of Bessemer mine owners held in Cleveland, Ohio, to decide on the proportion of ore to be turned out by the various ranges during the coming season, the total amount to be shipped is fixed at 10,000,000 tons, or 200,000 tons less than was shipped during the last season. The miners realize that when there is a surplus piled upon the lower lake docks, it acts as a price cutter.

**New York Metal Market.**

NEW YORK, Feb. 6.—PIG IRON—Southern, 11@12.00; Northern, 12@12.50.
COPPER — Brokers', 9⅞c; exchange, 10c.
LEAD—Brokers', $2.90; exchange, $3.00.
TIN—Straits, 13c@13.10c.
SPELTER—Domestic, $3.50.

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.87 |
| London Merchants | $4.84½ |
| London Sight Bankers | $4.88½ |
| Refined Silver, per oz., 1000 fine | 67½c |
| Mexican Dollars | 54⅝c |

**New York Silver Prices.**

NEW YORK, Feb. 6. — Following are the closing prices for the week:

| | Silver in London. | N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 30⅜ | 67⅛ | 9 75 | ..... |
| Saturday | 30⅜ | 67¼ | 9 80 | 2 90 |
| Monday | 30⅜ | 67⅛ | ..... | 2 95 |
| Tuesday | 30⅞ | 67⅛ | 9 85 | ..... |
| Wednesday | 30⅛ | 67⅜ | ..... | 3 00 |
| Thursday | 30⅝ | 67½ | 9 85 | ..... |

**San Francisco Metal Market.**

COPPER.

| | | | |
|---|---|---|---|
| Bolt | ¼ & 5-16, 21c; ⅜ and larger, 22c | | |
| Lake Superior Sheathing | 23 | @ | — |
| Ingot, jobbing | — | @ | 19 |
| Ingot, wholesale | 18 | @ | — |
| Sheet copper | — | @ | 22 |

ZINC.

| | | | |
|---|---|---|---|
| Sheet | 9½@ | | |

LEAD.

| | | | |
|---|---|---|---|
| Pig | — | @ | 3 90 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.

| | | | |
|---|---|---|---|
| Drop, sizes *smaller* than B, per bag of 25 lbs | $1 40 | | |
| Drop, B and *larger* sizes, " " | 1 65 | | |
| Buck, Balls and Chilled, do, " " | 1 65 | | |

IRON.

| | | | |
|---|---|---|---|
| American Soft | 22 00 | @ | 26 00 |
| Pig, per ton | 18 00 | @ | 30 00 |

STEEL.

| | | | |
|---|---|---|---|
| English, lb | 16 | @ | 19 |

COKE.

| | | | |
|---|---|---|---|
| Gas Companies' | 75c ₱ bbl. | | |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — | @ | 13 00 |
| " in sacks | — | @ | 15 00 |
| Cumberland | 9 00 | @ | — — |

ANTIMONY.

| | | | |
|---|---|---|---|
| Per lb | — | @ | 10 |

PIG TIN.

| | | | |
|---|---|---|---|
| Per lb | 15 | @ | 16 00 |

QUICKSILVER.

| | | | |
|---|---|---|---|
| Home trade, per flask | 39 00 | @ | 40 — |

BORAX.

| | | | |
|---|---|---|---|
| Refined, in car lots | — | @ | 5⅛ |
| Refined, in sacks and barrels | — | @ | 5⅜ |
| Powdered, in car lots | — | @ | 5⅜ |
| Concentrated, " | — | @ | 4⅞ |

TIN PLATE.

| | | | |
|---|---|---|---|
| Per bx | 4 75 | @ | 5 00 |

ZINC.

| | | | |
|---|---|---|---|
| Sheet | 8½@ | | |

NAILS.

| | | | |
|---|---|---|---|
| Wire | $3 00 | | |
| Cut | 2 80 | | |

LUMBER.

SAN FRANCISCO—WHOLESALE.

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

COAL.

SPOT FROM YARD—PER TON.

| | |
|---|---|
| Wellington | $ 8 00 |
| Greta | 6 50 |
| Nanaimo | 7 00 |
| Gilman | 6 50 |
| Seattle | 6 00 |
| Coos Bay | 5 00 |
| Cannel | 8 50 |
| Egg, hard | 10 00 |
| Wallsend | 7 50 |
| Scotch Splint | 7 50 |
| Brymbo | 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 50 |
| Liverpool Steam | 6 00 |
| Scotch Splint | 6 50 |
| Cardiff | 6 25 |
| Lehigh Lump | 9 00 |
| Cumberland | 13 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

THE CALIFORNIA DEBRIS COMMISSION having received applications to mine by the hydraulic process from G. M. Coney and W. S. Adkins, in the Coney mine, near Oro, Shasta county, to deposit tailings in the ravine below the mine; from H. L. Van Eman, in the Gorman mine, near Michigan Bluff, Placer county, to deposit tailings in Skunk gulch; from O. H. Simons, in the Princess mine, near Redding, Shasta county, to deposit tailings in a ravine and in a dry gulch; from John Sybel, in the Proper mine, near Murphys, Calaveras county, to deposit tailings in a ravine below the mine; from Gianini and Poggi, in the Nigger Ranch mine, near Grizzly Flat, El Dorado county, to deposit tailings in a ravine below the mine; and from E. S. Thompson and G. E. Hill, in the No Chunk mine, near Michigan Bluff, Placer county, to deposit tailings in Skunk gulch, gives notice that a meeting will be held at room No. 92, Flood building, San Francisco, Cal., on February 10th, 1896, at 1:30 P. M.

## Mining Share Market.

SAN FRANCISCO, Feb. 7, 1896.

As indicated in last week's MINING AND SCIENTIFIC PRESS, the market strengthened slightly, then weakened off up to Tuesday noon, when a stronger tone set in, followed by a slight advance. In the upmove Occidental and the middles did the best. The way in which the market is being handled ought to create a feeling of caution, for almost any day a bear raid might set in and prices be sent down twenty, or even more, per cent. There does not seem to be any element of strength, or, at least, it is not sufficiently pronounced to cause dealers to entertain the hope that anything of importance is at hand now. While saying this, the writer still holds to the opinion that 1896 will witness much higher prices than have ruled at any time within the past two years, and, if conditions are favorable, for over five years. This opinion is grounded on the conditions of the mines, the money markets in the United States, improving business and the people ripe for speculation. From one end to the other of the Comstock the mines were never in such favorable condition for being worked advantageously. For over eight years there have been run drifts, cross-drifts on several levels, upraises made and winzes sunk, so as to put the mines in the best possible condition for working. This work has not been done for no purpose, as it is the groundwork for more work when John W. Mackay and his associates get ready for business. When this time will come it is hard to say, but it looks as if it will set in some time in March. The money markets in the United States were never so easy, with the rates of interest favoring borrowers who can give gilt-edge security. That there is an abundance of money waiting investment is witnessed by the large number (4640) of persons and firms that put in bids for the Government new bond issue. Although the number of bidders was large, yet the amount subscribed was unusually large. Although the loan was only for $100,000,000, yet the amount subscribed was over $550,000,000. This country is full of people ready to invest or to speculate. The business of the country is steadily improving, and it looks as if it will continue to enlarge, notwithstanding that this is presidential election year. This is also an important sign in favor of a share deal. And then there is another thing. Reports are being circulated that the stock boards will close. In former years it was that the Stock Exchange building was going to be sold, and this almost invariably produced an upmove. Then there is another thing—the Exchange is reducing expenses.

From the mines there is everything to warrant the expectation that when the powers that be get ready, something of importance will be found in two or more of the mines. In these very mines they are "monkeying" around the vicinity of a considerable body of ore—enough to promote a good-sized deal, even if the propositions should not be backed by moneyed men. It may be before this ore is accidentally found Con. Virginia and several other companies will levy assessments. In the Alta group nothing of importance is reported and none looked for until after assessment sale-day, and not even then unless some of the outside holders give up their shares. In the Gold Hill group of mines there is the usual work under way, some of quite an important character, particularly in Belcher, Crown Point and Yellow Jacket. As Crown Point is collecting an assessment, it is not likely that enough ore will be found to excite the cupidity of buyers. Something good ought to come out of these mines before the spring months pass. Challenge and Confidence, that promised such great things, are virtually "dead letters." It is singular what became of the ore that was found and on which the shares sold at considerably higher prices. It is still in the mines, unless the Yellow Jacket people got in and took it out. The work in Con. Imperial is still making snail progress. The management may perhaps strike the ore they are running for before death overtakes them. In Alpha the water-strike has disappeared as mysteriously as does a Comstock ore-strike. They are still working in the vein, or, at least, were at last accounts. The work in Potosi, Chollar, Hale & Norcross and Savage of the middle group ought to show up better before long. Ore is being extracted in the first three, which helps to pay expenses. It is even stated that Hale & Norcross more than pays expenses. From the character of the work under way better things ought to be the order before long. From Gould & Curry and Best & Belcher nothing is reported to change in any essential the order of the weekly letters received for several months past. In Con. Virginia work is being prosecuted on several levels. It will probably take another assessment to cause them to find ore and also make lower prices for the shares, if that is the intention. In Ophir and Mexican nothing of importance is reported. The work that is being done is of the same character as has heretofore been reported by the superintendents. In Union the work under way promises good results. It seems to be laying the foundation for more active work later on. From Sierra Nevada nothing out of the usual order is reported.

On the Brunswick lode the work that is being done in Occidental is closely watched, but so far that is about all the good it has done anyone. There are persons who have great faith in something of importance being found. The work in that part of the lode around by the middle mines is being pushed as fast as circumstances will admit. There are those who still hold to the opinion that quite a body of ore will be struck, but considerable more work will have to be done yet.

From the Bodie district there is absolutely nothing new to report. The story of distances is still the order. They will have to work on a much lower level before they can expect to find much ore in Bodie. This and the Mono mine are very economically managed.

The following is the usual monthly statement of moneys on hand:

| | | | |
|---|---|---|---|
| BODIE MINES. | | Crown Point | $ 694 |
| Bodie | $ 9,246 | Exchequer | 3,865 |
| Bulwer | 1,763 | E. Sierra Nev | 27 |
| Mono | 920 | Gould & Curry | 6 088 |
| Standard | 21,906 | Hale & Norc'ss | 3,955 |
| Syndicate | 882 | Julia | 256 |
| | | Justice | 259 |
| WASHOE MINES. | | Kentuck | 3,145 |
| Alpha | $ 5,602 | Lady Wash'n | 16 |
| Andes | 1,683 | Mexican | 16,012 |
| Belcher | 4,695 | Ophir | 11,643 |
| Best & Belcher | 16,350 | Overman | 8,909 |
| Bullion | 5,575 | Occidental | 9,788 |
| Caledonia | 133 | Potosi | 14,884 |
| Challenge | 1,652 | Scorpion | 25 |
| Chollar | 19,821 | Sierra Nevada | 2,129 |
| Confidence | 5,674 | Seg. Belcher | 2,596 |
| Con. Imperial | 2,907 | Silver Hill | 482 |
| Con. Cal. & Va | 14,578 | Union Con | 2,415 |
| Con. New York | 1,121 | Utah | 1,916 |

Savage reports an indebtedness of $464.

The following illustrates the changes of the week:

| MINES. | Jan. 30. | Feb. 6. |
|---|---|---|
| Alpha | $ 20 | ..... |
| Alta Consolidated | ..... | $ 07 |
| Andes | 23 | 17 |
| Belcher | ..... | 28 |
| Best & Belcher | 87 | 84 |
| Bodie | 39 | ..... |
| Bullion | 17 | ..... |
| Challenge | 39 | 36 |
| Chollar | ..... | 64 |
| Confidence | 1 05 | ..... |
| Consolidated California and Virginia | 2 40 | 2 20 |
| Consolidated New York | ..... | ..... |
| Crown Point | 22 | 19 |
| Exchequer | 06 | 06 |
| Gould & Curry | 51 | 45 |
| Hale & Norcross | 1 25 | 1 20 |
| Justice | ..... | ..... |
| Mexican | 63 | 60 |
| Ophir | 1 45 | 1 35 |
| Overman | ..... | ..... |
| Potosi | ..... | 55 |
| Savage | 31 | 51 |
| Sierra Nevada | 47 | 42 |
| Union | 41 | 36 |
| Utah | 15 | 11 |
| Yellow Jacket | 47 | ..... |

## San Francisco Stock Board Sales.

SAN FRANCISCO, Feb. 6, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 500 Alta | 07 | 200 Crown Point | 19 |
| 250 Andes | 17 | 300 Gould & Curry | 45 |
| 300 Belcher | 28 | 150 Hale & Norcross | 1 20 |
| 500 Best & Belcher | 84 | 100 Mexican | 60 |
| 900 Bulwer Con | 15 | 1300 Occidental | 15 |
| 100 Chollar | 64 | 200 Ophir | 1 35 |
| 850 Con Cal & Va | 2 20 | 300 Potosi | 55 |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 400 Ophir | 1 35 | 400 Belcher | 28 |
| 100 Mexican | 60 | 100 Sierra Nevada | 42 |
| 300 Best & Belcher | 83 | 400 Utah | 11 |
| 500 C. C. & Va | 2 15 | 500 Exchequer | 08 |
| 350 | 2 20 | 100 Union | 36 |
| 100 Savage | 51 | 100 Challenge | 36 |
| 300 Potosi | 54 | 100 Occidental | 1 15 |
| 300 H. & N | 1 20 | 200 Bulwer | 15 |
| 100 Crown Point | 19 | | |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., February 5, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| CALIFORNIA STATIONS | Total Rainfall for the Week | Total Seasonal Rainfall to Date | Total Seasonal Rainfall Last Year to Same Date | Average Seasonal Rainfall to Date | Maximum Temperature for the Week | Minimum Temperature for the Week |
|---|---|---|---|---|---|---|
| Eureka | 1.12 | 24.73 | 28 73 | 23.91 | 64 | 36 |
| Red Bluff | .16 | 13.83 | 22.27 | 15.41 | 64 | 36 |
| Sacramento | ..... | * | 19.70 | 11.54 | * | 42 |
| San Francisco | ..... | 12.42 | 19.66 | 14.80 | 60 | 44 |
| Fresno | ..... | 4.09 | 9.62 | 5.46 | 62 | 32 |
| S. L. Obispo | ..... | 12 25 | 20.64 | * | 64 | 38 |
| Los Angeles | ..... | 5.91 | 11.22 | 10 39 | 70 | 40 |
| San Diego | .02 | 2.82 | 9 64 | 3 83 | 64 | 42 |
| Yuma | ..... | 46 | 2.99 | 2.27 | 70 | 38 |

* Indicates no record.

QUICKSILVER!
—FOR SALE BY—
The Eureka Company,
OF SAN FRANCISCO.
ROOM 1. - 426 CALIFORNIA STREET,
SAN FRANCISCO.

# MINING SHAREHOLDERS' DIRECTORY.

**ASSESSMENTS.**

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alta S M Co, Nev | 51 | 10c | Jan 13. | Feb 17. | Mar 9. J E Jacobus, 309 Montgomery |
| Andes Silver M Co, Nev | 42 | 15c | Jan 30. | Mar 6. | Mar 28. J W Twiggs, Nevada Block |
| Bay State M & D Co, Cal | 30 | 2c | Feb 1. | Mar 9. | Mar 28. F E Luty, 330 Pine |
| Bulwer Con M Co, Cal | 12 | 5c | Feb 5. | Mar 11. | Apr 3. J E Jacobus, 309 Montgomery |
| Challenge Bend M Co, Cal | 1 | 35c | Jan 13. | Feb 21. | Mar 13. W E Davis, 39 Sutter |
| Challenge Con M Co, Nev | 20 | 5c | Dec 20. | Jan 22. | Feb 12. C L M'Coy, Mills Building |
| Clara G M Co, Cal | 1 | 3c | Dec 17 | Jan 30. | Feb 20. C M Cross, Chronicle Building |
| Crown Point G & S M Co, Nev | 66 | 25c | Jan 16. | Feb 20. | Mar 12. Jas Newlands, Mills Building |
| Evening Star M Co, Cal | 2 | 1c | Dec 14. | Jan 22. | Feb 15. M G Loefler, 137 Montgomery |
| Gray Eagle M Co, Cal | 42 | 5c | Jan 6. | Feb 7. | Mar 3. W J Gurnett, 308 Pine |
| Haskell G M Co, Cal | 1 | 1c | Dec 11. | Jan 18. | Feb 8. G W Osborn, 309 Montgomery |
| Hite G M Co, Cal | 2 | 10c | Dec 17 | Jan 20. | Feb 10. H E Mathews, 120 Sutter |
| Home G M Co, Cal | 9 | 5c | Dec 24. | Feb 1. | Feb 19. O E Johnson, 315 Front |
| Julia Con Co, Nev | 37 | 5c | Jan 17. | Feb 20. | Mar 11. J Stadtfeld, Jr, 309 Montgomery |
| Justice M Co, Nev | 60 | 10c | Jan 13. | Feb 17. | Mar 9. R E Kelly, 309 Montgomery |
| Lady Washington Con Co, Nev | 11 | 5c | Jan 16. | Feb 17. | Mar 10. J E Jacobus, 309 Montgomery |
| Mono G M Co, Cal | 36 | 10c | Dec 30. | Feb 2. | Feb 25. M E Willis, 309 Montgomery |
| Occidental Con M Co, Nev | 21 | 15c | Dec 17. | Jan 20. | Feb 10. Alfred K Durbrow, 309 Montgomery |
| Orleans Mining Co, Cal | 1 | 10c | Jan 21. | Feb 29. | Mar 24. W Olney, 101 Sansome |
| Red Jacket Con M Co, Nev | 3 | 1½c | Dec 18. | Jan 27. | Feb 17. S M Capp, 413 Montgomery |
| Savage M Co, Nev | 88 | 20c | Jan 4. | Feb 6. | Feb 26. E B Holmes, 309 Montgomery |
| Sierra Nev S M Co, Nev | 110 | 25c | Feb 3. | Mar 7. | Mar 27 E L Parker, 309 Montgomery |
| Silver King M Co, Arizona | 13 | 25c | Jan 28. | Mar 9. | Apr 6. J W Pew, 310 Pine |
| Union Con M Co, Nev | 52 | 20c | Jan 14. | Feb 17. | Mar 17. A P Swain, 309 Montgomery |
| Ybarra Gold M Co, Lower Cal | 3 | 50c | Dec 26. | Jan 27. | Feb 12. T G Cantrell, 132 Market |

**MEETINGS.**

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Holmes M Co, Nev | C E Elliot, 309 Montgomery | Feb 11 |
| Standard Con M Co, Cal | J W Pew, 310 Pine | Feb 17 |
| Watt Blue Gravel M Co, Cal | G A Berton, 323 Montgomery | Feb 17 |

# Assessment Notices.

ANDES SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 30th day of January, 1896, an assessment (No. 42), of 15 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, No. 22 Nevada Block, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of March, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 28th day of March, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

JNO. W. TWIGGS, Secretary.

Office—No. 22 Nevada Block, San Francisco, California.

JUSTICE MINING COMPANY. — Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of January, 1896, an assessment (No. 60) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 309 Montgomery street, Room 23, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 9th day of March, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. E. KELLY, Secretary.

Office—No. 309 Montgomery street, Room 23, San Francisco, California.

ALTA SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Gold Hill Mining District, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of January, 1896, an assessment (No. 51) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 33, Nevada Block, No 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of February, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 9th day of March, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. E. JACOBUS, Secretary.

Office—Room 33, Nevada Block, No. 309 Montgomery street, San Francisco, California.

## DELINQUENT SALE NOTICE.

ANCHOR COAL AND DEVELOPMENT COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Kelso, Cowlitz county, Washington.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 6) levied on the 2d day of January, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| B. E. Loomis | 845 | 5 | $ 5 |
| J. A. Christian | 155 | 500 | 15 00 |
| J. A. Christian | 156 | 500 | 15 00 |
| Mrs. Edith Grey | 222 | 100 | 3 00 |
| Mrs. Edith Grey | 223 | 100 | 3 00 |
| Geo. E. Alexander | 670 | 200 | 6 00 |
| Geo. E. Alexander | 671 | 500 | 15 00 |
| Geo. E. Alexander | 707 | 225 | 6 75 |
| C. S. Capp | 838 | 5 | 15 |
| Geo. F. Tuttle | 214 | 1,000 | 30 00 |
| Geo. F. Tuttle | 215 | 1,000 | 30 00 |
| Geo. F. Tuttle | 681 | 400 | 12 00 |
| Geo. F. Tuttle | 683 | 500 | 15 00 |
| James E. Agee, Trustee | 651 | 500 | 15 00 |
| W. H. Gregory | 688 | 500 | 15 00 |
| W. H. Gregory | 689 | 500 | 15 00 |
| W. H. Gregory | 697 | 500 | 15 00 |
| Wm. Lynch | 705 | 150 | 4 50 |
| John Tarpley | 706 | 125 | 3 75 |

And in accordance with law, and an order from the Board of Directors, made on the 2d day of January, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, No. 632 Market St., room 5, San Francisco, California, on THURSDAY, the 5th day of March, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

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Office, No. 632 Market street, Room 5, San Francisco, California.

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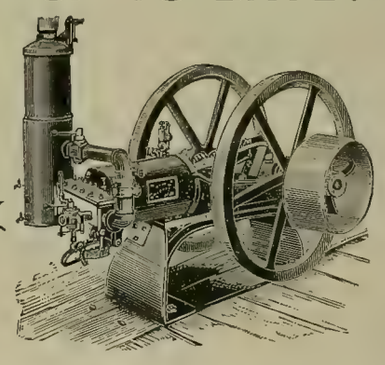
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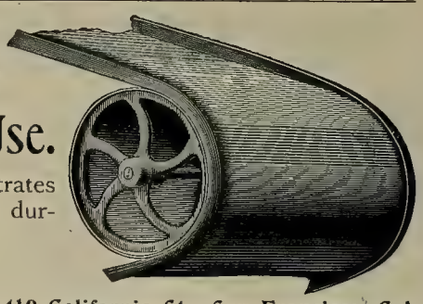
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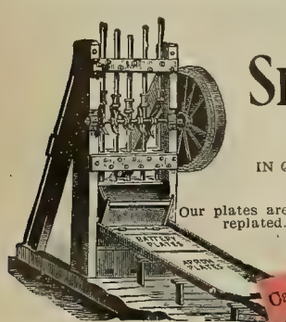
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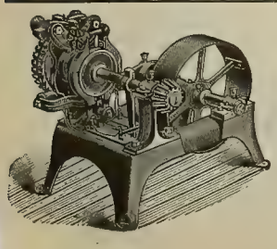
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VOLUME LXXII. Number 7. WHOLE NUMBER, 1863. SAN FRANCISCO, SATURDAY, FEBRUARY 15, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

## Transporting Mining Machinery.

Residents of accessible mining districts where broad or narrow gauge railways or roads or trails of easy grade make possible the speedy transportation of mining machinery and supplies have little idea of the makesbifts, the efforts and the ingenuity often necessary to pack in everything required in and about a mine situated in some place hard to reach. Many a mill has been put up, many a steam-hoisting works erected where every timber and piece of machinery had to be dragged up steep mountain sides or brought in on the backs of burros. Even yet there are many isolated localities where as much difficulty is found in bringing in required appliances as was experienced in the early days of mining on this coast when the transportation often cost as much as the supplies. But with the settling up of the country and improved mining appliances, much of the former difficulty in this respect has vanished. No part of the mining region of the coast has been exempt from vexatious expense, loss and delay. Whether in the Sierras, or among the crags of Nevada, in Death Valley or the canyons of the rivers, the same difficulty has been encountered. It used to be said in Arizona and Nevada that "the north was the country to mine in; in Montana, Oregon and Idaho they had plenty grass, wood and water, and one could make a road," which was measurably so. But even in the land of "grass, wood and water" were and are problems to be solved in the transportation of mining machinery.



TRANSPORTING AN 800-LB. CAM SHAFT THROUGH A TIMBERED COUNTRY TO AN OREGON GOLD MINE.

From the Hammond Manufacturing Co. of Portland, Oregon, are received four large photographs showing the difficulty of such transportation where too heavy a vegetable growth was as much a detriment to travel as the bold mountain slopes and steep sided canyons of the southern country. One of those pictures shows the method of transporting 6000 feet of three-fourths inch wire rope in one piece over a mountain trail eight and one-half miles, requiring nineteen horses, another the way in which a mortar weighing 6000 pounds was carried over the same trail. This mortar was placed on a "traction sled" consisting of two runners with a pulley on each end of each runner, the mortar bolted to the runner forming the body of the sled. Passing over the pulley was an endless chain with cast-iron traction shoes fastened on it every six inches. On the inner side of this chain between it and the runner were wrought-iron plates turned up at the end sufficient to prevent runners from sliding sidewise as the chain revolved. On the bottom of the runner was fastened a steel shoe. The plates between chain and runner were kept well greased, forming a slippery surface for the runner to slide on, and which revolved as the sled advanced, thereby laying down its own track. Four horses hitched tandem hauled this load, and the sled would climb over logs a foot or more in diameter. Turns were made by a tongue sticking out behind and used as a steering apparatus.

Another of the series of photographs illustrates the transportation of a cam shaft pulley seven feet in diameter and weighing 800 pounds. This latter has been selected as worthy the efforts of our engravers to correctly portray on a copper plate transportation of mining machinery through a mountainous, wooded country. Incidentally, the engraving gives a good idea of Oregon scenery, the tall spruce and hemlock trees being characteristic of that region.

The Champion mine, whither the machinery mentioned is being taken, is in Lane Co., Oregon, forty miles from Cottage Grove. The ore is free milling and concentrating. Supt. Jennings says he has a wire-rope tramway 3100 feet long, connecting the mill and mine. He uses an "Australian" concentrator. The Hammond Manufacturing Co., Portland, Or., have furnished two self-contained five-stamp batteries, and the mill and mine are a present source of profit to the owners.

---

UTAH, the newest of all the States, has a zealous and well meaning legislature in session which seems honestly desirous to do a good deal for the Utah miner. Considerable is now being put through for the protection of the miner, regulation of mining operations, liability for accidents, appointment of State officers, etc. The intent is evidently beneficial, but there seems a probablity that the new commonwealth of Deseret may overdo the thing. With power always comes responsibility. If Utah proposes to operate the mines within its borders it must share the responsibility of evasion or noncompliance with State law. Zeal and good intent are admirable, but a little discretion is also necessary for satisfactory legislation.

---

RECENTLY Thos. A. Edison said he was tired of electricity and was going into mining. He could easily turn his attention to mining without giving up his interest in electrical progress, for electricity has present intimate connection with mining in all its branches. Just now he is experimenting with Prof. Roentjen's recent "ray discovery" or "new light," and is disposed to begin where others leave off. He is testing the value of the x-ray in connection with metallurgy, and gives out probabilities of practical developments in that direction.

---

WITHOUT organizing any million-dollar companies with $25 paid up capital, our sister State to the north is turning out considerable gold in a quiet way. In southern Oregon, over one hundred hydraulic giants are reported in operation in the vicinity of Grant's Pass, and the quartz properties of that region are receiving considerable attention. In Baker Co., in the northeastern part, are some rich gold properties—steady producers that will aid in sending Oregon's gold yield over the $3,000,000 mark in '96.

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J. F. HALLORAN.....General Manager

## San Francisco, February 15, 1896.


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THE claim is reiterated that by means of the "X-rays" new light, or recently discovered luminous force, one can "see through metal bars," and attain equally unusual results, such as viewing mineral veins, noting the dip and trend of ore bodies, etc. It is a comforting theory, but so far savors more of the sensational than the scientific.

THE first annual report of the officers of the Manufacturers' and Producers' Association is a clear, business statement of the inception and progress of an important movement in the industrial life of the State. With present and pressing problems, the officers and members have dealt wisely; there are so many interwoven considerations that it is a difficult and delicate matter to do justice to all, but honest and intelligent effort will result in the general good. The first issue of this paper—May 24, 1860—announced in its salutatory the necessity of the development of home industry. Thirty-six years ago that was talked of; at various times efforts have been made to unite in a common cause those most interested. The present association represents so far the most continuous and successful combination through the years, and by every one of the members upbuilding the business principles of the organization success is assured. This is a case where "United we stand; divided we fall."

SISKIYOU AND TRINITY COUNTIES are receiving considerable present deserved attention. There are several undeveloped gold gravel tracts in that part of the State, and the fact that some of our local capitalists allow French and English companies to get in, as they have recently, is not complimentary to their business judgment. Rich as that northwestern part of the State is in these surface gold deposits, it takes capital to develop and work them. In some other parts of California big water ditch supply systems admit of individual working, but in the region referred to nothing extensive has ever been built, and a small claim holder has no chance of getting water enough to work his placer holding. The claims, many of them, are for sale at a very low price, the main cost being in the building of the requisite water system. This the foreign capitalists count on and have the nerve to put up the money. When, later on, they realize the golden returns, no local company can complain that the gold is being carried away. The opportunity has existed for years, and still exists in many cases. The fact that the Klamath, which drains the most of the country referred to, has been officially declared a non-navigable stream removes the debris question, and makes the outlook for hydraulic mining in that section all the more favorable.

THE Treasury Department is in receipt of a letter from E. Polk Johnson, special agent of the Treasury Department at St. Louis, Mo., enclosing a communication addressed to him by the surveyor of customs at Omaha, Neb., recommending that an allowance be made for moisture in lead ores imported by the Omaha & Grant Smelting Co. In reply thereto Acting Secretary Hamlin said: "I invite your attention to the Department's decision of Oct. 5, 1892, (S. 13,391) declining to authorize such allowance in the absence of any provision of law permitting the same, and referring to a decision of the U. S. Supreme Court, October term, 1891, bearing upon the subject. Such ores must be assessed with duty in the condition in which they are imported and cannot be exempted from the operation of a general rule stated in Article 850 of the Customs Regulations of 1892."

WITH justifiable pride this paper refers to the character and quality of its advertisers. There is not a single advertiser in this paper who is not entitled to the confidence of our readers. That is a good deal for a mining paper to say, but it is stated with a full knowledge of all that such a statement implies. Considerable business is weekly declined. Questionable speculations, glittering prospectuses, "bargains" in mining investments, are "conspicuous by their absence" from these columns, and those who use the sacred name of electricity in an attempt to swindle with sundry medicinal "electrical" appliances have long since learned that the MINING AND SCIENTIFIC PRESS declines to lend its aid to such meretricious schemes. Anything that tends to aid or develop legitimate mining or be of service in the field of industrial progress in any department is always worthy of admission herein and is gladly accorded notice. The fact is deemed worthy of note that our thousands of readers can confidently rely on the financial standing and business responsibility of the firms' and individuals whose announcements appear herein.

THE Anti-Debris Association, now the sole opponent of congressional relief to the residents of the Sacramento valley, has a manager, a lawyer and a literary bureau. The manager is a reasonable man, who concedes the fact that one is not necessarily a villain because he does not hold the same views on politics, religion, hydraulic mining, the funding bill and other public topics. The lawyer gets $250 per month as long as active opposition lasts, which is probably sufficient self-justification for his existence. The literary bureau is chiefly represented by Mr. Ohleyer, an earnest, conservative man, who believes all he is told and has a ready pen and abundant leisure. His most recent brochure is a disclosure in the Sacramento *Bee* (approvingly copied in the horror-stricken columns of sympathizing contemporaries) of the dreadful conditions on Chico creek, in Butte Co., where he recently visited. The editor of this paper believes that he lived a year there for every day Mr. Ohleyer spent there and to anyone acquainted with the facts Mr. O.'s statements and deductions are ludicrous. In common with other portions of our favored commonwealth, Butte had been blessed with a bountiful rain just before Mr. O. favored Chico with his transient presence and Chico creek was "booming." Like other inland water courses, it had overflowed and done some damage. In the dim January twilight Mr. O. noted the flooded banks and in the *Bee* he pours out his sympathetic soul, "hydraulic mining" being the subject of his song. There was and is no "mining mud," nor "destruction of fertile farms by the cruel giant." The method in Mr. O.'s monomania regarding hydraulic mining overshadows his admission of the fact that the natural wash and overflow of a freshet was all he saw in a water course innocent of hydraulic mining. Of course, Mr. O. must earn his money as the literary bureau of the Anti-Debris Association, but when that organization sends marked copies of papers containing his effusions to members of Congress in an effort to retard federal legislation that would inure to valley benefit, it would be only fair and honest to stamp the statement at its worth. Further along Mr. Ohleyer also visited Butte creek, which he finds leveed "at enormous expense by innocent yeomanry to restrict the overflow of mining mud." That is rhetorical, and doubtless has cash value with Mr. O.'s supporters; but as a cold fact, Gov. Stanford paid for all that, it being simply a part of the extensive improvements made by that gentleman when he bought the Sam Neal place. Mr. O. goes on and on. To his fertile mind a grain of sand suggests the desert; a mouse's skin the Hudson Bay Co.'s fur trade. Fact is subordinated to fancy and fiction supplies the place of argument or just comment. Seldom are those things noted herein, but Mr. O.'s recent production, a sample of stock on hand, is example of the glamour a good man is liable to when inflamed by passion and inspired by zeal, he nurses a wrath to keep it warm and mistakes the coinage of his brain for the patent facts.

### Mining Legislation in Congress.

The Mineral Land bill recently introduced in the House of Representatives was reported upon favorably by the Committee on Public Lands last Wednesday. It is believed that the bill will pass both houses and become a law. It is the culmination of the fight begun in September, '94, in these columns. Favorable result is not yet certain, and every friend of the miner needs to continue effort in behalf of the measure. The "compromise" bill, so strenuously objected to herein, has been withdrawn; the one now up for passage in Congress is the original bill, as published last in these columns December 21st, 1895, more precisely worded and changed in Sec. 2. In the bill as approved by the California Miners' Association at the convention last November, Sec. 2 reads as follows:

SEC. 2. That, for the purpose of making the examination herein provided for, there shall be appointed by the President of the United States, as soon as practicable after the passage of this act, three Commissioners, each of whom shall be a resident of the State of California, at least one of whom shall be a practical miner, and not more than two of whom shall be appointed from the same political party; and said persons so appointed shall constitute a Board of Commissioners to perform within such State the duties herein prescribed. Before entering upon their duties each of said Commissioners shall take an oath to faithfully perform the duties of his office. The oath of office of said Commissioners shall be filed by them in the office of the Commissioner of the General Land Office. Said Commissioners shall receive for their compensation their actual traveling and other expenses incurred while in the performance of their official duties; and, in addition thereto, the further sum of ten dollars for each day they may be actually engaged in the performance of their duties; and their accounts shall be audited by the Secretary of the Interior and paid monthly. Said Commissioners shall make examination of the lands herein mentioned, and may also take the testimony of witnesses as to the mineral or non-mineral character of any of said lands, and receive any other evidence relating to said matter, and shall have power to summon witnesses to appear before them, and to administer oaths; and they shall, immediately upon their appointment, proceed to examine and classify the lands herein mentioned, within said State of California, as provided in this act. All testimony taken by said Commissioners shall be reduced to writing, subscribed by the witnesses, and filed with the report of the Commissioners hereafter required. The action or decision of a majority of said Commissioners shall control in all matters herein provided for.

The bill reported favorably last Wednesday substitutes the following as Sec. 2:

SEC. 2. That for the purpose of making the examination herein provided for, Commissioners shall be appointed by the President of the United States, as soon as practicable after the passage of this act, as follows, namely: Three Commissioners for the Redding and Susanville land districts, three Commissioners for the Marysville and Sacramento land districts, three Commissioners for the Stockton and San Francisco land districts, and three Commissioners for the Visalia, Independence and Los Angeles land districts. The Commissioners thus appointed shall constitute four separate Boards of Commissioners for the several land districts above named and as last above indicated and set forth. That all of said Commissioners must be residents of said State of California, and at least one of the three Commissioners in each of said Boards of Commissioners must be a practical miner, and not more than two Commissioners in any one Board shall belong to the same political party. Before entering upon their duties each of said Commissioners shall take an oath to faithfully perform the duties of his office. The oath of office of said Commissioners shall be filed by them in the office of the Commissioner of the General Land Office. Said Commissioners shall receive for their compensation their actual traveling and other expenses incurred while in the performance of their official duties; and, in addition thereto, the further sum of ten dollars for each day they may be actually engaged in the performance of their duties; and their accounts shall be audited by the Secretary of the Interior and paid monthly. Said Commissioners shall make examination of the lands herein mentioned within their respective land districts, and may also take the testimony of witnesses as to the mineral or non-mineral character of any of said lands, and receive any other evidence relating to said matter, and shall have power to summon witnesses to appear before them, and to administer oaths; and they shall, immediately upon their appointment, proceed to examine and classify the lands herein mentioned, within their respective land districts, as provided in this act. All testimony taken by said Commissioners shall be reduced to writing, subscribed by the witnesses, and filed with the report of the Commissioners hereinafter required. The action or decision of a majority of any one of said Boards of Commissioners shall control in all matters herein provided for within the jurisdiction of such Board.

This is an improvement; and while it involves a little more governmental expense, it is justified by the importance of the interests involved. Three Commissioners for the whole State would make slow work in comparison with the proposed subdivision of the classification among twelve Commissioners. The fact that, as before, the act provides that the Commissioners shall be appointed by the President of the United States takes the important matter of appointment out of the domain of undue influence. All the miners ask is the appointment of competent, impartial men.

## Concentrates.

DE LAMAR, NEV., has a present population of 1500.

THE Bullion-Beck of Utah will pay a dividend of $25,000 this month.

MERCUR, Utah, $4 ore is mined and milled at a profit of $2 per ton.

THE London *Mining World* says "the real Transvaal question is the want of labor."

NEXT month the owners of the O. K. mine at Trail Creek, B. C., propose to put in a 20-stamp mill.

SEVENTEEN MEN are now employed at the Gladstone mine, French Gulch, Shasta Co., on good pay ore.

DURING '95 the Columbus and Rhodes marshes, Esmeralda Co., Nevada, produced 13,483,380 pounds of borax.

AT Mullan, Idaho, the Hunter mine is again running, with about eighty men, making 200 now employed there.

D. M. STEEN is about to put in a ten-stamp custom mill at Boise, Idaho, and will charge $3.50 per ton for crushing.

A STRIKE of $100 ore is reported in the Morning Star mine at Silver City, Idaho. A mill is to be erected upon the property.

THE *Prospect* hears that the Starlight mine near El Dorado is soon to be started up under the management of G. McM. Ross.

DENVER men have bonded from Hays & Fletcher the Cedar mine, Grass Valley, Cal. It is locally stated that a mill will shortly be built.

THE total lead production on the Pacific coast in 1895 is estimated at 173,000,000 pounds. Three cents was the average price during the year.

A BILL has been introduced in both houses of Congress extending the mineral land laws of the United States to all Indian reservations therein.

THE new ten-stamp mill at the Persia mine, on Saxon's creek, six miles north of Mariposa, Cal., started up this week. W. H. Wright is superintendent.

WHAT a boon it would be to mining communities, says a Utah exchange, could the Grim Reaper transfer his attention from the shining mark to the mining shark.

THE Big Canyon mine, near Placerville, has now assumed sufficient importance to justify the formation of a new school district for the children of the mine employees.

SIX TRAINS a day loaded with men arrive at Cripple Creek, Colorado. Eight out of every ten of these men are residents of Colorado. The other two are from the East.

SUPT. BROWN has forty men working at the Waldo, Oregon, copper mine. Work at the Wheeler City mine has been suspended till damage by recent high water is repaired.

A MINING CONVENTION will be held at Helena, Mont., March 10th, "to promote the legitimate development of the gold, silver, copper, lead, coal and iron resources of the State."

FROM $50,000 to $80,000 is the monthly gold yield of the Kennedy mine, at Jackson, Amador Co., Cal. The ore averages $15; the workings have attained a depth of 2000 feet.

THE U. S. Debris Commission has temporarily closed the Central Hill hydraulic mine at Murphy's, Calaveras Co., for non-compliance with some of the technical requirements.

VICTOR, COLORADO, is announced to be the highest incorporated town in the world, being 10,300 feet above the level of the sea. Leadville is 10,080 and Cripple Creek is about 10,000 feet.

SUPT. BABCOCK of the Golden Scepter Mining Co. proposes to erect a 100-stamp mill at Haney Creek, Montana. It is under consideration to build an electric railway from the mine to the mill.

BIG STORIES blow down from the Pen d'Orelle country of miners making $200 a day with a rocker. Some one may have struck a rich pocket, but the event does not justify more than passing notice.

"No mine can lay claim to real greatness unless it has been held up in court by some pirate with an attenuated claim to an interest in the property," is the correct conclusion of the *Mining Review*.

IN 1892 the silver production of this country amounted to 65,000,000 ounces. In 1891 it dropped to 49,500,000 ounces. At this rate of decrease the production in 1896 will be less than 25,000,000 ounces.

WHITE PINE, Nev., is again heard from; the Chainman has uncovered a large body of ore which is locally represented as being 60 per cent free, the remaining lead sulphides averaging $30 per ton.

IT is reported from Bangor, Butte Co., Cal., that the Catskill mine has been sold to a company composed partly of the owners of the worked-out Derbec mine near North Bloomfield, Nevada county.

IT is calculated that eighteen cubic feet of gravel in bank or twenty-seven cubic feet dry weighs a ton. Thirteen cubic feet of average gold or silver ore in mine, or twenty cubic feet of broken quartz, weighs a ton.

FORTY-THREE sticks of giant powder recently became ignited in the Mollie Gibson mine at Aspen, Colorado, and burned entirely to ashes without an explosion. Had the stuff exploded the loss of life would have been appalling.

A GOOD ILLUSTRATION of how the mining interests of the State are waking up is the increased stir in the newspaper world. Placerville, El Dorado Co., which has been well served by two weeklies, is now to have a daily.

THE Westralian gold output for '95 was 232,591 ozs., valued at $4,397,390. The railway is now thirty-eight miles from Coolgardie. The Government will spend $500,000 to provide water at different centers in the Coolgardie district.

THE Carson, Nevada, mint will no longer be maintained, but will be converted into an assay office, on the same basis as the one at Helena, Montana. It was first opened in 1872. No coining has been done there for nearly three years.

ACTING SECRETARY OF THE TREASURY SCOTT WIKE has made a recommendation for a change in the mining laws so as to allow the Government to defray expenses of refining and parting of bullion at the mints from the sale of the by-products of such bullion.

AT the Broken Hill Proprietary, Australia, for the week ending Jan. 16th, 6679 tons of ore were treated, yielding 449 tons of lead, containing 140,674 ounces silver, also 819 tons treated by amalgamating and leaching plants, producing 9054 ounces silver.

SECRETARY OF THE TREASURY CARLISLE writes: "There is not a word of truth in the statement that the owners of gold mines at Cripple Creek, or any other place, have offered to give the Government gold bullion in exchange for silver dollars, or for any other kind of currency."

AN appeal to the Supreme Court of Oregon is being perfected in the case of Francis Clarno, assignee of the Portland Mining Co., vs. George W. Grayson of this city. The case involves the title to the Virtue mine, near Baker City, Or., and $50,000 damages. An appeal bond has been filed.

THE *Mail* has ceased publishing lists of the newly organized Cripple Creek gold mining incorporations. Its brief and breezy editorial explanation is "it takes up too much valuable space. More than half these companies are frauds, anyway, which deserve no public notice other than exposure."

"CONCENTRATES" is told that the January gold yield of the Utica mine, Calaveras county, was a little over $800,000. My, what a fuss would be made about a mine with such a yield anywhere else on earth! Here in California it is taken as a matter of course—same as the big trees, the violets and strawberries in February, etc.

THE Mountain Mines Co. of Keswick, Shasta Co., expects to shortly begin monthly shipments of several thousand tons of copper matte twelve miles over its newly constructed road, thence to this city on the S. P. at 45 cents per ton, thence to Swansea for refinement. The first smelter is about finished. There will be four in all.

THE Godbe Mining Co. of Salt Lake and Denver has assumed control of the Machu mine, West Point, Calaveras Co., it having a bond on the mine. A shaft is sunk ninety feet and two levels 100 feet have been run southerly, a paying ledge being found in each case. It is locally reported that the Godbe Co. will build a stamp mill and hoisting works.

EMPEROR WILLIAM of Germany's cablegram to a Montreal firm asking could they supply him with 200 tons nickel has occasioned great interest. Sudbury, Ontario, has the largest known nickel deposits. Last year that district produced 4,566,542 lbs. Of this, 3,138,400 lbs. was imported into this country; the remainder went to Europe.

ONE HUNDRED business men of Leadville, Colorado, have entered into an agreement to pay $10 per month each for the purpose of developing prospects, and similar movements are being started in other Colorado towns. The purpose is to give employment to the idle miners and open up undeveloped properties, some of which are certain to become producing mines.

"A SUBSCRIBER" writes from Park City, Utah: "What is the deepest perpendicular shaft in the United States?" The vertical shaft at the Calumet & Hecla copper mine, Calumet, Mich., is now 4880 feet deep. At 20 feet deeper work will be stopped and cross-cutting and drifting will begin. The shaft is over 1000 feet deeper than any outside of Calumet, and is believed to be the deepest in the world.

STATE DEBRIS COMMISSIONER JOHN F. KIDDER has applied to the Supreme Court for a writ of mandate to compel State Controller Colgan to audit his January salary demand for $300 as a member of the State Debris Commission. Colgan has an opinion from State Attorney Fitzgerald that the money need not be paid. Should the case be brought to a final test it is probable that the opinion of Mr. Fitzgerald's predecessor, that the money may be legally paid, will obtain.

IN '95 the Rand Central Ore Reduction Co., Johannesburg, S. A., made a profit of £40,000 by treating 357,000 tons of tailings, and it is said they have a million tons of tailings left. This company is about to engage in the treatment of the Robinson slimes, which, it is believed, it will be able to do at a profit. These slimes are estimated in quantity at half a million tons, and should the effort to treat them be successful, then the slimes of adjoining companies will be operated upon in the same way.

REGARDING the Golden Sand Placer Mining Co., and its dredging operations in the Sacramento river near the mouth of the American river, a stockholder in the company writes "Concentrates" that there is but one amalgamator aboard the dredger, and that "the directors of the company are about to set up a clam shell bucket in lieu of the endless chain and buckets in order to be able to dredge in deep water and to a greater depth. When this is done, dredging will be commenced, flood or no flood."

AT the North Pole Mining Co., Cracker district, Baker Co., Or., Superintendent Recknagel proposes to erect an 80-stamp mill. A. Geiser, owner of the Bonanza mine at Clifford, Or., forty miles from Baker City, is in the city buying 10 stamps to add to his 10 stamps now in operation. This mill is turning out 500 ounces gold per month. At the Red Boy mine, Clifford, Taber & Godfrey propose to put in a 10-stamp mill. At the Ajax Superintendent Hartsell has added 10 stamps. The district is turning out considerable gold and times are lively. Men are paid $3 per day.

THE Leadville, Col., *Herald-Democrat*, in speaking of the big drilling match arranged to be held in the Ice Palace, says: "The Miners' Union will have a day at the Ice Palace, and it will be a big one. It is to be Feb. 24th and the great feature of the occasion will be a double-handed drilling contest. The first prize is $600; second, $300; third, $100. Gavin & L'Abbe add another $100 to the first prize, making $700, the largest rock-drilling prize ever contested for. All communications can be addressed to E. J. Dewar, box 132, Leadville." The California Miners' Association held a drilling contest in this city two years ago at which over $1200 was distributed in prizes.

AN ingenious geologist has propounded the astonishing theory that the center of the earth is a mass of molten gold and platinum. He says: "If you put into a bottle some coffee, some sand, and some quicksilver, fill it up with water and then shake it briskly, as soon as it has rested for a minute you will have a layer of quicksilver at the bottom, a layer of sand in the middle and a layer of coffee on top, with the water over all. That is, the heaviest at the bottom and the lightest on top. At one time the earth was just like the contents of the shaken bottle. And as it has cooled it is likely that the heaviest of all the elements—platinum—has gone to the bottom, that is, the center; and that the platinum is surrounded by a layer of pure gold. The gold that we find on the surface is merely a small quantity that, here and there, got entangled with other things and was prevented from sinking." This should afford some additional argument for the "deepest level" mining propositions of our South African friends.

E. P. LEAHY of Anaconda, Montana, is announced as the maker of a new device in placer mining. "It will do away with flumes, ditches and canals and the usual labor of panwashing and rock-rolling usually incident to placer mines. The outfit in question is a pumping engine ranging from 1 to 250-horse power and runs without steam, water, fire or electricity. This engine can be had to force water up a pipe 1000 feet with a very strong pressure. Where there is water in the vicinity of the mines he guarantees to supply it for placer mining purposes with this pumping engine at one-third the actual cost of constructing an ordinary steam-pumping outfit." The *New Northwest* says it is a sure success, and that "there are to-day over 45,000 in actual use." This may be so, but 45,000 such machines "in actual use," running "without steam, water, fire or electricity," seems a good many. "Concentrates" confesses its inability to locate one of that number.

THIS is how the current issue of the London *Mining World* talks of the Randt, South Africa, district: "At a time of depression like the present, it may be useful to recall what the Randt has done. Its mines have produced since 1887, when the first crushings took place, 8,800,000 ozs., valued at £30,800,000. The annual average production for the last two years may be taken roughly at over 2,000,000 ozs., valued at nearly £8,000,000, but this is nothing to what will take place, if we are allowed to work in peace and under normal conditions, in the near future. Already, we may expect an increase of the stamping power by 2265 stamps, and this is not including the 100 stamps apiece which it is believed the Crown, Langlaagte, Jumpers, Robinson, Nourse and Rose Deeps will shortly erect, which will add 600 more. All these stamps are of the heavier pattern, capable of crushing four and one-half tons a day; in fact, all anticipations lead to the belief that in five or six years' time 7000 to 8000 stamps should be crushing 1,000,000 tons a month, producing 400,000 to 500,000 ozs., or 5,000,000 to 6,000,000 ozs. per annum, and having a value of between £17,500,000 and £20,000,000 per annum."

IT is a curious commentary upon the instability of human affairs that the former owner of the entire city of Johannesburg now lies a confirmed invalid in the workhouse infirmary of the quaint old market town of Guildford, in Surrey, England. The old man seems to have had a most remarkable career. He was in the service of the East India Company, fought in the Crimea, was seriously wounded at Sebastopol, and afterward passed through the Indian mutiny. He then went to South Africa, where he fought against the Zulus and the Boers before the Transvaal was made over to them. He bought for £350—his accumulated savings—over 15,000 acres of land near the source of the Limpopo, where he made up his mind to ultimately settle, but war broke out, he took up arms against the Boers, and formed one of the party who held Pretoria against them. In 1880, when the Republic was declared, he refused service under President Kruger, and the consequence was that his land, upon a portion of which the Transvaal city of Johannesburg now stands, was forfeited. Thus the old man who lies dying without a penny in the world just escaped being "rich beyond the dreams of avarice."

AT Spokane, Wash., last Monday, Judge McBride found for the plaintiff in the suit of C. P. Oudin vs. Chas. Crossman. Crossman sold to Oudin a one-fourth interest in the Monitor, a British Columbia mine, for $1000 cash. The purchase was made solely upon the representations of Crossman, that the lode was a large one, carrying gold, and would assay from $15 to the ton upward. Crossman went to the property with Adolph Hellmers. Samples were taken from the lode and brought to Spokane in a sack for assay. Without the knowledge of Hellmers the samples, after being taken from the lode and before being assayed, were artificially charged with free gold, so that the assay when made showed a very large value for the ores. Crossman, well knowing that the samples did not represent the true value of the ore in the location, and knowing that the plaintiff was being deceived, induced him to make the purchase. The contract was the result of the deception, Crossman knowing that the property sold was worthless. The court's conclusions were that the contract of the purchase be rescinded and annulled, the defendants entitled to a reconveyance of the property sold to the plaintiff, and the plaintiff is entitled to the judgment for $1000, with interest and costs of suit.

DISCOURSING of the dykes and ore deposits of Cripple Creek, Colorado, State Geologist Rickard says: "One of the characteristic types of ore occurrence is that of gold-bearing dykes traversing the breccia and penetrating into the granite. Several well-known lodes are essentially such dykes usually marked by a multiple fissuring which produces a certain sheeting of the rock along planes enriched by the presence of gold-bearing ore. The ore is apt to have one fracture plane, and travel in a broken way across the formation to assume a more regular behavior as soon as it reaches a neighboring parallel 'wall.' The original wall goes on, smooth as a skating rink, devoid of ore and delusive as a promoter's dream, while the ore, obedient to the structure of the enclosing rock, scatters itself amid small cross seams, which finally lead to a companion fracture parallel to the original ore channel. In such a formation, crosscutting, based on a careful study of the structural geology, is imperatively necessary. It will be found as development proceeds that the ore deposition is intimately associated with multiplicity of subfracturing, quite opposed to that ideal conception of the fissure vein, which has led many to think of it as having the regularity of a sheet of paper, and penetrating creation with a careless disregard of the structure of the enclosing rock. Some of the ore discoveries are destined to be very restricted in size: other depositions of gold are evidently favored with an environment which makes it geologically probable that they will be marked by a continuity of productiveness. The district is already so large, twenty square miles at least, and the formation is so varied that many mistakes will be made by applying the experience obtained in one part of the camp to another portion, which has a geological structure quite dissimilar. To quote the rich ore reserves of a well-known mine as indicative of the potential richness of a neighboring claim is likely to be more than usually misleading, because the former is apt to have a rock formation entirely unlike that existing in the latter. For these reasons Cripple Creek will afford good opportunity for the proper use of the technical training of the experienced mining engineer."

## Mines, Miners and Monopolies.

Written by J. A. EDMAN.

NUMBER V.

Returning to the industrial history of mining in California, and reviewing the period between 1880 and 1890, we find that the Southern Pacific Company had not been inactive, even if not asserting its claims prominently. It had been busily investigating; and from the records of the general and local land offices, as well as from the reports of its own surveyors and mineral experts, had gained a very thorough knowledge of the topography and mineral resources within its grants, and specially of the areas, both vacant and occupied within the odd sections. So far, neither the people of California nor Oregon had made any organized efforts to oppose the oppression of the monopoly, and to our shame it must be said that individual complaints and remonstrances had shown as little tangible effect in consolidating the miners of California against the common enemy as our representations and appeals had found recognition by Congress. Gradually the company had filed its lists of lands claimed under the grants and had received patents on smaller selections. In doing so, it had frequently come in conflict with mineral claimants both in the courts and in the land offices, and had often been defeated by miners competent and able to defend themselves, while it levied blackmail upon power or less influential men desirous of preserving their property and make good their titles. One of the most flagrant instances on record of this infamous practice occurred in 1890, and is generally known as the case of Francœur versus Newhouse, tried in the Circuit Court of the United States before Judge Sawyer, August 9, 1890, and relates to the title of the Eagle Bird mine in Nevada county. Although well known in California, the case is so typical of the spirit and tactics of the Southern Pacific Company that a brief statement may here be in place. According to the testimony, the land in controversy had been occupied and worked as a quartz mine for over twenty-eight years, had had improvements of great value placed upon it, and was held under a U. S. patent for five years preceding the filing of the complaint. During all that period the railroad company had not set up any adverse title. In spite of all this the railroad corporation claiming title under the grant to the C. P. Company conveyed by deed the property in question to the plaintiff who brought suit, which, after a long contested trial, resulted in judgment for the defendant on all points and a signal defeat to the company and its subservient tools. In this case, however, the property was of great value and the owners able to defend themselves. A different result might have been expected under different conditions of ownership*. With the prospect before him of having to defend his title in the courts, is it a wonder that the miner or investor prefers other and safer fields for his labor and his capital ?

After this long period of apathy and inactivity by the struggling miners of California, a change for the better was inaugurated by a handful of men chiefly interested in hydraulic mining, whose properties had remained dormant and unproductive for years, and its first fruit was the organization of the California Miners' Association, whose delegates held their first convention in San Francisco on January 20, 1892, and discussed the general good of the industry and means for the rehabilitation of hydraulic mining with proper restrictions under the laws. As resulting from this action, the so-called Caminetti bill was introduced in the House of Representatives early in February, 1892, and passed there, but was not acted upon in the Senate.

The second convention of the Miners' Association was held in San Francisco, Nov. 15, 1892, and questions of general interest were discussed, among them the resumption of hydraulic mining. A memorial was prepared for presentation to Congress and resolutions passed setting forth the absorption of mineral land by the railroad company and praying for a remedy. The Association at that time counted 4378 members.

The Caminetti bill finally passed March 3, 1893, and in May the President appointed the Debris Commissioners, who shortly after organized and made ready for their labors under the Act. The State Legislature also passed a bill appointing a State Debris Commissioner.

The third convention of the Association, held October 9, 1893, entered a still wider field of discussion, among which the unfair rulings of the Interior Department became prominent. Resolutions were adopted and amendments proposed to the mining statutes, chiefly in relation to mineral land and determination of its character.

At the fourth convention, held November 19, 1894, delegates were present from Montana, Idaho, Utah, Alaska and Washington Territories, and the convention was addressed by many prominent men of the State, among them several of California's Congressmen. Representative Caminetti spoke there, as follows:

"Now, while you people are waiting, while the people throughout the district are doing nothing, the Southern Pacific Railroad, by its army of officers, by its army of perjured witnesses, is going round the district and in the land offices in this State and in Washington, robbing from the people of this State and from the miners the land that belongs to them."

He also said: "Under this departmental law, against the spirit of our laws, against the spirit of the mining laws, it has been intended to give this corporation lands that do not belong to them—lands that by the decision of the Supreme Court of the United States are plainly said to belong to the people, and any attempt to wrest it from the people by the means they have resorted to is illegal and a fraud."

At this convention a Committee on the Protection of Mineral Land was appointed and was instructed to take action to protect the mineral lands from absorbtion by the railroad company. When this committee went to work and sent an agent to Washington, he was denied the privilege of examining the records in the General Land Office of the selections of land made by the railroad, and it was only after a strong protest by the chairman of the Mineral Land Committee to the Secretary of the Interior that he was given access to them.

Through the action of the Mineral Land Committee protests were entered against the issuance of patents to large portions of the lands claimed by the Southern Pacific Company, and action thereon was temporarily suspended.

In April, 1895, chairman of the Mineral Land Committee, proceeded to Washington and laid the miners' case before the President as well as the Secretary of the Interior and the Commissioner of the General Land Office, and endeavored to secure a suspension of all proceedings in patenting public lands within railroad grant limits in California till Congress would meet in December and could take action on the classification bill (substantially the Idaho-Montana bill) introduced during the closing weeks of the Fifty-third Congress.

To his representations, supported by briefs and evidence, he received but evasive assurances, and shortly after his return to California the Commissioner dismissed the protests, when the matter was appealed to the Secretary of the Interior who speedily (November 5, 1895,) approved the dismissal—a conclusive evidence of the alliance of Interior Department with the railroad power and its total indifference to the rights of the Government as well as to the people's cause.

During last June the Legislative Committee of the Miners' Association had prepared two bills for introduction in Congress, one recommending amendments to the Mining Statutes, another providing for an appropriation to be expended by the Debris Commission in the construction of restraining dams.

The foregoing review represents the origin and prominent acts of the California Miners' Association up to July 1, 1895, to which time its action had been harmonious and mainly directed to the common good of the mining industry, and by its official acts the Association had gained the firm support and lasting gratitude of the great majority of all the miners in the State.†

While the miners of California had been thus occupied, it must not be supposed that the railroad interest had slumbered or had acquired any unusual access of justice, honor or patriotism. The Southern Pacific Company was preparing for its great stroke of policy, but its field of activity was mainly in the East and was concerned with the executive and legislative powers of the Government. Fully conversant with political tactics and intrigues; subtle and secretive as befits such a cause; in possession of a large contingent fund and familiar with its most effective use when convincing arguments were to be applied; supported by an army of dependents and lobbyists, the campaign had been mapped out by the able if unscrupulous mind which so long has directed the destinies of the Southern Pacific. With that company it was not now a-striving for supremacy on the Pacific coast; it was a fight almost for its existence. The obligations of the Central Pacific due the Government and exceeding eighty million dollars were to be met in 1896, and without any disposition to disgorge their booty the magnates and managers of the company proposed to coax, cajole, flatter or frighten the Government to reduce its large and just claims to the nominal pittance offered by the company, and thereby to perpetuate or prolong its existence for an indefinite term.

During the period from 1890 to 1895 the persistence in this policy had borne fruit and the departments in Washington had become stanch friends of, and in the case of the Interior Department, entirely subservient to the railroad power. The climax was reached when the odiously celebrated rules of July, 1894, were issued by the Secretary of the Interior, as before stated. Before this date comparatively few selections of land within the mineral belts had been filed at the General Land Office, but after the road had been opened for unobstructed perjury, the lists of selections were filed in rapid succession as distinctively mineral lands, not only in the main gold belt, but largely in the northern and southern belts. On July 1, 1894, there had been patented to the Southern Pacific Company within the Central Pacific grant 491,000 acres, and selections (largely of mineral land) had been approved to the extent of 415,000 acres more, leaving only 732,000 acres not located, chiefly because unsurveyed.

Before October, 1895, by which time the Miners' Association had become fully conversant with the methods of the company, over 600,000 acres of mineral land had been filed upon by the Southern Pacific Company; protests had been entered by the Miners' Association and had been dismissed by the commissioner; appeals had been taken to the Secretary of the Interior and had by him been dismissed and the lists approved for patenting, all before Nov. 5, 1895—a rapidity of action showing the perfection and smoothness of motion of official machinery when properly lubricated. Among the lists thus approved Clear List No. 54 will ever be evidence of misrule, robbery and official corruption, as it embraces old and well known mines and townsites, close to the Central Pacific railroad, returned by United States surveyors as mineral and as such specially described by the geological surveys of the United States and of the State of California.

It was during this period of activity in the General Land Office that the Southern Pacific Company had introduced its scheme of a Funding bill in the Fifty-third Congress, and, thanks to the initiative and activity of the liberty-loving citizens of San Francisco, and the able support of our then representatives in Congress, had there been ignominiously defeated, only to present the same scheme with some new features before the present Congress.

Meadow Valley, Cal., Feb. 5, 1896.

(*To be Continued.*)

*The above case is given in full on page 930 of the tenth annual report of the State Mineralogist, to which the reader is referred for details of this important case.

NOTE.—In No. 2 of this series, page 64, last line of first paragraph, second column, for J. S. Dreer read J. S. Diller.

† A full and comprehensive history of the Miners' Association can be found in No. 15. Vol. LXXI of the MINING AND SCIENTIFIC PRESS, to which the reader is referred.

## Geological Investigation in Michigan.

TO THE EDITOR:—It is the intention of State Geologists Messrs. Hubbard and Lane to devote a great deal of their time this spring to a thorough investigation of the geological formations of the Lake Superior native copper range in Keweenaw county. In addition to the geologists' labor, it is the plan of some prominent mining men who are interested in this county to further explore and develop their mining properties.

It is in this county that the celebrated mass copper-producing mines—the Cliff, Phœnix, Central and Copper Falls—are, which are worked almost exclusively on what are known as the fissure veins. It is now just half a century since the first of these mines was discovered, and a quarter of a century ago since they were most productive. To-day only one mine, the Central, is being worked and that only with a very small force, producing about twenty-two tons of copper per month.

The master belts or veins that are being worked so successfully in Houghton county, known as the Calumet conglomerate, Osceola, Amygdaloid, and Quincy or Pewabic veins, are known to extend through Keweenaw county, and the thorough exploration that modern methods of mining are now capable of doing will undoubtedly, when guided by scientific information, reveal that which will make this almost abandoned mining territory a rich copper and silver-producing district again.

In addition to its copper veins, there are known to exist veins that will pay to work for native silver alone.

Over fifty years ago Captain "Dick Kernic," a practical Cornish miner, found a rich conglomerate vein between Calumet and the Cliff location; he was unable to pay the miners who worked under him, so he went East and got money from some capitalist and was then known to have got north of Green Bay, Wis., where all track of him was lost. He is supposed to have been murdered for his money, as his wife in Cornwall or his friends on Lake Superior never got any clue of him. His rich copper discovery has not since been found, unless his was the original Calumet vein. A. F. ISLER.

Houghton, Mich., Feb. 7, 1896.

THE Syracuse, New York, *Standard* tells of an amusing correspondence that recently took place between a Wisconsin farmer and a local boiler firm. The farmer wrote as follows: "Dere Sirs I hav a 1000 akers of trees that I want cut. Im pore but Im willing to pay too hundred dollers fer an engin that will do my work," and he went on to explain just what sort of an engine he wanted. The boiler firm saw that the engine necessary to accomplish the devastation of his virginal forest would cost $3000, and they informed him to this effect. A week passed and then the following pithy epistle came from the Wisconsin woods: "Dere Sirs what in h—l wud I want of an engin or biler if I hed $3000 ?."

CALIFORNIA'S present militia force is officially stated to be: Commissioned officers, 304; enlisted men, 3986; total, 4290. The total available men for military duty in California is figured at 203,523.

## Notes on Gold Milling in California.

NUMBER XIII.

By E. B PRESTON, M. E., Field Assistant State Mining Bureau.*

No. 4. *Calaveras County.*—The rock consists of massive quartz, schistose and slaty diabase, and chloritic and talcose schist, with iron sulphurets; it is crushed in jaw-breakers at the head of the shaft, after passing over grizzlies, and is dropped into bins, from which the ore is conveyed, in cars, to three other bins in the mill, one for each section of twenty stamps, having a capacity of 600 tons each. The bins discharge into Challenge self-feeders. The sixty stamps weigh 775 lbs. each, and drop 105 times per minute, the drop being 6 inches, and the discharge 10 inches from the new die. Only one chock-block is used, causing the height of discharge to constantly increase. The duty of the stamps is 4 tons in twenty-four hours. Round-punched tin screens, 10x14 inches, are used. They are lightly burned before using. Three and a half of the screen sheets are tacked on the screen-frame on three sides; the top side is secured by a long, narrow strip of wood screwed to the frame. The superficial area of the discharge is about 287 sq. in. The screen-frame is braced by six cross-ribs, to which the screens are tacked. A splash-board is suspended in front of the screen by eyebolts and hooks, with a strip of canvas tacked along the bottom, the full width of the screen. An iron apron or table is secured to the front of the mortar below the screen, the bottom of which falls 1 inch below the lip of the mortar; permitting the insertion of a rough inch board, 9 inches in width, in front of the mortar, flush with the upper edge of the mortar; on this the pulp falls from the screen, and it is claimed to be superior to a plate in retaining the amalgam. Three inches below the board runs a trough, in which are two apertures one-third the distance from each end, which allows the pulp to fall on a short, 6-inch wide copper plate with a pitch toward the mortar, and from thence to the apron-plate, 2 inches wide and 24 inches long, set to a grade of 2 inches to the foot. An inside front plate is used in the mortar. From the apron-plate the pulp passes to a sluice-box and is conducted to the spreaders of the vanners, of which there are twenty-four. After leaving these, the pulp is led through a sluice-box and flume one mile long to the canvas-plant. The plates are dressed every morning; a battery is hung up, the water shut off, the splash-board removed and washed off, as also the screen and the entire front of the battery, to remove all sand; the plate is then vigorously scoured with a whisk-broom to loosen the amalgam. A very dilute solution of cyanide of potassium is sometimes used during this operation, and the lossened amalgam brushed to the foot of the plate. The plate is then scraped upwards with a piece of rubber 4x4 inches and ½ inch thick; a piece of rubber belting would answer the same purpose. The collected amalgam at the head of the plate is removed in a scoop and placed in a safe. The plate is then sprinkled lightly with quicksilver, which is spread evenly over the entire plate, the water turned on, and the stamps dropped. The operation for all the plates requires nearly three hours.

A clean-up of the mill is made monthly or semi-monthly, according to the condition of the battery amalgam, at which time all necessary repairs are made, and new shoes and dies are fixed if required. Shortly before hanging up, the feed is shut off to permit the ore to be crushed down as low as possible. The water is then shut off from the battery, splash-board and screen removed, and all hosed off; the inside plate is removed, and the amalgam scraped off. The contents of the battery are now removed, and placed in the relvolving clean-up barrel, the dies replaced, tappets set, screens replaced, and the mill started. The pulp that leaves the mill carries considerable auriferous pyritical slimes, as might be inferred from the high discharge used in the battery. This is conveyed through a sluice 12x8 inches, to a canvas-plant one mile distant. Just before entering the building set apart for the recovery of these slimes, the sluice is widened to 18 inches, and divided into three sections by two narrow strips fastened to the bottom. These divisions fork off into separate sluices, which are again subdivided. Three of these subdivisions are carried directly through the building, and there divided, and the other three are divided off in five separate sluices, one for each section of the canvas-tables. There are forty-five sections for each table—ninety in all. They are 42 feet long, 22 inches wide, and set on a grade 1¼ inches to the foot. No. 8 duck canvas is used, and when worn on one side it is turned; it lasts about one year. The last division of the pulp, outside the building, is into five boxes, 4 inches square, each of which terminates in a receiving-box, reaching across three canvas sections, about 5½ feet. The five divisions supply one-third of the sluices on one side of the bulding; the pulp passing to the canvas through an auger-hole in the side of the box. The flow is regulated by a slide suspended over the whole. Above the pulp-distributing box is a clear-water box, and at the lower end of the canvas-tables are two sluices, side by side—one to receive the concentrates, the other for the reception and discharge of pulp. The current must be thinned and distributed so that no accumulations form.

No. 5. *El Dorado County.*—The quartz carries considerable slate mixed with it, and about 3% of iron sulphurets. The stamps weigh 950 lbs. each, and drop 4 inches 104 times per minute, discharging through a No. 2 sheet-tin, perforated screen, with from 5 to 7 inches discharge, crushing three tons per stamp in 24 hours. The shoes and dies are both steel. The battery is supplied with an inside plate in front. The apron-plates are 16 inches long, set on a grade of 1¾ inches to the foot, and are followed by 6 inches of sluice-plates, 2 inches wide on the same grade. These plates are dressed every day, but only scraped once a month. (Note:—This is not advantageous, as the constant scouring action of the pulp undoubtedly detaches fine particles of amalgam.) The batteries yield 62% of the amalgam. Eight Woodbury concentrators receive the pulp. The quicksilver is introduced into the battery every half hour; the loss of quicksilver being estimated about one pound to every ten tons of ore.

No. 6. *El Dorado County.*—The quartz carries about 2% of sulphurets and contains slate mixed with it. The stamps weigh 750 lbs. each and are fed by Challenge feeders; no rock-breaker is used. The stamps make 96 drops per minute, varying from 4½ inches to 6 inches, with 7 inches discharge. The mortars are wide, and have an 8-inch wide amalgamated plate; the screen is perforated tin, equal to No. 7. The apron is 54x42 inches, with grade of 1¾ inches to the foot, followed by sluice-plates 12 feet long, which are double on one battery and divided into four divisions on the other; this arrangement gives better results. Below the sluice-plates is a blanket-sluice, 6 feet long and 14 inches wide, the blanket being washed twice a shift. From these the pulp passes to the Frue vanners with 6-foot belts; the same wheel runs both stamps and vanners. The plates are dressed twice in twenty-four hours, but are not scraped until the clean-up, once a month. One and three quarters tons are crushed to the stamp per twenty-four hours.

No. 7. *Mariposa County.*—This mill is working on ores containing gold in a very finely divided state. There are ten stamps of 900 lbs. each, fed by self-feeders. These stamps drop 96 times per minute, with a 7-inch discharge while the die is new; when it is worn down one-half, a smaller chock-block is placed under the screen. The pulp is retained in the mortar for a long time. The stamps are only raised to the level of the water as it stands in the mortar; and a front inside plate is used. The screen is a 60-mesh. It is claimed that 79% of all the amalgam saved is taken from the inside battery-plate. There are three apron-plates to each battery; the first is immediately in front of the splash-board, next to the lip of the mortar, 12 inches deep and the width of the mortar. This is followed by a 2-inch drop onto a second plate 3 feet deep, across the width of the mortar, succeeded by a 1-inch drop to a 4-foot apron-plate. from this plate the mortar, succeeded by a 1-inch drop to a 4-foot apron-plate. From this plate the pulp passes immediately through distributing pipes to the vanners, of which there are three. Two of these are 4 feet wide, taking the pulp from one battery, while a 6-foot belt vanner takes the pulp from the other battery. The narrow belt vanner gives the best satisfaction.

No. 8. *Nevada County.*—The ore is delivered by car at the top of the mill into grizzlies, the bars of which are 2½ inches apart, and which deliver the coarse stuff to a crusher of the Blake type, through a bin with chute immediately over the crusher, keeping the same constantly supplied without the aid of a shovel. From the rock-breaker the ore is delivered into bins with chutes connecting with the Challenge self-feeders. The feed is operated from the center stamp. The stamps drop 7 inches and 86 times per minute, with a 4-inch discharge. Steel shoes on iron dies are used. The screens are English sheet tin, perforated, No. 10, five pieces making a complete screen, costing 50 cents, and lasting one month. The steel shoes on iron dies have records of over 300 tons to the stamp, the daily average being from 1¾ to 2 tons per stamp. The plates are divided into an upper apron, 18 inches wide, followed by a 4-foot apron. Between the two, catching the pulp from No. 1, is a box 3 inches wide, with a perforated screen bottom, somewhat coarser than the battery screen. This acts as a distributor on No. 2 apron, retaining any coarse pieces. For the forty stamps and accompanying concentrators, 15 miner's inches of water are used, all applied on the inside of the battery. The aprons have a ⅝-inch grade to the foot. Below the apron are 12 feet of sluice-plates, part of them 30 inches wide, while the others have the same width as the apron above. These plates are cleaned up every morning with pieces of rubber belting; it takes about fifteen minutes to clean one set. From the sluice-plates the pulp passes over a 12-foot shaking table covered with silver plates; these plates receive their motion from an eccentric placed underneath. Passing the table the pulp enters a box, from which it is conveyed through pipes to the vanners on a lower floor, two for each battery.

No. 9. *Nevada County.*—The stamps weigh 750 lbs. each, drop 6 inches, 95 times per minute; with from 4 inches to 6 inches discharge, and crush from 1¾ to 2 tons per day, using stee shoes and dies. There is a 5-inch wide silvered plate in the front of the battery. A No. 9, perforated, sheet-tin screen is used; it is not burnt before putting on, and is turned when the lower edge is worn, lasting on an average thirty days. In front of the screen is a splash-board, provided with an 8-inch plate next to the screen. The upper apron-plate is 18 inches deep, set on a grade of ¾ of an inch to the foot, with 12 feet of apron-plates below, divided into four plates of 3 feet each, set on a grade of 1 inch to the foot. From these the pulp drops into a box running across the end of the plate, from whence it passes to the vanner. The plates are scraped every twenty-four hours, with the exception of the upper 4 inches next the mortar, and are dressed twice a day, using dilute cyanide of potassium. Both rubbers and chisels are used in scraping the plates. In cleaning up the batteries, which occurs once per month, the headings are put into a revolving barrel with pieces of iron and quicksilver, and after running several hours, the contents are removed in buckets, the sand "boiled out" with the hose, the dross skimmed off, and the quicksilver strained. About 75% of the amalgam is saved in the battery. The tailings assay from 25 cts. to $1.50 per ton.

No. 10. *Nevada County.*—The stamps weigh 800 lbs. each, and are given a 6 inch drop, 100 times per minute, with a discharge varying from 2 inches to 4 inches; there are no plates in the battery. The ore passes over grizzlies, with bars 1¼ inches apart, to a No. 2 Blake crusher; thence to the ore-bin that supplies the Challenge feeders, which are operated from the center stamp. Steel shoes and iron dies are used—the shoes lasting, on an average, 155 days; the iron dies, 70 days. No. 6 Russian-iron slot-screens are used. The outside mortar-plate is 14 inches wide, with ½-inch pitch to the foot, and retains 75% of the plate amalgam. The apron below is 4x4 feet, with a grade of ¾ inch to the foot. Beyond this are 12 feet of double sluice-plates 12 inches wide, and with ¾ inch grade to the foot. Three sand-boxes separate the different apron-plates. From the sluice-plates the pulp passes directly to the concentrators. The duty of the stamps is two tons per day. The tailings assay $1.80 to $2 per ton. From 10 to 12 lbs. of quicksilver per month is used for the 40 stamps. The plates are scraped every day, and the batteries cleaned once a month, the headings being worked in a Knox pan. A weak solution of cyanide of potassium is used in dressing the plates.

No. 11. *Placer County.*—The quartz carries but a small percentage of sulphurets, and is delivered from the mine over an incline tramway to two grizzlies with 12 bars, 3 inches apart, 12 feet long, 3 inches deep and ½-inch wide, set on an angle of 45°. In front, below, and between the grizzlies is a Blake crusher, from which the ore drops into the bin that supplies the Challenge feeders. These are operated from the center stamp. The stamps weigh 750 lbs. each, and drop 5 inches, 90 times a minute, and the discharge averages 5 inches. The screen is set on a 4-inch block, with a 5-inch plate on the inside. The screen is a No. 10, slot-punched, set with a slight incline. Part of the water for the battery is supplied from a small wooden trough, pierced with holes in holes in front of the screen. The outside iron lip of the mortar is covered with a silvered plate. The apron, set on a grade of 1½ inches to the foot, is 4 feet long, and is followed by 12 feet of sluice-plates, 18 inches wide. After passing through a quicksilver trap, the pulp passes through a 3-inch pipe to the Frue vanners. A tank of quicksilver is used every three months, in crushing 3500 tons of ore. The plates are scraped every day with rubbers, and are occasionally dressed with phosphate of lime, or with lye. The battery is cleaned out once a week, and yields 50% of the amalgam.

No. 12. *Plumas County.*—The ore is free-milling, and contains about 1½% of sulphurets. It is delivered to the Blake crushers in the mill by an incline tramway, and the ore passes through the bins to the Challenge feeders. The stamps weigh 850 lbs. each, dropping 8½ inches, 80 times per minute. The discharge varies from 6 inches to 8 inches, through No. 8 diagonal-slot punched screens, with a discharging surface to each battery of 45 inches in length by 6 inches in height. The mortar is furnished with a lip plate and a cast-iron trough, which receives the pulp, also with a 5-inch inside plate. The pulp passes from the trough to the apron and sluice-plates, which have a grade of 1¾ inches to the foot and a length of 20 feet, and is then passed to the concentrators. Below the mill the tailings are picked up by outside parties and re-ground in arrastras. The tailings assay $2 per ton. The loss of quicksilver at this mill is about a flask for every 4600 tons crushed. The cost of milling does not exceed fifty cents per ton when using water power. The plates are cleaned every twenty-four hours. About 60% of the amalgam is derived from the batteries, which are cleaned up once a month. The headings are placed in an iron revolving barrel, and the panning-out is done with a batea.

(*To be Continued.*)

* Bulletin No. 6, California State Mining Bureau.

## The Aluminum Industry.

Written for the MINING AND SCIENTIFIC PRESS by ORRIN E. DUNLAP.

Since the operation of the Pittsburg Reduction Company's plant at Niagara Falls, the output of aluminum has been very largely increased in the United States. This company is practically the only manufacturer of aluminum in the United States, and it controls and uses what is known as the Hall process, the invention of Mr. Charles M. Hall, who is now vice-president of the company. Under this patent the process of manufacture consists in dissolving alumina in a molten bath composed of the fluoride of aluminum and the fluoride of some metal more electro-positive than aluminum. An electric current is passed through the molten mass and aluminum is produced by electrolysis of the dissolved alumina. The fluoride of potassium and the fluoride of calcium with the fluoride of aluminum are the preferable salts used in the molten bath, although the fluoride of aluminum and the fluoride of sodium have been successfully used by the Pittsburg Reduction Company in much of its work. The double fluoride of aluminum and potassium is made by the action of fluorhydric acid upon alumina and pearl ash or carbonate of potassium. The fluoride of calcium is obtained from the mineral fluorspar. When the Pittsburg Reduction Company use the fluoride of sodium, it has in the past used largely the native mineral cryolite as the source of this portion of the salts, although of late improvements have been made by which cheaper methods of producing the double salts of fluorides of aluminum and sodium have been obtained over the use of the comparatively expensive mineral cryolite, which is mined in Greenland.

In the present plant at Niagara Falls, the Pittsburg Reduction Company has two lines of carbon-lined pots, twenty-nine in all, arranged in series with the electric current, and it is in these pots that the chemicals are placed. The electric current is passed through the molten mass by the aid of carbon cylinders used as anodes, which extend down into the molten metal. These carbon anodes are attached by copper rods to the main portion of the line conducting the electric current from the positive end of the generating machinery. Thus the pot itself, with its lining and the metal deposited upon the bottom, becomes the negative electrode, or cathode, and the pot is joined by copper connections to the line extending to the positive electrode in each pot. The alumina is deposited by electrolysis in a molten mass at the bottom of the pot by the passage of the electric current through the molten mass. The freed oxygen goes out as carbonic oxide or carbolic acid gas in connection with the carbon of the anode, wearing it away in proportion of a little less than an equal weight of the anode to the aluminum produced. The operation is kept continuous for months at a time, as the wear upon the pots is very slight, the metal being dipped out from the pots each day by heavy cast-iron ladles, replacing the electrolyte on the top of each ladleful of metal with the carbon rods. In some countries the makers of aluminum are greatly troubled with noxious gases, and their employes work only for very short periods. The Pittsburg Reduction Company, however, by the advantages of the special chemical solvents which it uses for dissolving the alumina and the particular strengths of current adopted, is not troubled in this way; there being practically no discharge of foreign or other noxious gases into the atmosphere; the only gas evolved being practically carbonic acid. Now and then a carbon will heat above the bath and sputter out in a dark blue flame, showing the burning of carbonic oxide to carbonic acid gas, and indicating the heating power of the current.

The temperature of the molten bath is kept constant by the passage of the electric current through it, the resistance of the bath generating sufficient heat for this purpose. In the Pittsburg Reduction Company's works currents of very large quantities in amperes and of low voltage are used, the pressure required being only enough to overcome the electrical resistance of the number of pots arranged in series, each pot now in use requiring from six to eight volts. The electric power used by the Pittsburg Reduction Company is supplied by the Niagara Falls Power Company, and is of the two-phase class, alternating, and of 2000 volts pressure. It is conducted from the power house to the factory on copper cables laid in a subway. In the manufacture of aluminum it is necessary that this current should be reduced as well as transformed from alternating to direct. The static transformers shown in the illustrations reduce the voltage of the current from 2000 to 115, and the rotary converters shown change the current from the two-phase, alternating, variety of 115 volts to a direct current of 160 volts. The electrical equipment of the Reduction Company's plant was furnished by the General Electric Company of Schenectady, N. Y., and is one of the finest in the world. The rotary converter is practically a direct-current generator, with proper collecting rings and connections attached to the rear of the armature to lead the alternating current into the apparatus. Practically it is a generator and motor combined in one machine. The Pittsburg Reduction Company's present electrical plant has a capacity of about 10,000 amperes at 160 volts or 1600 kilowatts, or about 2000 electrical H. P. on the direct-current side. The static transformer has an efficiency of about ninety-eight per cent, and the energy transformed into heat is so great that there is not sufficient radiating surface to throw it off; for this reason an air blast is forced continuously between the coils from below, thus keeping the heat easily under control.

There is a commonly accepted notion that clays are the ores of alumina. The Pittsburg Reduction Company does not use clays which are silicates of aluminum in the manufacture of the metal, but the pure oxide of aluminum, called alumina, which is made from the native oxide of the metal in a mineral that is called bauxite. This mineral is found in large deposits in Georgia and Alabama, and it is from these States that the Pittsburg Reduction Company secures its supply, finding it possible to lay the ore down at its factory in Niagara Falls at a low rate. The bauxite belt of Georgia and Alabama extends in a northeasterly and southwesterly direction through the counties of Floyd, Polk and Bartow in Georgia, and Talladega, Cleburne, Calhoun, Cherokee and Etewah in Alabama, its length being about seventy-five miles and its width about ten miles. The ore is found in pockets at the top of the Knox dolomite of the lower silurian rocks in both of the States mentioned. It is noticeable that the bauxite ores in the United States are all in sections of the country which have been broken up by sharp folds and great thrust faults, in which the character of the rock has been greatly changed, probably the result of intense heat.

The bauxite ores of Georgia and Alabama are associated with the manganese and iron ores, which similarly occur in the same district in "pocket" formations, as do the bauxites.

The manganese ore associated with the bauxite has about the following composition:

| | |
|---|---|
| Manganese | 43.73 % |
| Phosphorus | 0.129% |
| Silica | 0.353% |
| Metallic Iron | 0.101% |

The composition of iron ore as associated with the bauxite is as follows:

| | |
|---|---|
| Oxide of Iron | 71.36 % |
| Silica | 6.73 % |
| Titanic Acid | 0.00 % |
| Phosphorus | 0.066% |

The composition of the bauxite best adapted for the manufacture of alumina, and which occurs in large quantities in the States of Georgia and Alabama, is as follows:

| | |
|---|---|
| Silica | 3.00 % |
| Titanic Acid | 4.00 % |
| Oxide of Iron | 2.00 % |
| Water of Hydration | 32.00 % |
| Alumina | 59.00 % |
| Total | 100.00 % |

This ore exists in several peculiar forms, as follows:

1. In round nodules or pisolites, some of these being in sizes up to two inches in diameter and each nodule being separated from its fellows.
2. An agglomeration of these nodules into a conglomerate, the binding material between the nodules being pure alumina.
3. A massive formation.
4. A fine powdered condition in the beds at the banks, being mined in the form of plastic mud.

Thousands upon thousands of tons of this ore have been mined. To form aluminate of soda it only need be incinerated lightly with soda ash. This aluminate of soda is dissolved and decanted off and freed from the impurities of silica, oxide of iron and titanic acid, which have not been acted upon and are insoluble in the hot water used for solution of the aluminate of soda. It is from this solution alumina is precipitated by passing carbonic acid, formed by the distillation of carbonic acid from limestone, through the solution and also by agitation. The carbonic acid reforms carbonate of soda from the aluminate and precipitates the pure aluminum very freely. This settles at the bottom of the tank, and after being thoroughly washed with hot water and then dried, it is heated for some time at a high red heat to drive off the water of hydration, which makes the ore ready for the production of aluminum by the Hall process.

So successful has been the Pittsburg Reduction Company's Plant at Niagara Falls that, for all it was started on August 26, 1895, the company has already taken steps to double its capacity and has placed orders for the necessary transforming machinery with the General Electric Company of Schenectady, N. Y. This increase of capacity will be effected by raising each of the four rotary converters from 400 to 600 kilowatts capacity by rebuilding them and the installation of an additional rotary converter of 600 kilowatts. The static transformers will likewise be increased and added to. This will give a total of 3000 kilowatts, as compared with the 1600 now in use, or nearly double the present capacity. At present the Pittsburg Reduction Company is receiving 300 amperes on each of two phases at about 2000 voltage.

The plant as erected with the Niagara Falls Power Company was planned for doubling the capacity in the same buildings, and the contract arrangements which the Pittsburg Reduction Company has with the Niagara Falls Power Company are that it has the opportunity to call for additional power up to any capacity that is unsold by the Niagara Falls Power Company at the time when such power may be asked for; so that the Pittsburg Reduction Company enjoys the right to enlarge its works almost indefinitely at comparatively very small cost for installation of new plant, as the capacity of the Niagara Falls Power Company and its rights to the use of water-power at Niagara are practically illimitable.

Besides these favorable arrangements, however, the Pittsburg Reduction Company has contracted with the rival water power company at Niagara Falls, the Niagara Falls Hydraulic Power and Mfg. Co., for 4500 electrical H. P. additional. This plant is now progressing rapidly and will be completed in the early spring. Thus the Pittsburg Reduction Company is in position to enlarge its use of the Niagara power from both large power sources—one, the Niagara Falls Power Company, using the tunnel; the other, the Niagara Falls Hydraulic Power and Mfg. Co., using the hydraulic canal passing through the city of Niagara Falls. The 4500 H. P. from the canal will be used in a factory now in course of construction on the high bank of the gorge, and when completed the company will have an upper and a lower works, one being on the upper river above the falls, and the other below the cataract. The electrical equipment in the new or lower works will consist of dynamos directly attached to the turbine shafts. These generators will be of 750 electrical H. P. each, the turbines to operate them being of 1800-H. P. each and furnished by the James Leffel Co., of Springfield, O. In this plant the electric current will be transmitted from the power house at the water's edge in the gorge to the pot room in the factory on the high bank above on aluminum conductors—an innovation, by the way, as copper conductors are generally used. This new plant will be ready for operation next spring, and it is officially stated that by June 1st the Pittsburg Reduction Company expects to be making 10,000 pounds of aluminum per day at Niagara Falls.

In addition to the plant manufacturing aluminum at Niagara Falls, the Pittsburg Reduction Company has its old plant of some 2000 electrical horse power successfully working in the manufacture of aluminum at New Kensington, Westmoreland county, Pennsylvania. This plant is especially located for generating steam power economically.

The product of the Niagara plant is now being shipped in ingot form to its New Kensington works by the Pittsburg Reduction Company, where its foundries, rolling mills and hammer shops are located for forming the metal into sheets, bars, plates, tubes, wire and castings. The Pittsburg Reduction Company does not manufacture any articles of aluminum, as it does not care to become competitors of its own customers.

It is a significant fact of the efficiency of the cheap electric power of Niagara that it is a successful competitor of the Kensington, Pa., plant. The latter factory is located most favorably in the heart of both the natural gas and cheap coal fuel districts, which have made Pennsylvania famous, and for all the Pittsburg Reduction Company bought coal delivered at its boilers for 65 cents a ton, still it has found its Niagara location more advantageous.

When it is considered that this company within a few months will be turning out 10,000 pounds of aluminum a day, its importance to the industry is best shown by a table showing the product of aluminum in the United States each year since 1882, which is as follows:

| *Year—* | *Pounds.* |
|---|---|
| 1883 | 83 |
| 1884 | 150 |
| 1885 | 263 |
| 1886 | 3,000 |
| 1887 | 18,000 |
| 1888 | 19,000 |
| 1889 | 47,468 |
| 1890 | 61,261 |
| 1891 | 150,000 |
| 1892 | 259,885 |
| 1893 | 339,629 |
| 1894 | 550,000 |

The total output in the United States for 1895 reached about 850,000 lbs. The output for 1896, it is estimated, will be fully 10,000 lbs. a day for the 366 days of the year, or a total of 3,660,000 lbs., which will be the most notable increase in the output during any one year since aluminum was discovered. This will be over three times more aluminum each day than was made during the entire year of 1886, when the output was but 3,000 lbs., surprising progress for one decade.

The latest price list of the Pittsburg Reduction Company quotes aluminum guaranteed to be 98 per cent pure at 55 cents per lb. in small lots; 52 cents per lb. in 100-lb. lots, and 50 cents per lb. in ton lots, which price is likely to be reduced next year.

It was in 1885 that the first step towards the manufacture of aluminum for industrial purposes was taken in the United States. This was in the Cowles Electric Smelting and Aluminum Company's works in Cleveland, O., when they began to make aluminum bronze, which event marks the beginning of the dynamo-electro metallurgy in the United States. It was in 1888 that the Pittsburg Reduction Company began the production of aluminum for commercial purposes by the Hall process, and the prospects are that these works will increase in importance each year.

# Electrical Progress.

## Application of Electrical Power.

The Siemens & Halske Electric Co. of America have sundry devices for generating electric energy and reconverting that energy into mechanical motion that are worthy of notice. On this page is shown (Fig. 1) a centrifugal extractor. The armature is connected directly to the shaft of this machine. The frame of the motor is movably supported in a ball and socket joint, so that the motor can oscillate with the centrifugal machine.

Fig. 2 shows a sinking pump, used in mining. Pump and motor are supported by an iron frame suspended by chains and blocks, permitting the pump to be lowered and raised. The electric motor is geared to the pump piston.

Figs. 3 (lathe) and 4 (drill press) illustrate arrangements with cone pulleys for the variation of speed. Both the motor and the countershaft are mounted on hinged supporting plates. The cone pulley of the countershaft and cone pulley of the main shaft are connected by short belts. The belts are kept taut by the weight of the motor and the weight of the countershaft.

By means of a lever the distance between the hinged supporting plates may be decreased, the belts slackened, and so easily shifted on the cone pulleys for speed variations.

A. E. Brooke-Ridley, 10 Front street, San Francisco, is the Pacific coast representative of this company.

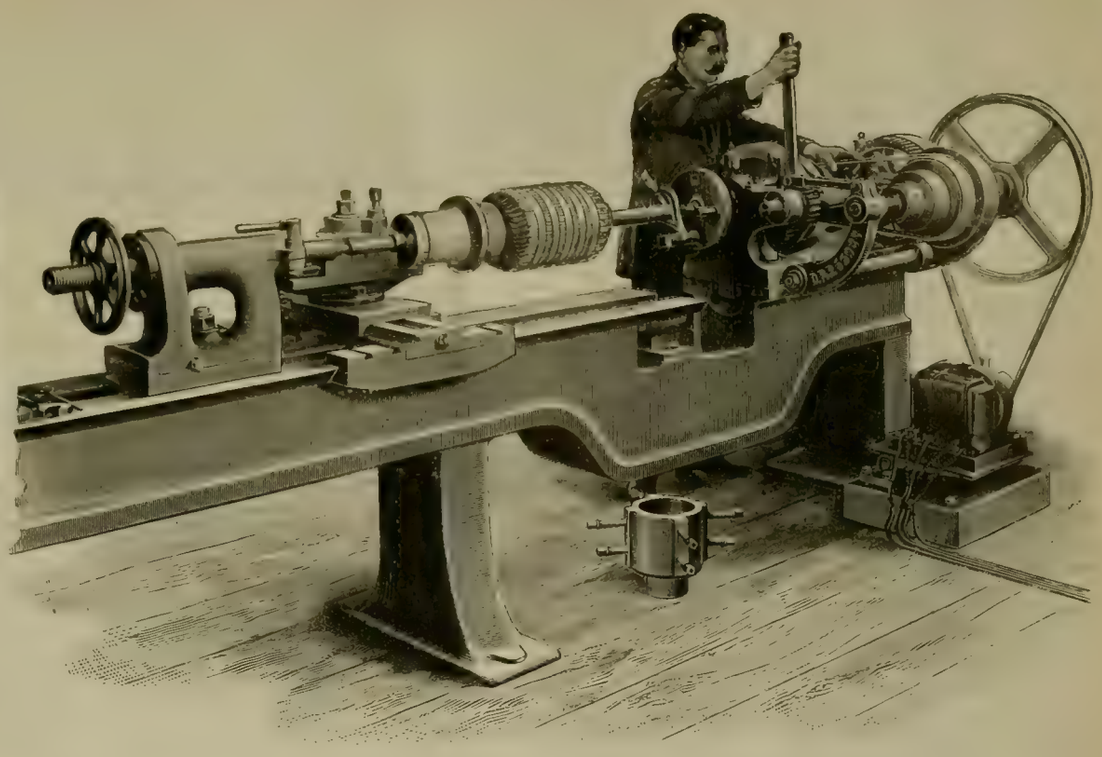


FIG. 3.—ELECTRIC LATHE.

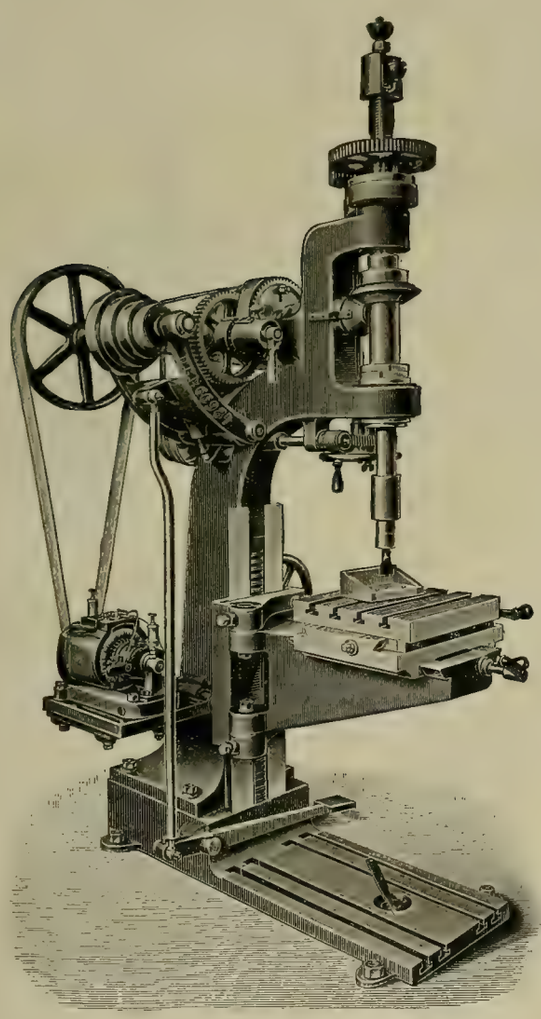


FIG. 4.—ELECTRIC DRILL PRESS.

In connection with the underground electric or conduit system, a proposition comes from Washington of a plan not to mount an electric motor on the car, making its connection with the source of supply through the slot, but to have the conduit subway large enough to carry another set of tracks with motors running on them. In this way any ordinary car can hook on to one of these invisible motors and be whirled along and the whole electrical system removed from the surface of the street.

## Steam and Electricity.

A fear, entertained by some people, that electricity as a motive power might absolutely supersede steam, is hardly well based. An illustration of this may be found in an enterprise which was conceived many months ago and is now progressing toward practical results for connecting the cities of Baltimore and Washington by an electric railway. The road runs parallel with the Baltimore & Ohio and Baltimore & Potomac railroads. The road will have double tracks, and the purpose of the company is to have the 42 miles traveled by passenger trains in 28 minutes, at the rate of 90 miles an hour.

But electrical currents when artificially created do not generate themselves. The Baltimore & Cantonsville Construction Company have therefore entered into contract with a firm of stationary steam engine builders for the construction of eight engines of 1000-horse power each to furnish the necessary power for this plant. They are to be of a direct-connected, tandem, compound, condensing variety, of a new pattern. The high-pressure cylinders will be of 22 inches internal diameter and the low-pressure cylinders 42 inches. The shaft will be made of a forging 22 inches in diameter, to which will be attached either one or two generators, together with a 16-foot flywheel, weighing 70,000 pounds. The aggregate weight of each engine will be 104 tons, or a total weight of 1,664,000 pounds for the eight engines. The length of the stroke will be 42 inches, with a steam pressure of 125 pounds, which will produce 100 revolutions a minute.

Thus it is shown that, instead of the substitution of electricity for steam as a motive power, electricity is a companion agent with steam, and that one operates as a stimulant to the use of the other.

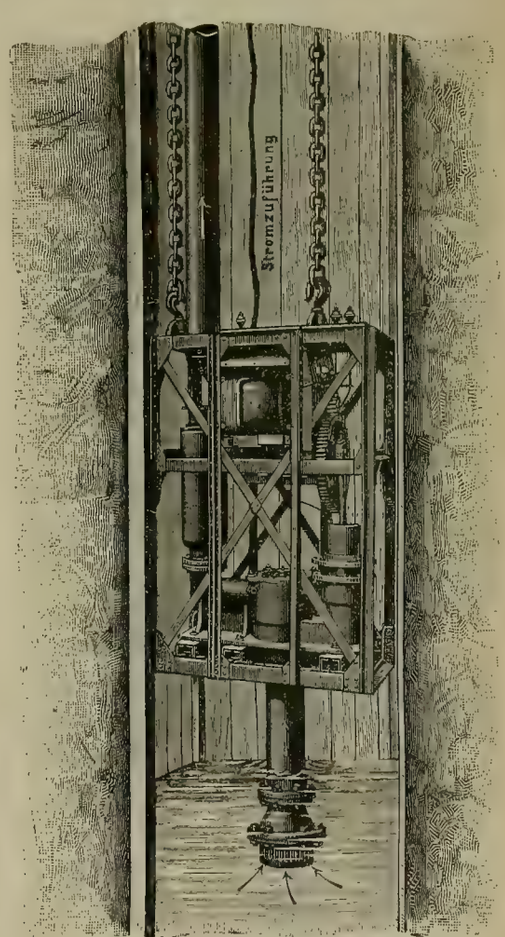



FIG. 2.—ELECTRICAL SINKING PUMP.

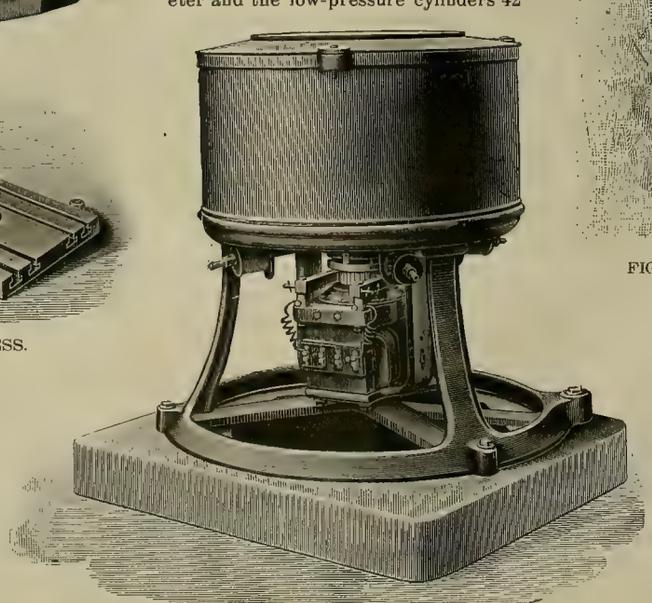


FIG. 1.—CENTRIFUGAL EXTRACTOR.

# Scientific Progress.

## Age of the Earth.

Clarence King has in preparation a new scientific lecture in which he calculates the age of the earth, since it assumed the solid form at 20,000,000 years. His deductions are not empirical or hasty conjecture. He has given the matter thought, has made many elaborate and long-continued experiments, both in San Francisco and elsewhere, and in some respects has gone at the investigation on different lines from some of his colleagues and predecessors.

The age of the earth has long been an attractive theme of speculation and inquiry. Within the memory of many now living it was an article of faith that the globe was about 6000 years old. Scientific research has produced cumulative proof that the globe on which we play our brief parts is of vast antiquity. About thirty years ago Sir William Thompson pointed out that the ocean tides retarded the speed of the earth's daily rotation. The earth loses in this way about ten seconds a century. From this he calculated that the present figure of the earth is about the same as it would have assumed many millions of years ago from the action of centrifugal force and the cause mentioned, on the supposition that the earth was then in a partly fluid state.

Another point of view was from thermo-dynamics. The laws of pressure and heat conduction are the keys to the true physical condition of the earth in the distant past. He pointed out that, knowing the rate of increase of temperature from the surface downward towards the earth's interior, and knowing the present rate of heat conduction and radiation from the earth, it was an easy matter to calculate backwards and ascertain what the temperature of the earth was at any time in the past, and that it was also as easy to calculate what the temperature of the earth would be at any time in the future from its observed condition in the present. The rate of increase of underground temperature is now taken to be about 1° Cent. for every thirty yards of descent. At the depth of twenty-five miles this gives an increase of 1500° Cent., or the temperature at which everything with which we are acquainted would be in a state of fusion. Calculating backwards, he found that if the same physical laws existed in the past as exist to-day, we arrive at a point in the earth's history when its temperature was so high that the materials which compose it could not have existed in a solid state.

Owing to the lack of certain necessary experimental data, such as the fusion point of certain rocks and earths under pressure, he was unable at that time to make any absolute calculations as to the earth's exact age, and he pointed out the experimental data that were necessary to make the calculations conclusive. This experimental data has now been ascertained by Clarence King, who has conducted recent elaborate experiments. He took the rock diabase as an average sample of the earth rock, and ascertained its point of fusion at various pressures, going up as high as 2000 atmospheres pressure. It is, of course, well known that the fusing point of substances depends upon the pressure to which they are subjected. The great majority of substances have their melting points raised by increase of pressure, so that, for instance, while the temperature of the earth's interior may be sufficient to melt these substances, yet they remain solid because of the pressure to which they are subjected.

After Prof. King had completed his experimental investigations he constructed a series of "temperature gradients" or tables with diagramatic representations of temperature and pressure from the surface to the center of the earth. He found that while there is really a very slight change of temperature from the surface to the center below a certain superficial depth, the pressure augments with one downward sweep to the center. It passes 1741° Cent. at 175,000 atmospheres, and the 3900° Cent. line at 390,000 atmospheres, thence steadily augmenting until at the center it reaches over 3,000,000 atmospheres pressure. The empire of heat over pressure is confined only to the superficial layer of the earth; that of pressure over heat being not far below the surface and increases steadily downward to the center.

The charts of Prof. King show a great many possible earth temperature gradients ranging around the temperature gradient of the rock diabase, but the only gradient he finds which satisfies all the conditions is the gradient showing a temperature from the earth's center to within fifty-three miles of the surface of a little under 2000° Cent. (about the melting point of platinum), necessitating 20,000,000 years' secular cooling with a surface rate of radiation of 1° Fahr. to 50.5 feet of depth. From this it is deduced that the earth's interior is rigid and solid. Below the fifty-three-mile limit the materials are solid by compression; above that limit they are solid by refrigeration. The temperature of the earth, as a globe, according to Prof. King's investigations, never exceeded 2000° Cent., and the central portions are made up of very dense substances, such as metals and their compounds, thus assuming that the earth is absolutely rigid and solid from surface to center, except occasionally here and there in very small areas.

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IT IS TIME, says Dr. Armstrong, president of the Chemical Society, that we ceased to speak of substances as pure, as a pure substance is and must ever remain an ideal conception; and while there can be an infinite number of degrees of impurity, there can be none of purity. The much misused phrase, "chemically pure," has no abstract meaning and should be discarded, it is usually nothing more than a convenient fiction, made use of by sellers of chemicals. Thus, the presence of arsenic in zinc being objectionable because zinc is used in testing for arsenic, it became customary to sell zinc freed as far as possible from arsenic as chemically pure, although other impurities were often present in such zinc in considerable quantities. Purified should be substituted for pure. Chemists are sufficiently serious offenders, but others also are not infrequently guilty of like thoughtlessness, as, for instance, when a paper headed "* * * Properties of Pure Iron" is prefaced with an analysis showing the presence in the "almost pure iron" of small amounts of carbon, sulphur, silicon, and manganese in what is first spoken of as a sample of very pure iron. Or when, again, it is stated that "the yield will of course depend on the amount of purity required. From * * * * about one-tenth of quite pure * * * * can be obtained, and about one-twentieth of very pure." Language may, indeed, be said to be an instrument for the concealment of thought when these abuses of it are possible. Surely, if devoted to science, we should be scientific in all things.

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A RECENT number of the *Zeitschrift fur Elektrotechnik und Elektrochemic* says that at the annual meeting of the German Electro-Chemical Society Dr. U. Borchers exhibited an apparatus by which he not only succeeded, nearly ten years ago, in preparing calcium carbide, but also showed that all the oxides which were regarded as irreducible could easily be reduced by the action of carbon. It consists of a small chamber or furnace of firebrick, through the walls of which pass thick carbon rods 50 mm. in diameter. Inside the chamber these are connected by a thinner carbon rod, 4 mm. in diameter and 40 mm. long. The furnace is fed with a mixture of iron and carbon. The action is not electrolytic, the effect of the current being simply to heat the lime to a temperature at which it is reduced by the carbon.

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THE World's Fair medals, 23,857 in number, have been received at the United States Treasury Department, Washington. The medals will be held there until the commission meets and adopts measures for their proper distribution.

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METALLIC glucinum is now quoted at $17.85 per pound. The specific gravity of this metal is 2.1. It is white, malleable, resistive to oxidation and susceptible of a high polish. The electrical conductivity is stated to be as high as that of silver.

# Mechanical Progress.

## Some Technical Notes Relating to Chain Blocks.

The two most important elements in a hoisting machine are the velocity ratio and the mechanical efficiency. The velocity ratio, or leverage, is the number of feet of rope or chain which the operator must overhaul with his hands to lift the load one foot. With a low velocity ratio, the operator can lift only a small load, but can lift it quickly; with a high velocity ratio, he can raise a large load, but only slowly. The mechanical efficiency of a hoist is a term which indicates the percentage of the applied power which is utilized in lifting the load, the difference between the power applied and the power utilized being the amount of power consumed or wasted in overcoming the friction of the machine. Common hoists rarely have an efficiency of more than 50 per cent., which means that of each 100 foot-pounds of energy applied by the operator, one-half is utilized in lifting the load and the other half is wasted in overcoming friction. In most chain blocks the efficiency is necessarily less because of the unavoidable friction of the chain, and still more because of the self-sustaining feature which such blocks usually possess.



FIG. 1.

Herewith is illustrated the triplex block, a worm-gear or screw block, and a differential pulley-block, which latter

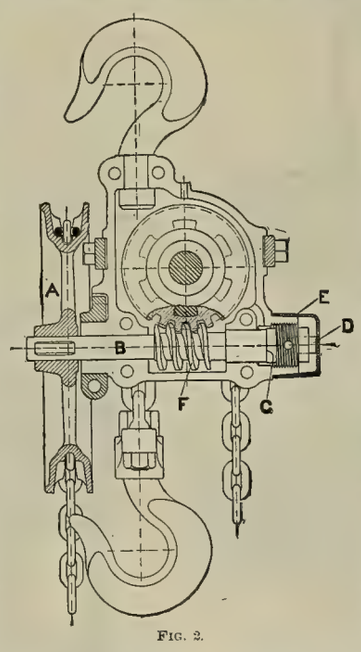



FIG. 2.

for many purposes is the most convenient chain block in the market, as it has the fewest parts of any block made and is the least likely to get out of order. Besides being a powerful hoisting device it also has the great advantage of being self-sustaining, so that under no circumstances will the load run down even if the chain be entirely let go. It is the combination of both of these properties which gives the block its practical value.

The differential block (Fig. 1), consists of a pair of pocketed chain wheels above, and a single wheel below. The endless chain passes over one upper sheave, down around the bottom block and then over the other upper sheave. The two upper sheaves are in one piece and only differ enough in diameter to

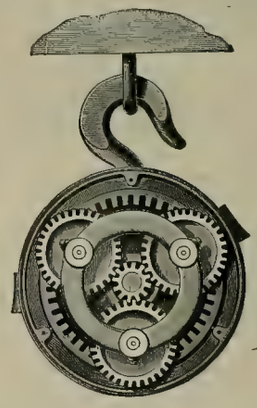


FIG 3.

make a difference of one chain pocket in circumference, or less than one-third of the length of a link in diameter.

In the Yale duplex controvertible screw block the leverage by which the hoisting capacity is obtained is that of a screw motion or, more properly, a worm and worm-wheel motion. The construction is such as to permit a much higher efficiency to be obtained than is practicable with an ordinary worm-wheel motion, and the device by which the load is sustained, and which acts in conjunction with the worm, is capable of conversion at the will of the operator, so that a dispatch lowering

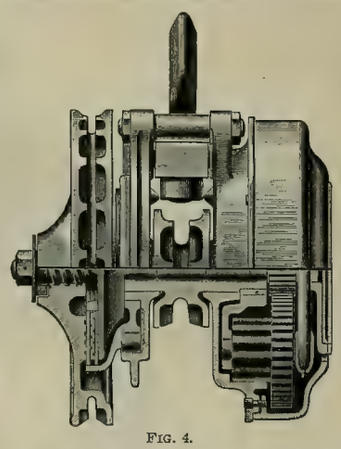


FIG. 4.

action may be obtained when desired. As shown in Fig. 2 the worm wheel is placed between the two chain sheaves and all the parts symmetrically disposed.

The Yale-Weston triplex spur-gear block is claimed to utilize eighty per cent of the workman's labor, accomplished by separating the sustaining mechanism from the hoisting gear, so that the operator is not wasting a large part of his effort in overcoming the resistance of the friction upon which the sustaining feature of the block depends.

The hoisting mechanism is shown in Figs. 3 and 4, and consists of a direct train of spur gears from the small pinion on the central shaft to the internal gear wheel cast within the main frame. The three intermediate gears between the pinion and the internal gear are carried on the circular frame or cage, and roll around with the internal gear, thus forming a sun and planet motion by which the desired leverage is obtained.

The advantages resulting from this triplex arrangement of gears are: increased wearing surface, subdivision of strains, and an accurate equalizing of the load. The frame upon which these intermediate gears are mounted is keyed fast to the hub of the hoisting chain sheave, and the central pinion shaft is operated by the hand chain wheel, so that the power of the operator is transmitted from the hand chain to the load chain through a

direct spur-gear train of high efficiency, with a leverage of about 30 to 1.

The sustaining mechanism is placed at the hand chain end of the block (the left of Fig. 4), and consists of a set of brass friction discs, the discs being alternately attached to the central axis and to a ratchet check wheel. The hand chain wheel is screwed upon the central spindle as shown, and the construction is such that it is clamped tightly by the friction discs to the shaft, either if it is rotated in the direction for hoisting, or if the shaft attempts to revolve in the opposite direction under the pull of the load. The parts being thus clamped together act as one, and the ratchets offer no resistance to the effort of the operator in hoisting. When the direction of the hand chain is reversed the alternate discs are released, and the others being held by the ratchets the load is lowered against their friction at a rate entirely controlled by the movement of the hand chain, while the stoppage of the hand chain movement causes the discs to tighten at once and sustain the load perfectly.

### A Visionary Scheme.

TO THE EDITOR:—I clip the enclosed from the New York *World*:

TO ROLL OVER THE WATER.

A FRENCH ENGINEER IS BUILDING A STEAMER ON HOLLOW IRON WHEELS.

There have been many novelties invented for ocean navigation, but one of the most extraordinary of these, and the latest, is the so-called roller steamer which is being built by M. Bazin, a French engineer. The steamer is in the form of a large raft, supported by hollow iron wheels, which revolve in the water and support the deck, some 22 to 23 feet above the surface.

Mr. Bazin claims, not only enhanced speed, but greater stability. He maintains that the surface friction will be minimized by the boat's rolling over the water, instead of cutting through it. The trial steamer for service on the British channel is now being built and the first test is eagerly looked forward to by the inventor and his friends, who are confident that the vessel will mark the beginning of a new era in naval construction.

The boat which is now being built will be 131 feet in length and will have a breadth of 39 feet. She is to consist of a platform having on each side four enormous wheels, and these will be revolved by the engines, which are to be centrally located.

In 1860 I thought I would revolutionize navigation with a boat on wheels or drums. I built a model about three feet long with three drums—one in front and two behind, so as to have a clear space for the rudder. On it I arranged clockwork to revolve the drums. Then, in company with an engineer named Green, who had great faith in my invention, I took the boat up to the reservoir at the foot of the "Sugar Loaf" at Nevada City. We wound up the clockwork and started it across, about 400 feet. It paddled off very nicely and we were very well pleased. We tried it over and back very carefully. Then, being prepared with a block of wood cut "ship shape" of exactly the same displacement, we transferred the clockwork, with paddles, to it and started it across the pond; but, much to my disgust, it made the trip in about half the time required by the great invention. So the clockwork was all we brought back to town.

About two or three years after this a man named Hopkins (I think) got out a patent on the identical same thing, a picture of which was published in the *Scientific American*. It was represented as going up the Hudson river with a lot of passengers and making a speed of something like 40 or 50 miles an hour.

While Hopkins was getting out his patent, a young engineer, Seibert by name, the inventor of the *first* sight-drop lubricator for steam engines, was then located up in Oregon or Washington. He conceived the idea and actually built a large boat on this plan, to run up the rapids at The Dalles, on the Columbia river. We never heard of it after its first trial.

Next Robert M. Fryar, the instigator and inventor of the "great Fryar process" for extraction of gold, silver and, possibly, diamonds, after the failure of the great process, commenced on plans and specifications for a boat on the same general principles; but he contemplated four large globes, instead of drums. He went back to New York and started work on his boat. It was to be large and would undoubtedly cross the ocean in three or four days. He enlisted considerable capital in the enterprise, but the boat never crossed the ocean. Now comes the "French engineer." Look out for the steamboat when the whistle blows! Yours truly, etc.. JNO. PATTISON.

107 Crocker Building, S. F., Feb. 8, 1896.

### An Electric Locomotive.

A Philadelphia locomotive works has shipped to the Westinghouse Electric Works in Albany the first electric locomotive ever built for a steam railroad. The locomotive is 30 feet long, mounted on two four-wheel trucks and weighs 60 tons. It is geared for 800-horse power and is intended for freight. The wheels are 42 inches in diameter. It is built to be operated by either overhead or underground trolley wires. It carries no coal, firebox, smokestack or water-tank. Its cost is about $10,000.

## Practical Information.

### Salt Storm on the Union Pacific Railway.

Written by J. B. HAYNES, Omaha, Neb.

Superintendent Korty of the Union Pacific's telegraphic department, in speaking of a salt storm which occurred in Utah and Wyoming on New Year's day, and interfered with the working of the telegraph wires, said:

"On the afternoon of January 1 a very peculiar rainstorm occurred in eastern Utah and western Wyoming along the Union Pacific railway, extending from Ogden, Utah, to Evanston, Wyo., a distance of seventy-five miles. The rain consisted of salt water or brine. The clothing of persons exposed to the shower had, when dry, the appearance of having been sprinkled with whitewash. The windows in the stores and residences at Evanston were so encrusted with a salt deposit as to make it impossible to look out. Dr. C. T. Gamble of Almy, Wyo., a gentleman of undoubted reliability, states that the storm deposited in Almy alone twenty-seven tons of salt. 'This assertion may appear fabulous,' says the doctor, 'but nevertheless is true, as it has been proven by carefully estimating the quantity on a given subject in different parts of the camp. The area of Almy is something over nine miles, and three tons to the mile would make twenty-seven tons of the matter deposited. The salt, if collected and sacked, would make ten ordinary wagon loads. Those who doubt the above statements, go to figuring.'

"The salt storm lasted about two hours. After it had ceased raining the sun came out, and as fast as things dried they turned a whitish color, and it was found that everything was covered with a thick coating of salt. Cars, buildings, trees, telegraph poles, insulators and wires all looked ghostly in their white coats. Through Weber canyon the salt storm turned into snow later. A peculiar effect of the salt deposit on the telegraph poles, arms and insulators through Weber canyon was noticed in operating the wires. During the day, when the sun came out, the wires worked clear and without interruption, while at night when it turned cold the wires were rendered unserviceable, which was attributed to the fact that the snow, having melted some during the daytime and again freezing at night, created a moisture in conjunction with the salt deposit underneath, so as to entirely destroy the insulation of the wires. After several unsuccessful attempts to remove the cause of the trouble, an engine with a pump and long hose was sent over the lines and the deposits thoroughly washed off the poles and fixtures for a distance of forty miles. The wires of the Rio Grande Western railroad between Ogden and Salt Lake City were slightly affected the same way, as were also those of the Southern Pacific for a short distance west of Ogden.

"The only theory that is given for this phenomenal storm is that the salt raised in vapor over Salt Lake and was carried by the wind and deposited over the country for many miles to the eastward."

### The Internal Temperature of Rocks.

For several years past, says Prof. Agassiz in a communication to the *American Journal of Science*, I have, with the assistance of our engineer, Mr. Preston C. F. West, been making rock temperature observations as we increased the depth at which the mining operations of the Calumet & Hecla Mining Co. were carried on. We have now attained at our deepest point a vertical depth of 4712 feet, and have taken temperatures of the rock at 105 feet; at the depth of the level of Lake Superior, 655 feet; at that of the level of the sea, 1257 feet; at that of the deepest part of Lake Superior, 1663 feet; and at four additional stations, each respectively 550 feet, 550 feet, 561 feet, and 1256 feet below the preceding ones, the deepest point being 4850 feet.

We propose, when we have reached our final depth, 4900 feet, to take an additional rock temperature, and to then publish in full the details of our observations. In the meantime it may be interesting to give the results as they stand. The highest rock temperature, obtained at a depth of 4580 feet, was only 79° Fahr.; the rock temperature at a depth of 105 feet was 59° Fahr. Taking that as the depth unaffected by local temperature variations, we have a column of 4475 feet of rock with a difference of temperature of 20° Fahr., or an average increase of 1° Fahr. for 223.7 feet. This is very different from any recorded observations; Lord Kelvin, if I am not mistaken, giving an increase for 1° Fahr. fifty-one feet, while the observations based on the temperature observations of the St. Gothard tunnel gave an increase of 1° Fahr. for sixty feet. The calculations based upon the latter observations gave a thickness of the crust of the earth in one case of about twenty miles, the other of twenty-six.

Taking our observations, the crust would be over eighty miles, and the thickness of the crust at the critical temperature of water would be over thirty-one miles, instead of about seven, and eight and one-half miles as by the other and older ratios. With the ratio observed here, the temperature at a depth of nineteen miles would only be about 470°, a very different temperature from that obtained by the older ratios of over 2000° Fahr. The holes in which we placed slow registering Negretti and Zambra thermometers were drilled, slightly inclined upward, to a depth of ten feet from the face of the rock, and plugged with wood and clay. In these holes the thermometers were left from one to three months. The average annual temperature of the air is 48° Fahr.; the temperature of the air at the bottom of the shaft was 72°.

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SHAVING a man in twenty-five seconds is a feat deserving of praise by all such as value their time. The feat has been rendered easy of performance by the construction of a shaving machine of wood, reported to have been made by Melchoir Farkas, a convict in the penitentiary of the city of Szegedin, in Hungary. Farkas was put to labor in the cabinet making shop of the prison, and, taking to his work with a will, he soon displayed great inventive ingenuity. With his machine he is said to have shaved all the inmates of the prison, nearly 150 in number, within less than an hour's time. The report fails to state, however, to what extent the shaving by machinery did or did not succeed in giving comfort to the sufferer in the chair.

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THE evidence supporting the sensational claim of Dr. Eugene Dubois that a genuine link between man and the apes had been discovered has been submitted to recent scientific meetings, and its substantial character is admitted by even the most conservative anatomists. The remains were dug up in 1892 from the bank of the Bengawan river in Java, where they were surrounded by bones of the hippopotamus, the hyena, several species of deer, a gigantic pagolin, and other animals. Among all these bones there were four—a wisdom tooth, a skull cap, a left femur, and a second molar—that undoubtedly represent an animal hitherto unknown. It seems quite certain that the four bones belonged to one individual, although they were scattered fifty feet in the gravel. The skull has twice the internal capacity of any modern ape, but is small for a man of the size indicated by the femur; the femur is decidedly human, and its possessor must have walked erect, but up to this the human remains have never been found in lower pleistocene deposits; the teeth are larger than human teeth, with a development that is characteristically simian. Pithecanthropus erectus, as the animal is now known, seems to be assigned by all to a place between existing man and apes, but opinions differ as to whether it was a man-like ape or an ape-like man.

### Nails in Wood.

Recently tests have been made at Cornell University to ascertain the holding power of nails in wood. The summarized results of these show cut nails to be better than wire nails for all purposes. They show that the sharper point of the wire nail gives its advantage, and that when this point is removed before driving in, only a third as much force is necessary to pull it out again.

The surface of a nail is best if slightly rough, but raising the surface into rasp teeth, as is sometimes done with wire nails, weakens the hold by one-third. The sides are better if wedge-shaped, as in a cut nail, rather than parallel, as in a wire nail. After a nail has been driven in for some time its hold loosens, unless it has rusted in, which tightens it. If to draw a nail from white pine the force required is represented by ten, for yellow pine it is fifteen, for white oak thirty, for chestnut sixteen, for beech thirty-two, for sycamore twenty, for elm twenty, for laurel twenty. Generally speaking, if for drawing out a nail driven parallel with the fiber of the wood a force represented by ten is required, when it is driven at right angles to the fibers a force represented by fifteen will be required.

### Locks Half a Cent Each.

What is the price of cheap cabinet locks coming to? A Willenhall maker is selling them at 2s. 9d. *per gross*, or a fraction under a farthing apiece! When old George Thornycroft was mayor of Wolverhampton, half a century ago, he saw some Willenhall padlocks, which he was told cost twopence each, and on hearing a complaint that they were so badly made that some of them would "only lock once," Mr. Thorneycroft replied, "It would be a pity if they were made to lock twice for that money." What his views would be as to these farthing locks we do not hazard a guess.—Hardwareman, Eng.

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PROBABLY nine people out of ten are under the impression that the extent and value of the agricultural products of the United States far exceed the value of the manufactured products. Instead of this being true, the total value of manufactured products in 1890 was $9,370,107,624, whereas the total value of all agricultural products for that year, as reported by the statistician of the United States Agricultural Department, was $3,800,000,000.

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A SMALL-FLANGED third wheel with outstretching arms has been invented to be attached to an ordinary safety bicycle by means of which the rider can travel on a railroad track.

# Mining Summary.

## Dividends Paid by American Mining Companies in 1895.

The *Bulletin* has an approximately correct list of dividends paid in 1895 by incorporated gold, silver, copper, lead and quicksilver mining companies in this country. Such a list is difficult to correctly and accurately collate. There is always some mistake, and it is necessarily incomplete. Alphabetically arranged, the list is as follows:

| | |
|---|---|
| Adams | $6,000 |
| Alaska Treadwell | 400,000 |
| Alaska Mexican | 90,000 |
| American Development | 24,340 |
| Amethyst | 36,000 |
| Argentina-Juniata | 156,000 |
| Etna Con. Quicksilver | 30,000 |
| Bald-Butte | 13,000 |
| Bangkok-Cora Bell | 36,000 |
| Belden, F. E., Mica | 48,000 |
| Boston & Montana | 1,050,600 |
| Bullion-Beck & Champion | 325,000 |
| Calumet & Hecla (copper) | 2,000,000 |
| Centennial Eureka | 510,000 |
| Champion | 27,000 |
| Church | 16,200 |
| Con. California & Virginia | 108,000 |
| Coptis | 1,000 |
| Copper Queen | 150,000 |
| De Lamar | 540,000 |
| Elkhorn | 50,000 |
| Forepaugh | 16,000 |
| Golden Coin | 15,090 |
| Golden Fleece | 192,000 |
| Gold & Globe | 11,250 |
| Hecla Con | 115,000 |
| Highland | 50,000 |
| Homestake | 375,000 |
| Hope | 10,000 |
| Horn | 50,000 |
| Iron Mountain | 105,000 |
| Isabella | 22,500 |
| Jackson | 2,000 |
| Kearsarge (copper) | 40,000 |
| Kennedy | 340,000 |
| Le Roi, B. C. (gold) | 25,000 |
| Mercur | 175,000 |
| Mayflower Gravel | 29,910 |
| Mollie Gibson | 50,000 |
| Montana Limited | 205,000 |
| Montana Ore Purchasing | 160,000 |
| Moose | 72,000 |
| Morning Star Drift | 24,000 |
| Moulton | 30,000 |
| Mount Rose | 5,000 |
| Napa Con. (quicksilver) | 80,000 |
| Nugget | 5,000 |
| Osceola (copper) | 100,000 |
| Portland (gold) | 556,000 |
| Quincy (copper) | 600,000 |
| St. Joseph (lead) | 150,000 |
| Silver King | 263,000 |
| Smuggler | 350,000 |
| Standard Con | 20,000 |
| Tamarack (copper) | 200,000 |
| Temonj (gold) | 10,000 |
| Tomboy (gold) | 260,000 |
| Union | 13,000 |
| Utah | 17,000 |
| Victor (gold) | 240,000 |
| Victor L. and M | 9,000 |

The above dividends may be geographically distributed as follows:

| | *Mines.* | *Amount.* |
|---|---|---|
| Alaska | 2 | $ 490,000 |
| Arizona | 1 | 150,000 |
| California | 8 | 557,110 |
| Colorado | 21 | 2,220,750 |
| Idaho | 1 | 540,000 |
| Michigan | 5 | 2,940,000 |
| Missouri | 1 | 150,000 |
| Montana | 9 | 1,662,340 |
| Nevada | 3 | 111,000 |
| New Hampshire | 1 | 48,000 |
| South Dakota | 2 | 425,000 |
| Utah | 6 | 1,340,000 |
| British Columbia | 1 | 25,000 |
| Totals | 61 | $10,599,200 |

The dividends credited to Arizona and Michigan were from copper mines; those in Missouri and New Hampshire lead and mica respectively, while all the others were either gold or silver, or both. The dividends compare as follows with previous years:

| | *Mines.* | *Amount.* |
|---|---|---|
| 1881 | 60 | $13,653,400 |
| 1882 | 64 | 13,378,100 |
| 1883 | 60 | 10,130,200 |
| 1884 | 64 | 9,462,700 |
| 1885 | 53 | 8,290,600 |
| 1886 | 58 | 10,098,100 |
| 1887 | 65 | 10,480,700 |
| 1888 | 68 | 13,532,000 |
| 1889 | 75 | 12,210,400 |
| 1890 | 73 | 13,485,400 |
| 1891 | 102 | 16,929,800 |
| 1892 | 84 | 11,702,800 |
| 1893 | 56 | 8,753,000 |
| 1894 | 58 | 8,263,700 |
| 1895 | 61 | 10,599,200 |

Making a total of $170,890,200 in fifteen years, or nearly an average of $11,400,000 per annum.

### CALIFORNIA.

#### Butte.

The Standard Gold and Silver Mining Company at Oregon City shipped 6600 pounds of sulphurets to the Selby Smelting Works at Vallejo Junction last week.

Reports from Forbestown say that water has been struck in the big tunnel at the Gold Bank, and that the ledge has been found on the other side of the hill where the stream is located.

AT MAGALIA.—The Pershbacker mine employs twenty-seven men. At the Princess mine twenty-two men are at work. A new inclined shaft has touched the channel at a depth of 300 feet, and paying gravel is being taken out. The Oro Fino, Bader and Lucky John are each working with a small force of men. The Emma mine at Nimshew employs six men. The Best mine, on Bull creek, is also being worked.

#### Calaveras.

AROUND SAN ANDREAS.—*Citizen:* A new shaft is commenced at the Scieffard mine, to be ten feet in the clear with two compartments. Machinery will no doubt soon be put up.

J. S. Edelen, the new superintendent of the Fellowcraft mine, is pushing the work along with all possible speed. The incline shaft is now down about 130 feet.

#### El Dorado.

(Special Correspondence).—The old shaft and tunnel abandoned some years, for lack of capital, on the Union quartz mine, one mile east of town, are being cleaned and timbered preparatory to placing machinery. There is a five-foot ledge of high-grade ore on this property. It is owned by S. H. Maginess of Placerville.

The Edsall mine, a plant fairly well developed, has been bonded to W. C. Myers, who will at once push the work. This property has a six-foot vein of high-grade ore and is very rich in sulphurets. It is situated fourteen miles southwest.

The California Jack, twelve miles north, has been bonded by Los Angeles people, who are erecting a ten-stamp mill. This is another of the good properties abandoned years ago at shallow depth.

The Lone Star, situated four miles southeast of town, was transferred by D. H. Jackson a few days since to a party of San Francisco people, who have enrolled among their number a few of the Bostonian opera troupe. The Lone Star has enough tunnel and shaft work, and a few tons of good ore to encourage the expenditure of money for the purpose of discovering a richly paying mine.

Placerville, Feb. 10, 1896.

#### Inyo.

The *Index* states that at the Jordan mines at Copper Mountain, Inyo county, they have struck ore that assays 115 ounces in silver and $22.75 in gold, and have a ledge into which they have crosscut 125 (?) feet.

#### Napa.

QUICKSILVER SHIPMENTS.—The *Calistogian* says: During the month of January the following number of flasks of quicksilver were shipped from the various mines, as reported by Station Agent Ford: Napa 450, Sulphur Bank 345, Ætna 300, Great Western 94, Mirabel 140; total, 1320 flasks. In company with Postmaster Armstrong of this city the editor visited the Great Western mine last Friday, and was informed by Superintendent Rocca that nearly 200 men are being employed there. The output of this mine averages nearly 400 flasks per month the year around, but has been falling off some lately owing to repairs being made. After paying all the expenses there is a neat little margin left. The mining industry of Lake and Napa counties continues to draw men from all parts of the country. It is expected that the shipments from the mines this year will exceed all previous years.

#### Nevada.

The Federal Loan Mining Co. has let a contract to Peter Byrne and others to run a drift 200 feet on the 800 level of the mine, and has levied an assessment of five cents per share, payable March 9th and delinquent April 2d.

MASSACHUSETTS HILL.—*Telegraph:* The work of pumping out the old shaft on Massachusetts Hill, by the North Star Co., is now in progress. From the eight-inch discharge pipe, which is laid upon the dump trestle, there is continuously pouring sixty miners' inches of water, or something over a million gallons a day. This tremendous quantity taken from the old workings does not seem to decrease the supply rapidly, for there are miles of drifts to uncover. The inflow appears at present to be about 600,000 gallons a day. The pump is a compound differential plunger, built by the Dow Steam Pump Works of San Francisco. The initial cylinder is twelve inches in diameter, by thirty inches stroke. The capacity is ten gallons per stroke. This pump weighs, without water, 15,000 pounds, is twenty-two feet long and is suspended between guides in the pump-shaft by a steel wire cable. A special triple-geared hoisting engine raises or lowers it in the shaft easily, so that when blasting, or when repair or repacking is necessary, it may be brought to the surface in a few minutes. This pump is actuated by compressed air from the Rix compressors, situated at the North Star Co.'s power house on Wolf creek. The air, after being compressed to ninety pounds, is passed through a pneumatic reheater in the hoisting works and its temperature raised to 350° and its volume increased from forty to fifty per cent. This hot compressed air is conducted to the pump through well-insulated pipes and it loses very little of its useful heat in the passage. The hot air makes the pump run without shock or jar, and enables it to work economically. Using dry hot air for pumping is new to this State, and the results thus far from the pumping plant justify the conclusion that the method is a satisfactory one. This pumping plant is but one feature of the splendid power plant the North Star Co. has installed. It is to be hoped, for the good of the mining camp, that substantial success may crown the company's efforts. It is self-evident that, being equipped with modern and economical machinery, with buildings well situated, convenient and comfortable for miners, that the operating expenses should be a minimum, which means that rock which would have to remain untouched in the ordinary mine can here be successfully mined and milled. It takes courage and confidence to expend the amount necessary to equip this mine. It has been done, and if the results justify it it will make a new era in the method of mine prospecting.

NORTH BLOOMFIELD.—*Union:* Col. I. M. Taylor and others have been negotiating for the purchase of all the claims on the ridge from the Derbec to Moore's Flat.

Some time ago the Derbec Co. tried to buy the De Noon property, but could make no satisfactory arrangements for a purchase. The gentlemen now interested also tried to get this ground, but without avail, although there is still a possibility of making a bargain.

Col. Taylor has a telegram from New York that everything had been perfected and the deal for the property will be made in a few days. The company is an English one and has an unlimited amount of capital behind it. The property consists of 4000 acres and four miles of channel. It is calculated to run a tunnel 4000 feet in length into the mountain near Relief hill and tap the channel above the De Noon ground. The company expects to spend $50,000 in running the tunnel and opening up the channel.

#### Placer.

Auburn *Herald:* The Zantgraf made a clean-up Saturday last after a three weeks' run of their mill. It realized $16,000, or about $700 a day, besides the sulphurets.

Supt. O. L. Barton of the Herman mine, near Westville, tells the *Sentinel* that the company is working nineteen men and that the ten-stamp mill is running continually. The present working tunnel is sixty feet above the mill. A tunnel on the mill level is now in 400 feet, and they soon expect to crosscut the ledge. Bullion is being shipped.

*Sentinel:* Emanuel Polifka of Michigan Bluff has struck a fifteen-foot quartz ledge of $6 ore, four miles above the big trees and about three miles from Greek Flat.

#### Riverside.

The Briggs mine has been shut down several weeks, pending a contest in the land office, but that is amicably arranged and men are at work developing.

The hoist and boiler for the Golden Chariot mine is expected to be in place and in working order next week, when active development in the mine will be resumed.

J. B. Dennis has bought machinery for the Indian Queen mine. As soon as the water in the shaft and drifts can be handled development will be pushed and a millrun made on the ore.

#### San Bernardino.

RAND MINING DISTRICT.—The first quartz of any value was discovered here last May by Burcham and Singletou. They have several claims at present that are not being worked because of legal squabbles. Pat Reddy, of this city, is a partner with Burcham and Singleton. It is expected that the troubles will be speedily adjusted, when development work will be pushed.

The Black Hawk is three miles east of the town of Randburg, which has sprung up within the past three months. It is owned by Swarthout, Kuffel, Richard and Wilson. They have six men at work, sinking on the main ledge, and at a depth of 60 feet have started to drift to another ledge. The surface ore runs $60 per ton. One drawback is the distance from water, which has to be hauled by team over a heavy road twelve or fourteen miles. An eight-stamp mill is in course of erection at Cow wells, the water station. Ore will be hauled to the mill and crushed for $15 a ton. The owners of the Black Hawk contemplate the erection of a stamp mill at Cow wells, where they have an arrastra at work now.

CALICO.—The Pacific Coast borax mine, situated about eight miles northeast of Calico, at present employs about seventy-five men. It is divided into three shafts and each one has a force of miners of its own. Two small gasoline engines, respectively four and eight horse power, are used to hoist the borax to the surface, after which it is taken in cars to the bin, from which it is put into the big wagons and hauled to Daggett, whence it is shipped to Alameda, where it is refined and made ready for use. The ore, or borax, is drawn to the surface on two of the shafts in hide-covered buckets, and on the third in a skip which holds the same as a medium-sized car. At times, when the demand for borax is great, the force of men has to be increased until the order is filled and is then decreased.

At present there are three twenty-mule teams engaged in hauling ore from the mine to Daggett, which is about sixteen miles from the mine.

It requires three days for a team to make the round trip, as they camp about half way every second night. Two of the teams are owned by Seymour Alf of Daggett and the third by the company.

The wages were reduced from $3 to $2.50 per day and the board from $1 to 75 cents per day on the 1st of January.

The borax mine has produced more money in the last year than all the silver mines in the county.

#### San Diego.

AN EXTENSIVE PROGRAMME.—The Denver *Republican* says S. W. Dorsey, J. B. Grant, S. B. Morgan, Henry Bolthoff of the Hendrie & Bolthoff Manufacturing Company, and W. Teller have secured from the Mexican residents of Picacho, on the shore of the Colorado river, four miles from the basin, title deeds to about 500 acres of valuable mining property, and the work of erecting 100-stamp mills, constructing an electric railway to connect with the Southern Pacific railroad at Yuma, and setting up a modern town in the vicinity of the basin, will at once be commenced.

Papers were filed with the Colorado Secretary of State last week: the Picacho Gold Mines Company, capitalized at $3,000,000. The directors are the five gentlemen named above.

Picacho basin is the creation of volcanic agencies. It has for years been the source of a livelihood for a colony of Mexicans, who built their town, which is named after the basin, on the bank of the Colorado. Owing to lack of water this little colony in the desert of San Diego county has prospered only indifferently in the quest for the precious metal that runs rich through the rock formation of the volcanic dip four miles from their doors. Many years ago the appliances for treating the ore were crude in comparison with those now in use; the company, too, was poor, and after a short time its members gave up their scheme and abandoned the basin to their slow but patient neighbors, the Mexicans.

Their method of mining is one of the most primitive character. It is a combination of old-fashioned wet placer mining and the arrastra system.

Once and sometimes twice a year that section of San Diego county is visited by heavy rainstorms, known locally as torrential rains. The downpour soaks into the baked ground until it washes clay, gravel and weathered ore into a wet mass of ordinary placer consistency. This is panned in the regular way by the Mexicans, to whom a rainstorm means a harvest that must last out the remainder of the year, and the gold saved. When the torrential rains cease the entire adult population of the Mexican settlement spreads itself over Picacho basin.

Each miner is equipped with a broom of the finest texture, and the crowd is soon as busy as may be sweeping the gold-bearing dirt into pans. Every crevice and cranny worn by the rain into the basic ore is cleaned out and the particles of precious metal thus exposed collected carefully from the cleanings. Water for panning purposes is found in the rain pools that gather here and there.

Having exhausted the clay and gravel, the miners pry out such lumps of ore as have become loosened by the rain. These they pack upon burros and carry to the river bank, where they are subjected to the arrastra method of treatment. One piece of ore is rubbed against another until both are ground into particles small enough to be panned. This work over, the Mexicans betake themselves again to the ease of their "dobeys" to wait until another rainstorm visits their neighborhood.

It is the intention of the Picacho Gold Mines Co. to put up modern mills to run 100 stamps near the town of Picacho. When these are in place a railroad to be operated by electricity will be constructed between Picacho basin and the river, equipped with trains for hauling the vast quantities of ore to the mills.

From the river on the opposite side another electric railway will operate to Yuma, which is a station on the Southern Pacific, eighteen miles distant, so there will be no lack of accommodation for shipping the bullion. By the time the new district is in full working order considerable money will have been sunk, but there is no doubt that the gold in Picacho basin will richly repay the men who have engaged in the enterprise.

*Sentinel:* The Julian mining camp is attracting more attention this winter than at any time since the boomy days in the first few years of its history. There is more work under way, more work underground, and more gold being taken out, than at any time for fifteen years. A large number of mining men from all parts of the country are coming in, and a large number of prospectors in the field. There is plenty of room for all; the prospecting of the country has scarcely commenced, and the greatest depth reached in any one mine in the camp can scarcely be considered more than a prospect shaft.

#### Shasta.

BULLY HILL MINE.—Hugh McDonnell denies the current report that the Bully Hill mine at Copper City has been sold, but says a sale is probable.

Says the *Free Press:* It was originally a quartz mine, and was opened about twenty-five years ago. It had placed to its credit about $600,000 up to 1878, when it was abandoned, all the surface ores having been worked off, and since which time no work has been done in it until the present proprietors secured control.

At present the work under way is in the direction of cleaning out the old tunnel and driving a new one, which will cut the vein 275 feet from the surface. The tunnel is now in about 500 feet, and three shifts of men are engaged upon the work. It is proposed to penetrate about 700 feet, and three veins will be cut—a gold vein on each side of a big base ore which was worked some years ago.

These gold veins will run about $35 a ton in gold and a good big body of copper is assured, the ore showing about fourteen per cent of that metal. The ore now runs about sixty ounces in silver besides the gold and copper.

#### Sierra.

GENERAL NOTES.—*Messenger:* At the Plumbago quartz mine men are taking out ore. The mill has been temporarily closed.

In the Hope quartz mine active development work is being prosecuted. William Williams is foreman; nine men are employed.

Twenty-five men are employed at the Golden King quartz mine and the mill is crushing the ore extracted, with good results.

A bedrock tunnel is being run on the South Fork. Three shifts of three men each are employed.

At the North Fork pay gravel has been struck, and it is reported a dump and flume will be constructed at once.

At Maple Grove some prospecting has been done during the winter, and it is expected that very soon a force of men will be put to work.

About forty men are working at the B. M. Extension mine. Last week's cleanup aggregated eighty-five ounces.

THE HOPE MINE.—At the Hope mine at Alleghany the tunnel is in 150 feet, crosscutting to the contact, thence 380 feet southeast, and has yet about 100 feet to run to get under the old pay chute that was worked above. It was rich ore.

#### Siskiyou.

*Journal:* The Eastlick Brothers hydraulic mine at Oro Fino is running in full force. This mine pays $2.50 per day. About fifteen men are employed in this mine.

The Steamboat mine on McAdams creek will be started up in March.

The Success mine at Greenhorn is to be started up again under the superintendency of John Burgess. A river pump is being rigged up and it is thought there will be no trouble in keeping the water out, which has

been the means of preventing the operation of the mine for some time past.

The Ray Brothers of Oro Fino are getting out considerable rock at their mine. The ledge is not very wide, but is quite rich, the quartz averaging at least $40 to the ton. They will soon have an arrastra running at this mine.

Pitts and Goodfellor of Oro Fino are finding some very rich spots in their quartz mine. They have their rock crushed at the Johnson mill at that place.

Sam Gardner has twelve men at work in his hydraulic mine at Oro Fino, and will do well this season. He pays good wages and gets good men.

A. Erno of Quartz valley has an exceedingly rich quartz mine, and is taking out considerable quartz at present. He crushes his rock in an arrastra at the mine.

George Buchner of Etna also has a rich ledge in Quartz valley, called the Pinkham ledge. This is a small ledge, but the quartz usually runs from $60 to $80 a ton.

The Wright & Fletcher hydraulic mine at Oro Fino has started up, and will doubtless prove as remunerative as the other mines in this locality. This mine is among the best in this county.

The Espey, Hunter & Co. mine near Hawkinsville has been closed down since Sunday last, on account of the recent high water taking part of the dam out of the river that supplies the ditch. During the freshet sufficient water entered the ditch to keep all the wheels running, but as soon as the river went down water became scarce and the dam had to be repaired. The large pumps have been started again and will run steadily, to supply the giants at work in the claim.

### Trinity.

AROUND TAYLOR'S FLAT.—Pelletreau & Hedges are running steadily on their placer mine—the Highland—opposite Taylor's Flat. Their new ditch slid in places during the heavy rains of last month and cannot be used. A force of men is now employed in repairing and cleaning it out and will have it in running order by the 10th inst. At present the small gulches supply enough water to run an inch and a half nozzle on a canvas hose. The first two and a half days' run with the small pipe through a twelve-foot flume paid $250 in a partial cleanup. As soon as the ditch is in running order a No. 1 giant will be used and dirt moved much more rapidly and a good cleanup will be made for the season. The mine contains about forty acres of rich pay gravel, is a series of old channels, has a dump of from 900 to 1000 feet and is a valuable property.

Huestis Bros. are working the Don Juan mine this winter. They have run off about an acre of gravel through the high flume and will bottom up.

The Cedar Flat Consolidated Mining Co. of San Francisco, E. B. Hagans superintendent, is engaged in sinking shafts, prospecting and developing its properties at Cedar Flat. If the event justifies it, the mine will be worked on a large scale. They have found a rich high channel.

Gable and partners, who have Watson's Bar leased, are piping steadily and will undoubtedly do well.

Farther down the river Corning & Smith have fitted up their Hawkin's Bar claim and are mining.

On the point of the South Fork mountain between the junction of the South Fork and Trinity is one of the largest and finest gravel deposits in the State. There are thousands of acres of gravel that prospect well from surface to bedrock—in fact, are rich. At present there is no water to work it. It is a fine field for a big company. At present J. J. Morton is handling it.

A Weaverville dispatch says a Berlin syndicate has bonded the Bloss, McClary and Haskins mines, and the greater part of Trinity Center. The first payment is to be made April 1st, when the new owners take possession and put men to work.

### Tuolumne.

The 20-stamp mill at the App mine will be finished next week; eight concentrators will be put in. At the Rawhide the shaft is to be sunk to the depth of 1000 feet.

*Independent:* The Rawhide mine will be running by electric power on the 1st of March. This is the intention of the Electric Light Company, which has contracted to furnish 100-horse power to the mine by that date. The post holes are nearly all dug, and the poles are up as far as the forks of the Tuttletown road. Twenty-six men are employed, and the work is being pushed forward as rapidly as possible. The company met with a few obstructions in obtaining the right of way, which caused considerable vexation and delay. The company will have a telephone system in connection with its plant, so as to afford easy communication with the different stations and direct with San Francisco. The new 1000-light dynamo for the Sonora plant will be put in place as soon as possible. A line will also connect Sonora with the plant at the Marble Works, so when the water supply gives out here the electricity will be furnished from the dynamo at the river.

## NEVADA.

*Enterprise:* It is again reported that the Peck Brothers have purchased the Douglass mill tailings below Sutro and that arrangements will be begun to operate at the Rock Point mill about March 1.

The Holmes Mining Co. will shortly begin operations on the 300,000 tons of accumulated tailings at Belleville and Candelaria.

### ON THE COMSTOCK.

POTOSI.—The bullion report of the Potosi mine for January is as follows: Worked at the Nevada mill, 1030 tons of ore; gross proceeds in bullion, $20,632.03; cost of reducing, $6180; net proceeds in bullion, $14,452.03; assay value per ton, 320 tons, $31.29; 710 tons, $26.87; gross average per ton, $20.03; net average per ton, $14.03; mill worked 70 per cent; ore slimes considerably.

HALE AND NORCROSS.—The average assay of samples taken from the mine cars and railroad cars of the ore milled at the Brunswick mill during the month of January, 1896, was $32.81 gold and $50.90 silver; total, $83.78. The percentage of the average car sample is $81.53. The average battery assay of the above ore was $18.54 gold and $8.24 silver; total, $56.78. The percentage obtained of the average battery assay is 119.58. The gross yield from 424.5 tons was $28,969.

### CHURCHILL COUNTY.

THE DESERT MINES.—The Reno Reduction Works assay office has been very busy for a week testing ores from the Desert mines, near White Plains. Out of more than thirty samples none showed less than $5 per ton in gold, while many assayed from $20 to $125. It is the opinion of competent judges that there are many valuable gold mines in Desert district.

### LINCOLN COUNTY.

EL DORADO CANYON.—*Chronicle:* The district is situated three miles from the Colorado river and eighty miles from The Needles in San Bernardino county. It has long been known to contain silver in quantities, and for thirty years the Southwest Mining Company took out large quantities of the metal. The discovery of the gold deposit was, however, only made in 1894 by John Appel. It is in a different formation. A range of granite mountains extends along the county. At their base are foothills, where the mining is carried on. A peculiarity of the region is that the silver and the gold regions are distinctly separated by a great wash, forming the El Dorado canyon, whence the name of the new camp. Thus far seventy or eighty locations have been made, a number of which have been bonded for sale in the East. As yet only two groups of mines have gone beyond the embryo state. One of these is the Capitol, which is claimed under contract by A. S. Barney, but is being worked by Murphy and Monaghan with a 3½-foot Huntington mill. What they are taking out is known only to themselves, it being kept a profound secret, as Barney has brought suit against them for damages. He, however, has information that $2000 a week is being extracted. The other group is the Marie, and consists of four claims—the Marie, Black Cloud, Star and Belle. It is yet only a development. Its owners are mostly well-known San Franciscans. They are L. P. Drexler, John M. Wright, W. C. Wallace, J. C. Anthony, A. S. Barney, H. J. W. Dinkelspiel and George H. Sanford of Nevada. While the assays run much higher, the experts estimate the average value of the ore at $30 a ton.

They report that the formation is decidedly volcanic, traversed by fissures of gold-bearing ore, with occasional chimneys rich in gold. The enclosing wall rock is of porphyritic trachyte. The volcanic area consists of hills varying in height from 150 to 500 feet, situated at the base of a higher volcanic range, which is devoid of ore, but which changes to a complex volcanic combination of a silver-gold bearing nature. The auriferous deposit is found in the lower hills, and at an elevation of about 1300 feet above the Colorado river. Except for that stream the district is without water and contains no timber. Miners' wages are $3 a day and Indian labor costs from $1 to $1.50 a day with board. Supplies are purchased at Los Angeles, shipped thence by rail to The Needles, and from there to camp are hauled up the Colorado in boats by Indians. A couple of hundred whites are in the district. Some are working miners and others prospectors, but it is believed that all of the gold locations have been made by the first comers.

### WHITE PINE COUNTY.

E. C. Wood of the Cumberland & Osceola Gold Mining and Milling Company, Osceola, reports 1000 feet of work which has resulted in the disclosure of a big body of low-grade ore, while in the Cumberland 250 feet of exploration has revealed the presence of two distinct veins—one a fissure with well-defined walls, the other a contact. The company will, as soon as the snow departs, begin the erection of a mill, experiments having demonstrated in a test on 125 tons that amalgamation was the process adapted to the treatment of the product, although a test was made on cyanide and with the tri-cone rotary mill.

About May 1st the washing of gravel will begin on the placer bars in the sluicing of which the Osceola Gravel Mining Company has been the most active, and for which it has constructed two large ditches. From the waters that are thus controlled, the smaller companies that last year yielded between $10,000 and $15,000 in gold derive their supply.

## OREGON.

### JOSEPHINE COUNTY.

*Journal:* Gold is still coming into Grant's Pass in good quantities. This week over $4000 were turned into the bank for shipment. Jewell & Dodge shipped out over $1100, and Cramer Bros. some $400. Besides these sums, others went out through Wells, Fargo & Co.'s express, the aggregate of which we could not learn. Of the $4000 shipped by the bank, about $1700 came from the mine of Bent & Alexander, on Galice creek, and about $800 from the mine of the Black Gold Channel Co., on Footes creek. These are the results of only partial cleanups, and from now on the shipments will largely increase.

## WASHINGTON.

J. W. Draa, from Squaw creek, in the Methow valley, says if you want to buy mines it depends entirely upon the circumstances of the owner. Some might sell very cheap, because they must have the money, but the tendency is to want to sell an interest in the properties rather than the whole of them. The miner looks at it in this way: If he only sells a part and the mine proves to be of any great value, he will at least have a share of the wealth. But if he sells the whole thing, and it proves to be valuable, he will be "kicking himself" for ever having been so foolish as to sell, so for that reason you can secure a share in a mine for much less money in proportion than a whole one. That country is going to come to the front in time, for the reason that the ore is of such high grade.

Squaw creek district is on the Methow river. The Durr camp is on the east shore of the Methow, about five miles up from Ives' landing, on the Columbia. Squaw creek itself flows into the Methow on the west side. There are mines on both sides of the creek. The district extends for fifteen miles that is, it runs up to the divide in the direction of the Okanogan river.

NICKEL ORE.—Several months ago L. H. Bowman of Leavenworth, Washington, and associates shipped from Okanogan county a carload of nickel ore to St. Louis for smelter treatment at an expense of $360 for the car alone. It had all been packed out to the Great Northern railroad on the backs of men at considerable expense. When it reached St. Louis the first samples were treated, with a net result of $90 per ton. But just at that juncture the smelter became the object of litigation, was closed by orders of the court and the remainder of the carload of ore has remained unused and of benefit to nobody.

There is no other smelter in the United States where nickel ore has been successfully treated and there are only two others outside of this country, viz: one in Wales and one in Germany. Nickel ore has been found in the United States in limited quantities at Benton, Saline county, Arkansas; in Fremont county, Colorado; at Chester, Connecticut; at Dracut, Middlesex county, Massachusetts; at Cottonwood canyon, near Lovelock's station, in Nevada; on Piney mountain and upper Dad's creek in Douglass county, and near Rock Point in Jackson county, Oregon. But the most important deposit of nickel thus far discovered in this country is that of Lancaster Gap, in Pennsylvania. At first it was mined from 1852 to 1860 by the Gap Mining Company; the mines were closed down from the latter date until 1862, when they were purchased by Joseph Wharton of Philadelphia and reopened the next year. Within a few years the output at Lancaster Gap has been declining because of the gradually decreasing quantity of ore. It is to be hoped the Washington ore may be produced in quantities sufficient to supply the American demand, and if so the facilities for smelting will not long be the only obstacle to production.

## BRITISH COLUMBIA.

QUESNELLE RIVER.—*Journal:* The Quesnelle River Hydraulic Gold Mining Company will resume operations, with Mr. James Deacon of Quesnelle as foreman, in the early spring. With a permanent water supply, this company has a valuable property. More work will have to be done to secure a good supply of water. A four-mile ditch will add largely to the supply and a permanent dam at Big Lake will give a good supply to draw on for the latter part of the season. The mines are situated about 13 miles above the mouth of the Quesnelle, on the north bank, and the company's ground consists of 320 acres, with a lease of 160 acres more four miles farther up the river. Messrs. J. B. McLaren and Albert Palmer are the principal owners.

THE HORSEFLY.—Ashcroft *Journal:* Six additional cars of pipe for the Horsefly Hydraulic Gold Mining Company have arrived at Ashcroft from San Francisco during the past week, and the railroad employes state that all the pipe has arrived. The amount is about 275,000 pounds. A great deal of the pipe has been forwarded and is strung out on the Cariboo road from Ashcroft to the 150-Mile House. A considerable amount was started up the road in December and unloaded at the hills and hard places, and when a load would be started subsequently it was taken on as far as possible, much of it being served as the previous loads had been—unloaded when necessity required.

The pipe is of heavy sheet iron, similar to that used at the Horsefly and Cariboo mines. Where laid it will be pitched on both sides, a plan that renders it impervious to rust.

TRAIL CREEK SMELTER.—Last Saturday the Trail smelter blew in its water jacket blast furnace for the first time. The buildings consist of the main matte and power building 310 feet long, 60 feet wide and 62 feet high; the O'Hara building, 180 feet long by 70 feet wide by about 60 feet in height, the sampling mill, ore bins, and offices, etc. In the main building are two reverberatory furnaces, nearly completed, with four roasters above each, the blast furnace and an 80-horse power boiler and engine. Two more reverberatory furnaces have be begun, which will, like the others, have four roasters also on top of each of them. The plant will have a daily capacity of 300 tons.

## UTAH.

At Mercur Messrs. Scheu, Thompson and McFarland have bought from the Viking Mining Co. the Hillsdale group of mines for $25,000, cash.

COMPOSITION OF GILSONITE.—In reporting the results of an investigation of Utah gilsonite, says *Paving and Municipal Engineering* Dr. William C. Day, after discussing analysis of varieties of asphalt by Boussingault and Kayser, remarks that although there are in print many articles of value on the commercial applications of asphalt, and some giving the results of elementary analysis, he has failed to find any, other than by the two persons mentioned, and one by Peckham, which throw light upon the real nature of asphalts or which definitely describe the products obtained from them.

His investigation of gilsonite, a variety of asphalt, had for its object the isolation of such single hydrocarbons, or classes of hydrocarbons or their derivatives, as would give some information as to the nature of the material itself. Although the object has not been fully obtained, sufficient progress has been made to indicate that definite results are near at hand, but the work will be interrupted for a few months. At the conclusion of Dr. Day's analyses he found the percentage composition of gilsonite to be as follows:

Carbon, 88.30 per cent; hydrogen, 9.96 per cent; sulphur, 1.32 per cent; ash, 0.10 per cent; oxygen and nitrogen (undetermined) 0.32 per cent.

## MONTANA.

Suit has been brought in the Federal Court in Butte in the name of the United States against several local real estate men to set aside a placer patent to a large piece of mining ground covered by the smelting plant of the Parrott Mining Company, which is the real defendant in the case. It is charged by the Government that the patent was irregularly and fraudulently issued under the supervision and direction of Land Commissioner Stone, who, it is alleged, was in collusion with the defendants. It is charged that the proofs on which the patent was obtained consisted mostly of forged and fraudulent affidavits.

SOME BUTTE PRODUCERS.—The report of the Montana Ore Purchasing Company for '95 gives full details of the Glengarry and Rarus mines. The yield of ore at the former was 44,019 tons and at the Rarus 26,185 tons. The gross value of the ore obtained from both mines was $13.59 per ton and the cost of extracting the ore is given at $3.12 per ton, the total cost for extracting the ore being $219,036.48. The cost of transporting the ore from the mines to the smelter was 35 cents per ton, the total cost of transportation amounting to $24,571. The cost of reducing the ore was $8.97 per ton, the total cost of reduction amounting to $629,729.88. The amount expended for labor is given at $455,270.97 and the cost of supplies $418,066.79.

The Boston & Montana Company gives the net proceeds of the Mountain View, Pennsylvania, Leonard and West Colusa at $835,006.07.

The Butte & Boston's report of ore extracted during the year is as follows: Silver Bow No. 1 and No. 2, 120,000 tons; East Gray Rock, 61,170 tons; Blue Jay, 9660 tons. The custom ore purchased by the company during the same period amounted to 13,380 tons. The sum of $950,450 was expended for labor, and the cost of supplies is given at $700,550. No net proceeds are given.

The Parrot Company extracted 75,000 tons of ore at a total cost of $223,438.31, or nearly $3 per ton, and the total cost of reduction amounted to $704,864.25. The net proceeds are given at $163,581.56.

The production of ore at the Colusa-Parrot, owned by W. A. and J. R. Clark, was 33,670 tons of the gross value of $8.80 per ton. The cost of mining is given at $2.65 per ton, the cost of transportation 50 cents per ton and the cost of reduction $6 per ton. The expenses for labor are given at $57,511 and the cost of supplies $31,551.

At the Stewart the production was 4750 tons of the gross value of $13.50 per ton, which was mined and reduced at a cost of $9.90 per ton; transportation cost 60 cents per ton. The expenses for labor were $30,650 and the cost of supplies $16,350.

The Moulton produced 1000 tons of ore of the gross value of $15.60 per ton at a cost of $8 per ton, and the total cost of transportation is given at $7000. The company claims it operated during the preceding year at a loss of $12,000.

THE ANACONDA'S NEW REFINERY.—The Anaconda Company's new refinery is in operation. It cost $250,000 and has a daily capacity of 240,000 pounds of refined copper, 15,000 ounces of silver and 60 ounces of gold—$40,000. The blister copper, the unrefined product, shipped abroad represents nearly as much more. The Anaconda Company produces fifty-two per cent of the American copper production. The American product amounts to two-thirds of the world's output, so that this company produces more than one-third of the total production of the world. The new structure is 250 feet square, all under one roof, and contains 600 electrolytic tanks and all their appliances. The silver mill has also received a recent extension. As a by-product, the company turns out about as much silver as any silver mine in the country.

AROUND GREAT FALLS.—The Boston & Montana smelter had 900 men employed last month, with a payroll of $60,000. The United Smelting & Refining Co. paid out $15,000. At Belt, twenty-five miles from the city, the mines owned by the Anaconda Co. paid out $75,000, and the Sand Coulee mines $40,000. This company is shipping 145 cars of coal and six cars of coke to Butte daily. It is operating 100 coke ovens and running night and day, and is unable to extract coal enough for its own use and is taking a number of cars from the Sand Coulee mines. The Montana Central railway is running fourteen trains a day from Great Falls to Butte.

## NEW MEXICO.

T. H. Lothian of the Lone Star mine, Cochiti, has arranged for the erection of a mill of large capacity at Bland. The process adopted is the invention of Mr. Schroeder of Denver. There are about 800 feet of shafts and drifts. The ore in the sixty-foot shaft on the property averages $10 in gold.

## COLORADO.

W. S. Stratton, of whom so many wonderful tales are afloat, is reported in a Denver newspaper as saying: "All this talk about my not being able to take care and keep account of my money in the bank, which is supposed to be accumulating so fast, is all bosh. I have no great income. At present I am shipping little or no ore from the John A. Logan, American Eagle or Lottie, and the wonder-

fully rich ore in the Independence has been passed through and a large body of lower grade sulphide ore encountered, but I am not shipping much from the Independence or the Portland No. 2, which is directly above it and connected with it."

### WYOMING.

A Rawlins dispatch says the Timberlake placers in the Four Mile district are being investigated by a syndicate of Des Moines, Chicago and New York parties, with a view to their purchase. They spent three days looking over the property, which embraces about 4000 acres of rich gravel. Tests were made in numerous places on the property with the pan, the results showing values running from 50 cents to $2 a yard. The sale of the property will mean the expenditure of from $150,000 to $200,000 in building a ditch to put water on the property. The parties returned to Omaha on Wednesday, where they will meet the other members of the syndicate and decide upon the question of purchase.

### MICHIGAN.

COPPER COMPANIES.

THE CALUMET & HECLA CO. — Some of the ground north of No. 5 shaft is showing a large amount of rock which, according to reliable information, will yield at least 20 per cent of ingot copper, which is said to equal anything ever found in the mine. The shares of this company have advanced to $300.

The Quincy Mining Co. in 1895 produced 19,732,970 pounds of mineral, yielding (about) 16,250,000 pounds of refined copper, against 15,484,014 pounds of refined copper in 1894. The Quincy pays a dividend of $4 per share on the 17th, which makes the total dividends declared by this company since its organization $7,870,000.

THE BOSTON & MONTANA CO. — This company's production of copper for 1895 amounted to 50,000,000 pounds. They have so far reduced the cost as to be able to lay down copper at New York at 5.27 cents per pound. The argentiferous character of the ore, containing gold as well as silver, is a factor of great importance in keeping down the cost of the copper product to this remarkably low level.

The Boston & Montana has declared a dividend of $2 per share, payable February 20th. It is understood that this is the beginning of regular quarterly dividends of a like amount. As the indications are for higher, rather than lower, prices for copper this year, the ability to pay at least $8 per share annually is unquestioned. This would be equal to about 10½ per cent per annum with the market value of the shares at $76. The bonded indebtedness stands now at somewhat less than $1,000,000. It is believed that the new improvements at the Great Falls works will give the Boston & Montana a capacity of about 5,000,000 pounds per month, if conditions warranted such an output. A production of this amount would be pretty close to that of the Rio Tinto, the greatest copper mine in Europe. The Rio Tinto Co. brings to market annually about 31,000 tons of copper. According to its last report it had a bonded indebtedness of £3,600,000, bearing interest at the rate of 4 per cent. Dividends were declared of 4s per share in April, and 10s per share in October, 1895, or a total of 14s. Rio Tinto shares about five or six weeks ago were at the equivalent of some $70, but had risen to about $89 a few days ago. Taking the latter figure as the present market value of Rio Tinto, annual dividends of 14s per share would bring the investor a return of only 4 per cent as compared with 10½ per cent by the Boston & Montana. On the foregoing basis of cost and production the Boston & Montana would be able to fully earn $8 a share per annum on the altogether improbable contingency of an 8-cent market for copper.

Tharsis Sulphur & Copper Co. informs Houston & Co. that their production for 1895 is about 10,000 tons of fine copper. The company's last dividend was 4 shillings per share, payable in May, 1895, and covered a period of twelve months' operation, equal to about four per cent on the market value of the shares. Since 1866 the Tharsis Co. has paid in dividends £5,258,432.

The Cape Copper Co., Limited, produced in 1895 of fine copper 5350 tons, against 5300 tons in 1894.

The production of John Stanton's group of Lake Superior mines for 1895 was as follows, in refined copper, viz.:

| | *Pounds.* |
|---|---|
| Wolverine | 1,815,391 |
| Atlantic | 4,832,497 |
| Central | 397,020 |

The Franklin Mining Co. did not produce any copper in December, owing to the destruction by fire of the hoisting engine. The total production for 1895 was 3,086,933 pounds of refined copper.

LAKE SUPERIOR COPPER MINES.—(Special Correspondence).—The January product of the Lake Superior copper mines is as follows: Atlantic, 257 tons 35 pounds; Wolverine, 101 tons 165 pounds; Quincy, approximately. The Franklin was closed down in January on account of fire having destroyed the engine and boiler plant.

The Tamarack, Osceola, Tamarack Jr. and Kearsarge mines do not give out their monthly products for publication, but from a semi-official source we give the January product of the Tamarack as 1050 tons, Osceola 300 tons, Kearsarge 100 tons of mineral copper.

The Calumet & Hecla is not crowding its product since the new year. Its product cannot be given approximately correct, as the mine management use great caution to prevent it being known.

The Calumet & Hecla is having considerable trouble with its No. 6 shaft, as the hanging wall is caving in on the miners. Recently a number of miners and drill boys were imprisoned for several hours under rock and timber. The framed and mortised timber which this mine only is using has to be abandoned and the largest pine timber that the forest affords is being put in, but it cannot hold the immense weight of rock that crowds it.

The action of Judge Hubbell in the case of the widow of Fred Shoepper vs. the Hancock Chemical Company of Woodside for a damage of $30,000 for the killing of her husband by an explosion of nitro-glycerine, was a surprise to the members of the bar and particularly the plaintiff's attorneys, who had taken the case on an agreement to receive a certain per cent of the amount recovered. The Court ordered the jury to find a verdict for the defendants on the ground of insufficient testimony. The plaintiffs will appeal to the Supreme Court for a new trial. A. F. ISLER.

Houghton, Mich., Feb. 4, '96.

### MINNESOTA.

A PRIMITIVE STAMP MILL.—Rainy Lake *Journal*: It has been thought that the heart of this gold belt lies between Rainy lake and Wild Potato lake, along Seine river, but new and valuable discoveries have been made farther up the river and north as far as Little Turtle lake. The latter place, from all accounts, promises to prove the wonder of the range. The parties owning one rich property there are at work grinding quartz with a contrivance made of such pieces of wood as could be hewn from timber and such scraps of iron as could be secured without expense, all of which did not cost to exceed $10. The "mill," as it is termed, is nothing more nor less than three "dollies," enclosed and housed in a log building. Each "dolly" consists of a long, heavy spring-pole, fastened outside of the building, hung on a swivel. Inside the building, at the end of the pole, is hung a log, in a vertical position, at the end of which is attached a worn-out stamp-mill shoe, or other heavy scrap iron. A hole is bored through the stamp-log and a pole inserted for a handle. The operator grasps the handles, and, by bearing down, forces the heavy "stamp" down upon the quartz beneath upon the solid rock floor, the spring-pole then making quick, heavy blows, with a little effort, which soon reduces the quartz to dust, when the gold is panned and saved in the ordinary manner. The three stamps crush about 500 pounds a day, and, as the ore is assorted and yields from $60 to $90 a ton, the three men are making more than five times the ordinary wages. The success attending the efforts of these men should induce others to go at work in a similar way, and by so doing they can laugh at the present apathy of capital with regard to these new gold fields.

### ARIZONA.

SMALL-POX AT CONGRESS. — Because of a small-pox epidemic the following is posted at Congress station. All persons are forbidden to leave Congress mines or its immediate vicinity, or from boarding, or attempting to board any trains passing Congress station, or to purchase a ticket at said station, without a written certificate from Dr. J. Miller. By order of the Board of Supervisors of Yavapai County, Territory of Arizona.

THE TUCSON SMELTER.—The Tucson smelter this week resumed operations with a force of thirty-five men, working eight hour shifts. Returns from New York on bullion heretofore shipped to that point, shows it yielded a high percentage of pure copper, and copper matte.

Yuma *Sentinel*: Last Monday the La Fortuna mines, that were bonded on the 3d of last July to C. D. Lane, passed out of the hands of the original locators and a deed on that day was filed by Supt. R. M. Straus with County Recorder M. L. Pool, which conveyed all right and title in said mines to Mr. Lane, and the consideration therein expressed is $150,000.

This is one of the largest amounts ever paid for a partially developed mine in this county.

The mine is located 28 miles southwest of this city, in the San Alvino mountains, and the fortunate locators are Messrs. Farrell, Halbert, Albert and Thomas.

The above-named gentlemen located the mine a little over a year ago. They were all poor prospectors and had a hard time to get the necessaries of life until R. M. Straus came along and was successful in getting Mr. Lane to take hold of the prospect and put a large number of men developing the property.

Since that time a shaft has been run down over 200 feet and crosscuts made, which at the present stage of development shows more rich gold ore in sight than has been paid for the mine. The ore is free milling and the richest ever seen hereabouts, averaging from $50 to $300 per ton in gold.

It is the opinion of mining experts who have visited the mines that it will prove one of the richest mines ever discovered in the Territory.

THE OLD VULTURE MINE.—The old Vulture mine that in the past added millions to the gold circulation is again assuming prominence. The old mine for all its millions, never was worked much lower than 400 feet in depth. There the ore commenced to run into sulphurets, and the scheme of the workings above was not such as would warrant a continuation of the procedure at a greater depth. Then the pipe line from the Hassayampa was swept away in the Walnut Grove flood and the mine closed down. This valuable old property has been leased by Mr. Kempton. Of the Vulture mine and surroundings the *Republican* says: "Ten of the hundred stamps of the old mill are at work on ore taken from the old workings, and they are running the batteries by a 25-horse power Westinghouse engine. Water for steam is secured from the bottom of the inclines while the drinking water is condensed. The nearest surface water is in the Hassayampa, over the hills fifteen miles distant. The works are the relics of what was once the largest plant in the southwest. Many appliances are there that render Vulture a complete though little camp, and when the connecting rod of the high-speed engine broke a few days ago there were appliances at hand in the machine shop whereby a new rod was neatly constructed within a few days."

### MEXICO.

SONORA.—At El Plomo, in the Altar district, the National Mexican Development & Mining Co., under the management of George E. Bent, is pushing work. It has twelve teams hauling freight from Santa Ana. The machinery for a sixty-ton concentrating plant has passed the custom house at Nogales en route. Underground there are already 8000 feet of development work on the three properties owned by the company, and new work is being prosecuted with vigor. A tunnel 350 feet long will be run through the hill on the Johnson property, and work of driving it has commenced from both ends. Mr. Bent is now working some forty Mexicans and fifteen Americans.

### NEWFOUNDLAND.

It is said that asbestos mining is likely to become an important industry of Newfoundland in the near future. Next year, says the *Canadian Colliery Guardian*, will witness an active development of these deposits, regarding which there are sanguine expectations. It is reported that gold-bearing quartz has been discovered at Ferryland, south of St. John's.

### SOUTH AFRICA.

A SLIMES PLANT.—Johannesburg *Mining Journal*: The slimes plant at the Crown Reef is now nearly ready; it comprises six circular iron vats, 32 feet in diameter and 10 feet deep, the concrete floor sloping from the circumference to the center. This set of vats is just above the cyanide shed, and a few feet lower are two 20-foot receiving vats for the solutions from the leaching vats, prior to passing to the precipitation boxes. Below the shed is the big solution tank, 40 feet in diameter and with a capacity of about 70,000 gallons. The quantity of solution will of course be very large, and the precipitation boxes are to be six in number, built of brick, and arranged, as is desirable in the case of weak solutions, for the electrical precipitation process, with sheets of iron and lead. Their dimensions are: length, 30 feet by a width of 4½ feet, and a depth of 11 feet. The complete pulp-treatment plant will now comprise the classifiers, with five concentrate vats, the treatment of sands and the treatment of the slimes. The concentrates are received in two vats for a first treatment and then are transferred to the other three vats for the remainder of the process. The sand treatment remains as usual, but the overflow from the vats is to pass a series of serrated separators, from the bottom of which further sands will be obtained and removed by trucks. From these separators the overflow passes on by launder, in which a precipitating lime-solution will mingle with the slimes, to a series of three separators, the two upper ones being 20 feet in diameter, top section, and the lower one 40 feet in section. The slimes, settled here by the lime, will be pumped as a sludge to the six leaching vats already mentioned. These vats will be one-quarter filled with sludge, when the cyanide solution, a very weak one, will be introduced by vertical pipe in such a manner as to impart a circular stirring motion to the sludge. A contact of a few minutes in this soup-like mixture will dissolve the gold, when the sludge being again precipitated, the gold-charged solution will be drawn off at different levels by a series of exits down the side of the vat. It is calculated that about 80 per cent of the solution will be drawn off, bearing that proportion of the gold; and, if the further proceeding should be found payable, by introducing water and again drawing off, a further 10 per cent of the gold may be brought away. The plant is arranged to treat about 180 tons of slimes a day.

### VENEZUELA.

A returned miner says: "The methods of miners are absolutely crude. The mining parties are composed of negroes with a white man at the head. Each miner carries a shovel, a pick and a crowbar. He also carries a machete or long heavy knife for cutting his way through the underbrush which springs from the moist earth in every direction. There are no roads, and every man cuts his own road when he travels. The parties travel up stream in a boat, usually a crude dugout, and there may be a great number of the boats afloat at the same time. Arriving at the placer ground little time is lost in building houses, as a shelter overhead is all that is needed in that country. The negroes are hired with the understanding that they are to receive half the gold they find. The negroes scatter through the forest, each man selecting a spot which he clears of underbrush by the aid of his machete. He then digs a hole in the soft ground. The hole begins to fill with water and the negro is soon hard at work panning by means of a wooden 'batea.' He pans the dirt as long as it yields $10 to $12 a day, and when it drops below that amount the pay streak is said to be exhausted, and the miner moves on to a new spot. I have seen holes in the ground ten feet deep, but they are generally quite shallow. The placer gold belt is 300 to 500 miles long and of unknown width."

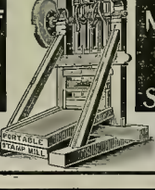

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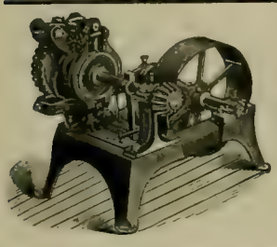
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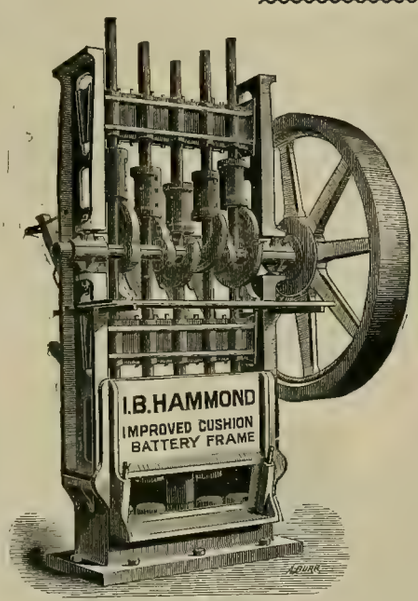
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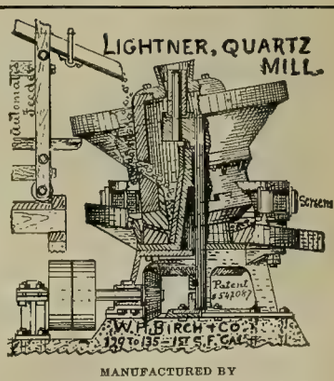
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## Coast Industrial Notes.

—The Los Angeles oil yield is reported to be falling off.

—The advance in wheat has checked the export flour trade with China.

—The annual value of San Francisco manufactures is estimated at $82,743,000.

—The Tubbs Cordage Co. has resumed operations at the Potrero rope walk, employing about 100 operatives.

—At Guaymas a schooner from Oregon has discharged 500,000 feet of lumber for the Creston Mining Co. at Minas Prietas.

—At the Potrero, this city, the sugar refinery now employs about 700 hands. At the rolling mills 500 men have present employment.

—Twenty-five years ago, next Saturday, the corner stone of the "new city hall" in this city was laid. To date it has cost nearly $5,000,000 and is not completed.

—The question of a dredger for the Fraser is under consideration by the board of trade of Westminster, B. C. An appeal will be made to the dominion government.

—During January the collections of inland revenue for the Victoria, B. C., division totalled $13,491.01, as contrasted with $10,586.68 for the corresponding month of '95.

—California sends the most of its exported barley to England; but, in '95, 300,000 bushels went to Honolulu. Barley exportation is comparatively new to this State. Two years ago 2,000,000 bushels were imported.

—The Mexican federal census, just completed, shows a population of 12,542,057. The City of Mexico has 339,905; Guadalajara, 83,870; Puebla, 91,917; San Luis Potosi, 69,676; Pachuca, 52,819; Monterey, 56,835; Merida, 56,702; Zacatecas, 40,026; Durango, 42,106.

—Revenue Cutter No. 3 for service on the Pacific Coast will be completed Jan. 15, '97 and delivered to the Government at Philadephia by Cramp & Sons of that city. Their bid was $198,000. The Union Iron works of this city offered to build it on modified specifications and deliver it here, where it is to be used for $199,000, but as in the case of another vessel, the Atlantic builders secured the work.

—California annually sends away a great deal of money for products that could be supplied at home. Take, for instance, Pacific coast codfish—not the cheap Massachusetts imitation codfish sent here and largely consumed, but genuine codfish, all wool and nearly a yard wide. Were San Francisco jobbers to carry that and discard the imitation product, or, rather, could they induce the retailer and consumer to call for Pacific coast codfish, it would keep money in the State now sent away for an inferior article. This is only a drop in the bucket, but is cited as worth passing notice.

—"A chain of compressed cakes of gun-cotton tied around the trunk of the largest size trees and exploded, will, by the action of its violence, cut the tree down instantly as smoothly as if it were done by an ax in the hands of an expert woodsman. Timber cutters working the forest giants of Montana, Idaho and Washington declare it to be the cheapest and most economical mode of felling trees that has yet been devised." The above is clipped from a Colorado paper and may be so. If any of our readers in the region referred to have personal or practical knowledge of the alleged "mode of felling trees" it would make interesting reading.

—The tin deposits of California are not being worked. Stream tin has been found in the bed of the Feather river, and float tin has been discovered in Hungry creek, and in loose soil near Weaverville. Native crystalline tin was found in gold mining in Tuolumne county. The only deposits yet discovered which seem to have any value are in the Temescal mountains, 55 miles east of Los Angeles. A mine was worked there for two or three years by the San Jacinto Estate, Limited, but operations were discontinued some time since, and there seems to be no prospect of work being resumed. All told, less than 300,000 pounds of tin were produced from the workings.

—The northern transcontinental lines have revised their west-bound freight tariffs to Portland, Or., and Puget sound from the central traffic association territory, Chicago and common points and Mississippi river common points to meet the rates made by the southern lines in connection with the steamship service from San Francisco. The rates of the northern lines to Portland and Puget sound points are now equal to the southern rates to San Francisco, plus the local rate from San Francisco to destination. The new tariff goes into effect next Saturday, the rates on northern lines will be reduced to a basis which is practically five cents above the rates applying from these territories to San Francisco via southern lines.

—The first annual report of the Manufacturers' and Producers' Association is received. On March 19, '95, there were practically 40 members; the association has a present membership of 1310, representing 272 branches of industry in 89 cities and towns of the State, with a rating at Davis' Commercial Agency of $82,900,000. The association members employ about 52,500 persons. Considerable work has been done during the year at a very small cost, the funds being economically spent. The total receipts of the year were $7252.17; total expenses, $6951.03. H. T. Scott is president, L. R. Mead secretary. The officers have all worked hard for the general advancement of all the interests of the association and deserve commendation. The report is printed from type with ink and paper made in California. The association has secured a suitable site on Twelfth street, been Market and Mission, in this city, having a street frontage of 200 feet, with a depth of 475 feet, on which it is proposed to erect a pavilion and suitable buildings in which to hold an exposition.

## Personal.

HENRY F. MYERS, representing the Playa de Oro Mining Co., is visiting the city and State.

MESSIEURS REYNAVD LAEROZE and M. Pierredor, of Paris, are looking at mining properties at Grass Valley, Cal.

CAPT. THOS. MEIN is urged by resident California miners in South Africa for the position of U. S. consul at Johannesburg.

CHAS. C. DERBY, former surveyor at the New Almaden quicksilver mine, is the new manager of that extensive property, vice Capt. Harry, recently deceased.

GEO. H. ROBINSON, manager of Capt. De La Mar's Utah and Idaho mining properties, has been elected president of the East Golden Gate Mining Co., at Salt Lake City, Utah.

W. C. BUTLER, the general manager of the Puget Sound Reduction Works, Everett, Wash., has received instructions to proceed promptly with the construction of the bullion refinery.

H. S. SHERARD, formerly of the Grand Victory mine, Placer Co., has had bonded the New Year, in the Judith mountains, in Fergus county, Montana, together with some adjoining claims, for $100,000, to New York capitalists. The bond is for one year. The first payment, $25,000, is to be made May 1, 1896; the second, $25,000, September 1, 1896; and the third, $50,000, January 1, 1897. There shall be deposited in the Bank of Fergus county, before work commences, a forfeit of $5000.

JAS. H. TIBBITS writes from Buluwayo, Matabeleland, South Africa, under date of Jan. 9th, that transportation there is very high. He paid $50 to have his trunk carried on the coach. Freight from Mafeking to Buluwayo is $100 per ton. The freight on a 20-stamp quartz mill amounts to $27,000—a sufficient sum to build a good mill in California. No mills have yet been erected, but there are three 20-stamp mills on the road. There are 560 bullock wagons on the road and it requires three months' time to make a round-trip.

## Commercial Paragraphs.

THE contract for the ten stamp combination mill to be erected on the April Fool mine at De Lamar, Nev., has been awarded to the Colorado Iron Works after some spirited competition between Salt Lake agents.

THAT the product of the Westinghouse Electric and Manufacturing Company is of world-wide demand has again been demonstrated recently by the company receiving orders to equip an electric railway in the "Isle of Man," the little island near the coast of Ireland, which has been made famous by Hall Caine, the great novelist; another order for electric railway apparatus for the city of Coventry, England; and a third order for electric motors and railway generators for Cape Town, South Africa. The company is also about to ship an order for electric railway apparatus to Bangkok, Siam, India.

JAS. S. BROWNELL, Western agent of the Frue Vanning Machine Company, this city, reports recent sales as follows: Esperanza Mill, Mokelumne Hill, Cal., 6-foot plain belt Frue Vanners; Jackson & Lakeview Mining Company, Lundy, Cal., one 4-foot patent lip flange belt Frue Vanner; Hector Mill, Sutter Creek Cal., sixteen 4-foot patent lip flange belt Frue Vanners; C. C. May, Davenport, Wash., four 4-foot patent lip flange belt Frue Vanners; J. H. Huffer, Jacksonville, Ore., one 4-foot patent lip flange belt Frue Vanner; W. Y. O. D. Mine, Grass Valley, four 4-foot patent lip flange belt Frue Vanners.

## Recent Mining Incorporations.

THE Golden Fissure Mining Company has incorporated in Oakland with a capital stock of $96,000, of which $100 has been subscribed by the following: G. H. White, J. C. Young, I. S. Watson, J. H. Aydelotte, O. E. Hitchcock, E. R. Shaw, H. B. Pinney, W. Wiand and J. A. Pouser.

THE Iron Mountain Investment Company, with a capital stock of $50,000, all of which has been subscribed. The Mountain Mines, Limited, subscribed $47,500. The company will acquire and manage water rights and ditches in Shasta county. Incorporators—L. B. Parrott, Alexander Hill, Clay W. Taylor, C. P. Eels, M. F. Michael.

The Golden Crown Mining and Milling Company of Los Angeles, Cal.; principal place of business, Los Angeles; capital stock, $10,000,000, with $500 subscribed; George G. Mullins, W. V. Hedges, C. L. Hedges, Ben Goodrich and Thomas S. Fuller of Los Angeles, directors.


This doesn't happen every day. You can't expect it more than a few times in a lifetime. No one is going to agree and guarantee positively to save you 30 per cent or else no pay unless they know what they are about. You can't expect people to say, "You need not pay for this until you have proved our guarantee," unless they intend to do all that they claim. As a matter of fact, we do more than we claim. We guarantee to save 30 per cent, but actually we save a good deal more.

Have you ever heard of a Double Pipe Air Compressor? It has one disadvantage. It needs twice as much piping as is needed with the ordinary makes of Air Compressors. On the other hand, it has more real, genuine advantages than you can shake a stick at. It will do the same work as the ordinary Air Compressors, such as are in general use throughout the mines on this coast, on 30 per cent less power. We will guarantee this and prove it to your satisfaction, else you need not pay for the Compressor. It weighs less than half as much as the ordinary Air Compressor. It costs less for freights and is more easily carried up into the hills. It shows the same high efficiency at all altitudes, high or low. It takes no more fuel to do the work if located on the highest peak of the Sierras than it would take if located at the sea level. It enables you to buy a smaller boiler than you can use with any other Air Compressor to do your work. It does not overheat the air at the Compressor and freeze it at the rock drill. In short, it is the ideal Air Compressor. It has been tried in practice, and we can show you the highest recommendations and endorsements. We sell it on a strict, positive, iron-clad guarantee If your power costs you anything, you want the Double Pipe Air Compressor, because you can buy it on a guarantee that it will run on 30 per cent less power than any other make of Compressor. If you have to take a Compressor to your mine over bad roads, you want the Double Pipe Air Compressor, because it weighs less than half as much as any other Compressor. It is cheapest to buy, cheapest to run, cheapest to transport, cheapest to carry anywheres. For pumping it beats the world. You can run it with steam or water.

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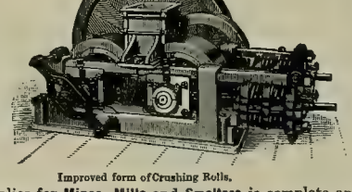
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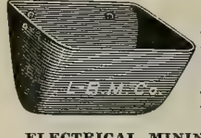
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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR WEEK ENDING FEBRUARY 4, 1896.

553,954.—SHEEP SHEARS—S. L. Cohoon, S. F.
554,174.—OVERSHOE RETAINER—F. F. Foster, Snohomish, Wash.
554,023.—POWER WHEEL—G. S. Fouts, San Jose, Cal.
553,950.—LAMP—J. Gregory, Seattle, Wash.
554,062.—CONVERTING MOTION—E. W. Hammon, Davisville, Cal.
554,183.—PLASTER—T. W. Heinemann, Los Angeles, Cal.
554,027.—CAN MACHINE—A. Johnson, Oakland, Cal.
554,069.—STRAP MACHINE—Leibe & Vanderpool, Napa, Cal.
553,936.—GANG PLOW—A. J. Malsbary, Reedley, Cal.
554,073.—ENGINE—Miller & Collins, Vacaville, Cal.
554,082.—MINING PUMP—W. Nance, Grass Valley, Cal.
554,077.—FRUIT SPLITTER—S. H. Shelley, Berryessa, Cal.
25,114.—BUTTON DESIGN—J. M. Litchfield, S. F.
25,115.—BUTTON DESIGN—J. M. Litchfield, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SEED RACK.—James Sproule, San Francisco, Cal. No. 553,571. Dated Jan. 28, 1896. This is a rack which is especially adapted for containing packages of seeds. It is composed of a series of superposed troughs having end or side pieces which are supported at an inclination so that said troughs form a series of receding terraces from the bottom to the top, open transverse arches spaced or separated from each other and fixed to the upper surfaces of the troughs, and rods extending parallel with the troughs along the front and backs of the tops of the transverse open arches. The object of the device is to so dispose of the packages which it contains as to render them convenient of access and inspection.

ENGINE.—Edwin W. Hammon, Davisville, Cal. No. 553,613. Dated Jan. 28, 1896. This engine belongs to the class of reciprocating engines which, on account of the shape of the cylinder, are known as "sector-shaped" engines. The invention consists principally in the improved means for mounting and packing the shaft, and the object of the invention is to provide such a shape in cross section of the sector cylinder as will adapt it for the best and most effective packing off the shaft and piston, and also to provide for the necessary clearance at the ends of the cylinder.

AMALGAMATOR.—Samuel A. West, San Francisco, Cal., assignor of one-half to Wm. H. H. Hart of same place. No. 558,634. Dated Jan. 28, 1896. This amalgamator belongs to that class in which a vertical series of amalgamating surfaces are arranged so as to successively discharge the material from one surface upon the other. The object of the invention is to provide a simple and effective amalgamator for use in both the wet and dry processes. The machine comprises a box, a series of oppositely inclined supports or shelves with the supports of each side terminating short of the opposite side to leave spaces from one shelf to the other on opposite sides successively, amalgamating plates extending over said supports or shelves and traversing the spaces, having the portion extended over the spaces foraminated, a hopper at one end of the box and a discharge at the opposite end.

LOW WATER ALARM.—Oscar J. Backus, San Francisco, Cal. No. 553,636. Dated Jan. 28, 1896. The object of this invention is to indicate and signal when the water in a steam boiler has become too low for safety. It consists of a vertically disposed casing connected at the upper and lower ends with the boiler above and below the water line, said casing having projecting from one of its sides the right-angled extension, with openings in it corresponding with the gauge cocks and a visible water gauge, an expansible bar secured at one end only to one of the inner walls of the vertical casing in line within the horizontal extension, its outer end sliding through a stuffing-box at the end of the casing so as to press against a lever which stands in line with it. This lever has a long arm, movable so as to make a contact between two electrodes whenever it is thus pushed by the expansion of the bar on account of too great a heat, and when this contact is formed an alarm will be sounded, which will attract the attention of any one near. Whenever the bar contracts, a spring moves the lever so as to separate the electrical contacts. The action depends upon the fact that as long as the bar is immersed in the water it will have a less temperature than when the water has sunk so as to expose it to the steam, and the higher temperature of the steam will expand the bar and lengthen it so as to operate the lever as above described.

DEVICE FOR CONVERTING MOTION.—Edwin W. Hammon, Davisville, Cal. No. 554,062. Dated Feb. 4, 1896. This invention relates to the general class of mechanisms for converting motion from one form to another, and its object is to convert an oscillatory into a continuous rotary motion in the same direction. It may be applied to any use to which it is adapted and is especially useful in connection with the oscillatory motion of a vibratory engine or such as is commonly known as "sector-shaped" engines whereby their motion is conveniently and economically converted into a continuous rotary motion, and is adapted to be readily reversed. The device consists essentially of a driving gear to which the oscillatory motion is initially imparted, independent pinions meshing at opposite sides of said gear and at right angles therewith, a driven shaft upon which said pinions are loosely mounted, and a means for alternately engaging and disengaging said pinions from the pinion-shaft.

FRUIT SPLITTING MACHINE.—Sivert H. Shelley, of Berryessa, Cal. No. 554,037. Dated Feb. 4, 1896. This invention relates to the class of machines for pitting or stoning fruit and especially to that sub-class particularly adapted for the handling of clingstone peaches in which the operation is performed by the complete splitting of both the flesh and pit of the peach. The machine comprises oppositely rotary cutters in the same plane and having their edges brought closely together, said cutters being mounted upon fixed bearings whereby they are held rigid with respect to one another and a suitable carrier for advancing the fruit to and between the cutters consisting of parallel opposing belts or ropes, square or angular in cross section with their sides tangential to the fruit surface whereby V-shaped grooves are formed in which the fruit rests.

MOMENTUM ENGINE.—James M. Miller and Wm. L. B. Collins, Vacaville, Cal. No. 554,073. Dated Feb. 4, 1896. This invention relates to an apparatus for applying the power of water under high pressure and momentum. The object is to provide an apparatus in which a column of water is impelled by the action of a jet of steam under high pressure, and by the pressure of air which it compresses into an air chamber to apply it to the buckets on the periphery of a wheel so as to rotate the latter. It consists of a momentum wheel, an injector having a pipe connecting with a steam boiler, an inlet pipe connecting it with a source of water supply whereby a body of water is discharged through the injector by the velocity of the escaping steam, an intermediate condenser through which the jet of steam and water are discharged and a discharge nozzle surrounded by a body of fluid and connecting with the condenser and delivering the water upon the wheel.


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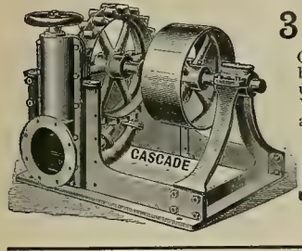
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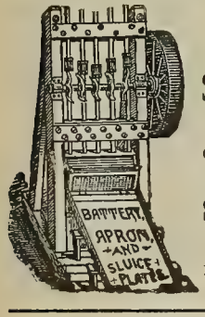
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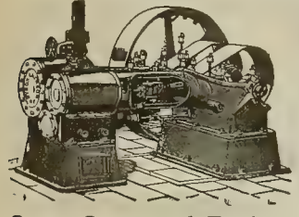
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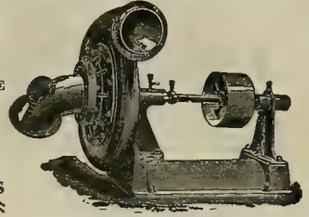
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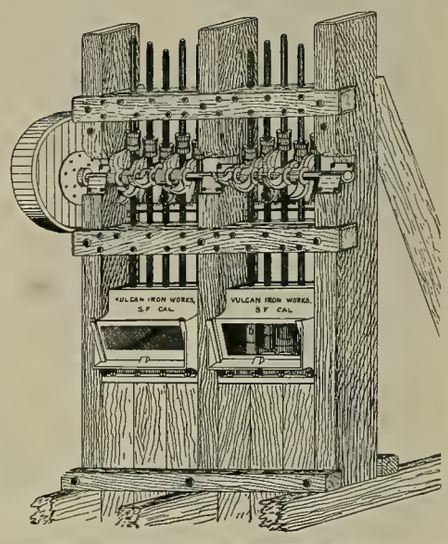
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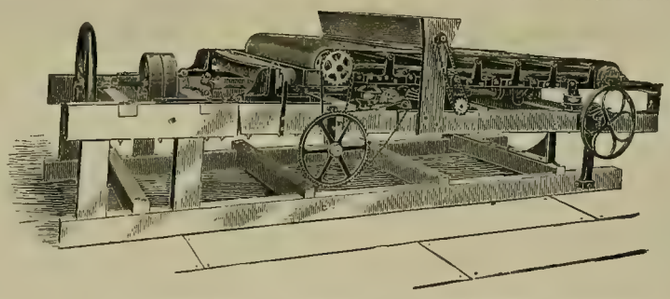
A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.

SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION.

CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH

Including prepared canvas belt 4 ft. 6 ins. wide.



FALES MINE, IGO, SHASTA CO., CAL., May 25th, 1893.

THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,

E. L. BALLOU, Propr. Ballou Reduction Works.



NOTICE TO GOLD MINERS!

## SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

## San Francisco Novelty and Plating Works

Incorporated.

☛ SEND FOR CIRCULARS. 68, 70 and 72 First Street, San Francisco, Cal.

## Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH

—AGENT FOR—

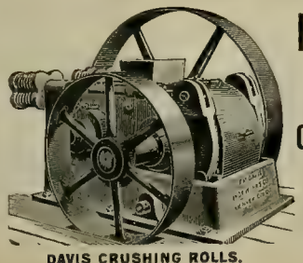
Hoskins' Hydro-Carbon Assay Furnaces.

# RIX COMPRESSED AIR MACHINERY CO.

MANUFACTURERS OF

## AIR COMPRESSORS AND ROCK DRILLS,

OFFICE AND WORKS—11-13 FIRST STREET, SAN FRANCISCO.



DAVIS CRUSHING ROLLS.

—THE—

## F. M. Davis Iron Works Co.

MANUFACTURERS OF

Concentration, Chlorination, Cyanide and Amalgamation Machinery.

Complete Plants for Ore Treatment

High Class Machinery and Experienced Modern Engineering.

WRITE FOR OUR PUBLICATIONS.

OFFICE AND WORKS:

723 to 743 Larimer Street, DENVER, COLO.

# MINE BELL SIGNALS.

Adopted, Used and In Force in Accordance with State Law.

FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.

# Market Reports.

## The Markets.

SAN FRANCISCO, Feb. 13, 1896.

There is a general advance to note this week.

The Wire Nail Manufacturers' Association has addressed a circular to the jobbing trade, giving notice of another advance in prices of 15 cents per cwt. This will change the base rate from $2.25 to $2.40 per cwt., which is the highest price asked for wire nails in many years. Only a year or so ago the base price was 85 cents.

Wire nails were worth $2.10 per keg on January 1, 1892. By reducing the tariff the price got up to $2.53 per keg on January 1, 1896. With absolute free trade we may reach the old ante-bellum price of 17 cents a pound for wire nails.

According to Messrs. James Lewis & Son, of Liverpool, English and French consumption of copper for the year 1895 amounted to 93,350 tons, against 88,209 tons for 1894, an increase of 5,141 tons.

The United States production for 1895 was the largest in the history of the copper industry, viz: 383,190,080 pounds.

Under date of the 3d, D. Houston & Co. of New York write: Exports of copper from the United States during January amounted to 8456 tons. European copper statistics show an increase in stocks per cable to-day of 210 tons, and in visible supply of 110 tons during the last half of January. Total visible supply February 1st, 46,140 tons. The London market for G. M. copper closed to-day at £43 17 6 spot, and £44 5 0 futures. Sales, 150 tons spot, and 450 tons futures. The market for copper here presents some irregular features, with Lake quoting 10½@10⅝ cents; electrolytic 9⅞@10 cents, and casting 9¾ cents.

### New York Metal Market.

NEW YORK, Feb. 13.—PIG IRON—Southern, 12@13.00; Northern, 13@13.50.
COPPER—Brokers', 10¼c; exchange, 10½c.
LEAD—Brokers', $3.00; exchange, $3.15.
TIN—Straits, 13c@13.50c.
SPELTER—Domestic, $4.00.

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.86¾ |
| London Merchants | $4.84½ |
| London Sight Bankers | $4.89 |
| Refined Silver, per oz., 1000 fine | 67⅝c |
| Mexican Dollars | 54¼c |

### New York Silver Prices.

NEW YORK, Feb. 13.— Following are the closing prices for the week:

| | Silver in— London. | N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 30⅜ | 67⅛ | 10 00 | ..... |
| Saturday | 30⅜ | 67¼ | 10 20 | 3 00 |
| Monday | 30⅞ | 67⅜ | ..... | 3 10 |
| Tuesday | 30⅞ | 67⅜ | 10 25 | ..... |
| Wednesday | 30⅞ | 67⅜ | ..... | 3 12½ |
| Thursday | 30⅞ | 67½ | 10 25 | ..... |

### San Francisco Metal Market.

| | | | |
|---|---|---|---|
| **COPPER.** | | | |
| Bolt | ¼ & 5-16, 21c; ⅜ and larger, 18c | | |
| Lake Superior Sheathing | | 23 @ | — |
| Ingot, jobbing | | — @ | 19 |
| Ingot, wholesale | | 18 @ | — |
| Sheet copper | | — @ | 18 |
| **ZINC.** | | | |
| Sheet | | 9½@ | |
| **LEAD.** | | | |
| Pig | | — @ | 3 90 |
| Bar | | — @ | 4 15 |
| Sheet | | — @ | 5 50 |
| Pipe | | — @ | 4 75 |
| **SHOT.** | | | |
| Drop, sizes *smaller* than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and *larger* sizes, " " | | | 1 65 |
| Buck, Balls and Chilled, do, " " | | | 1 65 |
| **IRON.** | | | |
| American Soft | | 22 00 @ | 26 00 |
| Pig, per ton | | 18 00 @ | 20 00 |
| **STEEL.** | | | |
| English, lb | | 16 @ | 19 |
| **COKE.** | | | |
| Gas Companies' | | 75c ₱ | bbl. |
| English, to load | | 9 00 @ | 10 00 |
| " spot, in bulk | | — @ | 13 00 |
| " in sacks | | — @ | 15 00 |
| Cumberland | | 9 00 @ | — — |
| **ANTIMONY.** | | | |
| Per lb | | — @ | 10 |
| **PIG TIN.** | | | |
| Per lb | | 15 @ | 16 00 |
| **QUICKSILVER.** | | | |
| Home trade, per flask | | 39 00 @ | 40 — |
| **BORAX.** | | | |
| Refined, in car lots | | — @ | 5½ |
| Refined, in sacks and barrels | | — @ | 5⅝ |
| Powdered, in car lots | | — @ | 5⅝ |
| Concentrated, " | | — @ | 4⅞ |
| **TIN PLATE.** | | | |
| Per bx | | 4 75 @ | 5 00 |
| **NAILS.** | | | |
| Wire | | | $3 00 |
| Cut | | | 2 80 |
| **LUMBER.** | | | |
| SAN FRANCISCO—WHOLESALE. | | | |
| Redwood, Fluming | | 17 00 @ | — — |
| Pine | | 13 00 @ | 18 00 |
| Spruce | | 25 00 @ | 30 00 |
| **COAL.** | | | |
| SPOT FROM YARD—PER TON. | | | |
| Wellington | | | $ 8 00 |
| Greta | | | 6 50 |
| Nanaimo | | | 7 00 |
| Gilman | | | 6 50 |
| Seattle | | | 6 00 |
| Coos Bay | | | 5 00 |
| Cannel | | | 8 50 |
| Egg, hard | | | 10 00 |
| Wallsend | | | 7 50 |
| Scotch Splint | | | 7 50 |
| Brymbo | | | 7 50 |
| TO ARRIVE—CARGO LOTS. | | | |
| Australian | | | 5 50 |
| Liverpool Steam | | | 6 00 |
| Scotch Splint | | | 6 50 |
| Cardiff | | | 6 25 |
| Lehigh Lump | | | 9 00 |
| Cumberland | | | 13 50 |
| Egg, hard | | | 10 00 |
| West Hartley | | | 6 50 |

## Mining Share Market.

SAN FRANCISCO, Feb. 13, 1896.

The north end shares sold down, with sales of Con. Virginia made at $1.95. On Monday afternoon the north ends strengthened slightly, but were weaker again Tuesday. Yesterday more strength was noted. The market still lacks the element of strength which would point to more active and much better figures. It wobbles too much, as if moneyed men were not giving it support, and in the absence of the latter no pronounced move need be looked for. Why they hold back is not difficult of seeing, and it lies in the lawsuits brought and the one still in court. All the suits brought have met defeat except the Hale & Norcross, and this will probably go the way of the others unless there is a miscarriage of justice. The defense in this case have made a strong showing, and well-informed lawyers and experienced and unbiased mining men think that the plaintiffs have lost their case. If this should prove to be the case, then it is reasonable to conclude that moneyed men will be more apt to come in the market and back up several good showings with twenty-dollar pieces. The last few years' experience has shown that it is not so much the mines as proper manipulation and moneyed backing that make good-sized deals. Men with their millions of dollars will not go into anything that promises lawsuits and losses. With the dog-in-the-manger parties quieted by law, then those who can and would do something have inducement to enter the market. With leaders, others will follow. There is plenty of money on the outside which only awaits an opportunity to present itself for a speculative gambler. The history of the Comstock shows that, however much dealing in the mining shares has been condemned and men state they would not invest, yet they forget themselves and venture in when the market is made active and attractive by higher and fluctuating prices. The two latter have never failed to draw in outsiders. The mines are unquestionably in splendid condition for working, and with more miners put on in two or more of the mines, ore strikes of some importance would follow. As it now is, the work in about all, if not in all, is being done in a kind of killtime way, and this never pays.

At this writing it looks as if the market will sell at still better prices, and then go off. It also looks as if some of the shares, notably those of the north end mines, will have to sell still lower, but how much it is hard to say. To hold the down move, Con. Virginia and some of the others will probably be assessed soon.

From the mines the favorable advices heretofore reported continue to come to hand. In the Alta group it looks as if the managers are trying to see how much a showing of work can be made without much being done. In the Gold Hill group Overman seldom finds mention in official published reports. In this mine some good work is being done. In Crown Point the work to the east ought to show results before the spring months pass. In Seg. Belcher and Belcher the work is being pushed slowly, but as it is to the west it is in the right direction. The west workings in Crown Point are seldom mentioned. It is to the west where the best results are looked for. In Yellow Jacket the work being done ought to show up something before many weeks pass. Experienced miners are watching it with considerable interest. The west workings on the upper levels in Challenge and Confidence do not attract much attention, yet they are quite important. The same can be said of Con. Imperial. In Alpha there is a promising outlook for better things before long, provided the work is not stopped or turned. In the middle group of mines there is nothing new to report. Ore extracting continues, and some interesting prospects are being followed. It looks very much as if in at least two of these mines much better things can be looked for with great confidence before the summer months. Hale & Norcross is said to be more than paying expenses, and if the lawsuit was decided and well out of the way better prices for the shares would rule. In Gould & Curry and Best & Belcher the work under way is essentially unchanged. The work going on in Con. Virginia is on two levels and takes quite a force of men, which is eating up the surplus funds in the absence of ore extracting. Old miners are disappointed in an ore body not being struck before this, but the company made an assessment strike and is in a fair way of making another before long. These are indispensable luxuries for the managers, if they are not for the shareholders. The work in Ophir and Mexican is essentially unchanged, and can remain in that delightful condition for many months to come if it so desired. The same remarks can be applied to Union and Sierra Nevada.

The work on the Brunswick lode does not "pan" out so well as many had been led to believe, yet they express confidence in the future. It is to be hoped they will not be disappointed. There can be no doubt of work being actively pushed, and if there is anything of importance to be found it will be discovered. Many miners have confidence that this lode will yet surprise the street; so far the surprises have been in the regularity of the assessments, but it takes money to run a mine. The Occidental mine is most promising at present.

From the Bodie district nothing of interest comes to hand. Not even an assessment has been levied, so as to break the monotony of events. These mines are very economically handled, which reflects credit on the management; but this is small comfort to shareholders who are expecting an ore strike. Possibly this will come in the course of human events.

The following illustrates the changes of the week:

| MINES. | Feb. 6. | Feb. 13. |
|---|---|---|
| Alpha | ..... | ..... |
| Alta Consolidated | $ 07 | $ 15 |
| Andes | 17 | ..... |
| Belcher | 28 | ..... |
| Best & Belcher | 84 | 78 |
| Bodie | ..... | 35 |
| Bullion | ..... | 14 |
| Challenge | 36 | 41 |
| Chollar | 64 | 66 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 2 20 | 2 05 |
| Consolidated New York | ..... | ..... |
| Crown Point | 19 | 18 |
| Exchequer | 06 | ..... |
| Gould & Curry | 45 | 43 |
| Hale & Norcross | 1 20 | 1 25 |
| Justice | ..... | ..... |
| Mexican | 60 | 58 |
| Ophir | 1 35 | 1 30 |
| Overman | ..... | 16 |
| Potosi | 55 | 53 |
| Savage | 51 | 47 |
| Sierra Nevada | 42 | 42 |
| Union | 36 | 34 |
| Utah | 11 | 10 |
| Yellow Jacket | ..... | 40 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, Feb. 13, 1896.

9:30 A. M. SESSION.

| | | | | | |
|---|---|---|---|---|---|
| 300 | Alta | 15 | 200 | Hale & Norcross | 1 25 |
| 100 | Bodie | 35 | 100 | Mexican | 58 |
| 100 | Challenge | 41 | 150 | Ophir | 1 30 |
| 300 | Chollar | 66 | 50 | Sierra Nevada | 42 |
| 300 | Gould & Curry | 43 | | | |

SECOND SESSION—2:30 P. M.

| | | | | | |
|---|---|---|---|---|---|
| 200 | Mexican | 58 | 100 | Yellow Jacket | 40 |
| 400 | Gould & Curry | 41 | 600 | ..... | 39 |
| 300 | Best & Belcher | 78 | 100 | Sierra Nevada | 41 |
| 100 | ..... | 77 | 200 | Bullion | 14 |
| 500 | C. C. & Va | 2 05 | 200 | S Belcher | 09 |
| 600 | Savage | 47 | 100 | Overman | 16 |
| 100 | Chollar | 63 | 400 | Union | 34 |
| 50 | ..... | 62 | 100 | Challenge | 40 |
| 100 | Potosi | 53 | 400 | Occidental | 1 05 |
| 40 | ..... | 51 | 200 | Mayflower | 1 55 |
| 50 | Crown Point | 18 | 500 | Utah | 10 |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., February 12, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| CALIFORNIA STATIONS. | Total Rainfall for the Week. | Total Seasonal Rainfall to Date. | Total Seasonal Rainfall Last Year to Same Date. | Average Seasonal Rainfall to Date. | Maximum Temperature for the Week. | Minimum Temperature for the Week. |
|---|---|---|---|---|---|---|
| Eureka | ..... | 24.73 | 29 23 | 25.39 | 52 | 38 |
| Red Bluff | ..... | 13.83 | 23 73 | 16 26 | 64 | 36 |
| Sacramento | ..... | * | 20.62 | 11 61 | * | 40 |
| San Franc'co | ..... | 12.42 | 20.63 | 15.72 | 64 | 46 |
| Fresno | ..... | 4.09 | 10.17 | 5.76 | 64 | 34 |
| S. L. Obispo | ..... | 12.25 | 21.26 | * | 68 | 34 |
| Los Angeles | ..... | 5.91 | 11.38 | 11.20 | 76 | 40 |
| San Diego | ..... | 2.82 | 9 87 | 3.89 | 70 | 38 |
| Yuma | ..... | .46 | 2.99 | 2.39 | 76 | 34 |

* Indicates no record.

## DELINQUENT SALE NOTICE.

ANCHOR COAL AND DEVELOPMENT COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Kelso, Cowlitz county, Washington.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 6) levied on the 2d day of January, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| B. E. Loomis | 845 | 5 | $ 15 |
| J. A. Christian | 155 | 500 | 15 00 |
| J. A. Christian | 156 | 500 | 15 00 |
| Mrs. Edith Grey | 222 | 100 | 3 00 |
| Mrs. Edith Grey | 223 | 100 | 3 00 |
| Geo. E. Alexander | 670 | 200 | 6 00 |
| Geo. E. Alexander | 671 | 500 | 15 00 |
| Geo. E. Alexander | 707 | 225 | 6 75 |
| C. S. Capp | 838 | 5 | 15 |
| Geo. F. Tuttle | 214 | 1,000 | 30 00 |
| Geo. F. Tuttle | 215 | 1,000 | 30 00 |
| Geo. F. Tuttle | 681 | 400 | 12 00 |
| Geo. F. Tuttle | 683 | 500 | 15 00 |
| James E. Ager, Trustee | 651 | 500 | 15 00 |
| W. H. Gregory | 688 | 500 | 15 00 |
| W. H. Gregory | 689 | 500 | 15 00 |
| W. H. Gregory | 697 | 500 | 15 00 |
| Wm. Lynch | 705 | 150 | 4 50 |
| John Tarpley | 706 | 125 | 3 75 |

And in accordance with law, and an order from the Board of Directors, made on the 2d day of January, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, No. 632 Market St., room 5, San Francisco, California, on THURSDAY, the 5th day of March, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. D. FARISH, Secretary.

Office, No. 632 Market street, Room 5, San Francisco, California.

# MINING SHAREHOLDERS' DIRECTORY.

### ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alta S M Co, Nev | 51 | 10c | Jan 13. | Feb 17. Mar 9. | J E Jacobus, 309 Montgomery |
| Andes Silver M Co, Nev | 42 | 15c | Jan 30. | Mar 6. Mar 28. | J W Twiggs, Nevada Block |
| Bay State M & D Co, Cal | 30 | 2c | Feb 1. | Mar 9. Mar 28. | F E Luty, 330 Pine |
| Bulwer Con M Co, Cal | 12 | 5c | Feb 5. | Mar 11. Apr 3. | J E Jacobus, 309 Montgomery |
| Challenge Con M Co, Nev | 20 | 5c | Dec 20. | Jan 22. Feb 12. | C L M'Coy, Mills Building |
| Clara G M Co, Cal | 1 | 3c | Dec 17. | Jan 30. Feb 20. | C M Cross, Chronicle Building |
| Crown Point G & S M Co, Nev | 66 | 25c | Jan 16. | Feb 20. Mar 12. | Jas Newlands, Mills Building |
| Evening Star M Co, Cal | 2 | 10c | Dec 14. | Jan 22. Feb 15. | M G Loefler, 137 Montgomery |
| Gray Eagle M Co, Cal | 42 | 5c | Jan 6. | Feb 7. Mar 3. | W J Gurnett, 308 Pine |
| Gold Bar Con M Co, Cal | 3 | 5c | Feb 10. | Mar 19. Apr 10. | E C Godfrey, 38 Crocker Building |
| Home G M Co, Cal | 9 | 5c | Dec 24. | Feb 1. Feb 19. | O E Johnson, 315 Front |
| Julia Con Co, Nev | 27 | 5c | Jan 17. | Feb 20. Mar 11. | J Stadtfeld, Jr, 309 Montgomery |
| Justice M Co, Nev | 60 | 10c | Jan 13. | Feb 17. Mar 9. | R E Kelly, 309 Montgomery |
| Lady Washington Con Co, Nev | 11 | 5c | Jan 16. | Feb 17. Mar 10. | J E Jacobus, 309 Montgomery |
| Mono G M Co, Cal | 36 | 10c | Dec 30. | Feb 2. Feb 25 | M E Willis, 309 Montgomery |
| Orleans Mining Co, Cal | 1 | 10c | Jan 21. | Feb 29. Mar 24. | W Olney, 101 Sansome |
| Red Jacket Con M Co, Nev | 3 | 1½c | Dec 18. | Jan 27. Feb 17. | S M Capp, 413 Montgomery |
| Savage M Co, Nev | 88 | 20c | Jan 4. | Feb 6. Feb 26. | E B Holmes, 309 Montgomery |
| Sierra Nev S M Co, Nev | 110 | 25c | Feb 3. | Mar 7. Mar 27. | E L Parker, 309 Montgomery |
| Silver King M Co, Arizona | 13 | 25c | Jan 28. | Mar 9. Apr 6. | J W Pew, 310 Pine |
| Union Con M Co, Nev | 52 | 20c | Jan 14. | Feb 17. Mar 17. | A P Swain, 309 Montgomery |

### MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Standard Con M Co. Cal | J W Pew, 310 Pine | Feb 17 |
| Watt Blue Gravel M Co, Cal | G A Berton, 323 Montgomery | Feb 17 |

# Assessment Notices.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 10th day of February, 1896, an assessment (No. 3) of 5 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 38 Crocker Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 19th day of March, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 10th day of April, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. C. GODFREY, Secretary.

Office, 38 Crocker Building, San Francisco, California.

ANDES SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 30th day of January, 1896, an assessment (No. 42), of 15 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, No. 22 Nevada Block, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of March, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 28th day of March, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

JNO. W. TWIGGS. Secretary.

Office—No. 22 Nevada Block, San Francisco, California.

JUSTICE MINING COMPANY. — Location of principal place of business, San Francisco, California; location of works, Gold Hill, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of January, 1896, an assessment (No. 60) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, No. 309 Montgomery street, Room 23, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of February, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 9th day of March, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

R. E. KELLY, Secretary.

Office—No. 309 Montgomery street, Room 23, San Francisco, California.

ALTA SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Gold Hill Mining District, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 13th day of January, 1896, an assessment (No. 51) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 33, Nevada Block, No 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 17th day of February, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 9th day of March, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. E. JACOBUS. Secretary.

Office—Room 33, Nevada Block, No. 309 Montgomery street, San Francisco, California.


## A SMALL COMPANY FOR ALASKA GOLD MINES.

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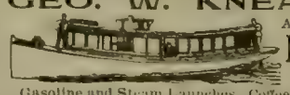
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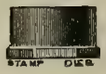
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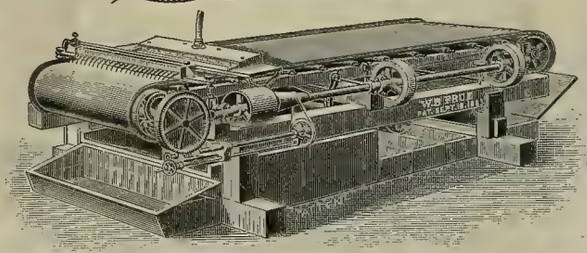
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## AND PACIFIC ELECTRICAL REVIEW.

VOLUME LXXII. Number 8. WHOLE NUMBER, 1564 SAN FRANCISCO, SATURDAY, FEBRUARY 22, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.


### An Interesting Example of Ropeway Practice.

A Vulcan ropeway has just been started in operation at Empire, Nevada, that merits more than a passing attention, both by reason of special features of construction and ingenuity of mechanical detail, but more particularly on account of the economy of operation, resulting in a very low cost per ton for transportation, due to the extent to which automatic appliances have been used in this ropeway for the loading, carrying and dumping of the material conveyed, those automatic features including the Vulcan automatic loader and the Vulcan automatic dumping device. This ropeway is used for conveying 200 tons of tailings daily from the dumps or bed of tailings to the Mexican mill, a distance of a little less than a mile. It is the purpose to treat these tailings, of which there is an accumulation of several hundred thousand tons, by a new process, which results in the recovery of a large portion of the precious metal yet contained in these tailings, and which has hitherto been considered as beyond recovery and valueless. Fig. 1 gives a good general idea of the nature of the ground on which this ropeway is erected, this photo being taken looking from the Mexican mill. It will be seen that the ground is level or nearly so, and that the ropeway crosses a river (the Carson). Particular attention may be called to the fact that the ropeway runs in a straight line to the point marked "turn" (Fig. 1), and there makes a turn or angle of 60 degrees, running thence directly to the point marked "loading terminal," where the tailings are loaded onto the ropeway.



FIG. 1.—GENERAL VIEW OF ROPEWAY.



FIG. 2.—LOADING TERMINAL.

The method of making the turn is illustrated by Fig. 3, on page 145. The main point to be considered in planning a turn is that the hangers of the buckets must be kept on the outside of the rope when going around a horizontal sheave, *i. e.*, must not come between the rope and the sheave. If a turn could be made by placing a horizontal sheave in the inner angle of the outgoing rope, and likewise one in the inner angle of the incoming rope, it would be a simple matter to so make a turn. In fact, however, it is possible to so place only one such sheave and thus make a turn directly with one of the ropes. To satisfy the previously mentioned condition, it is necessary to construct a number of sheave structures outside of the line of ropeway proper, the purpose of these structures being to so lead and change direction of the other rope that it will finally start in its proper direction in the line of ropeway, with the buckets on the outside of the rope. These various sheave structures are shown in Fig. 3. (See page 145.)

The method of loading the buckets is of special interest and is one of the important features of the Vulcan ropeway. This loading is done at the loading terminal, shown in Fig. 2, and which consists of the terminal machinery and framework proper, an automatic loader, a small storage bin of about twenty tons capacity to supply the loader and an elevator to raise the tailings from the ground into the bin. A sectional drawing of such an arrangement is shown in Fig. 4 (see page 145), except that Fig. 4 shows the ordinary case of the storage bin filled directly by the ore cars from the mine.

In the ropeway we are describing, the tailings, as they are brought to the loading terminal, are dumped into the boot of the endless chain-bucket elevator, and from thence elevated to a height of some thirty feet and dropped into the bin.

The loader consists briefly of the stationary hopper *D* (Fig. 4), the traveling hopper *C*, and means whereby an exact load for a bucket on ropeway *B*, and that is contained in stationary hopper *D*, is automatically transferred to the traveling hopper *C*, and from hopper *C* to the ropeway bucket. All this is accomplished by one man, who handles the lever *E*, which controls the gate of the storage bin.

The elevator and automatic loader are both driven by means of gearing from terminal machinery proper.

The buckets, loaded in the manner just described, and fastened to the endless moving wire rope, are carried into the mill building and there dump their loads of tailings, automatically, into the large storage bins inside the mill. This ropeway, being built on a practically level country, has to be operated by some auxiliary power, and hence is connected to the mill machinery by a ropedrive, about 8 H. P. being required in all.

The total operating expense for loading, transferring and dumping the 200 tons daily is stated to be the labor of one man plus the cost of 8 H. P., which would figure out about 2½ cents per ton.

The total cost of the ropeway erected in running order, but not including freight, was approximately $9000.

We add to the illustrations of this ropeway a cut (Fig. 5, on page 145) showing the delivery or lower terminal of a ropeway, placed inside a mill building, and so as to permit the buckets of ropeway to dump directly onto the grizzly, or grizzlies, as the case may be. The Vulcan ropeway is built by the Vulcan Iron Works of San Francisco, which makes a specialty of ropeways, in connection with its business of building mining machinery in general.

Many of these Vulcan ropeways are in use on the Pacific coast, and in Mexico, etc.—one having been recently completed and started in successful operation at the mine of the Bald Mountain Mining Co., Montana.

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TWENTY-FIVE years ago to-day—Feb. 22, 1871—the corner stone of the "new City Hall" in this city was laid. The structure was to cost $2,000,000. It has cost over $5,000,000 and is not yet finished.

SEDUCTIVE statements are being made regarding an alleged "California Exhibition" in New York City, next May; among other things it is represented as being under the auspices of the California Board of Trade. It is a private affair, has a suspicious look, is in no way endorsed by any California commercial body and intending exhibitors should know something more positive about it before paying for space. It may be a worthy scheme, but it claims too much and has a shaky appearance.

IN last week's issue appeared on page 130 a list of dividends paid by incorporated American mining companies in 1895, in which California was credited with dividends aggregating $557,110. In answer to sundry hasty criticisms received, it is but necessary to point out that the list distinctly included only *incorporated* companies. It is not "the fashion" to incorporate gold mining companies in this State, the biggest, best and oldest producers are not owned by incorporated companies, and hence, the dividends declared by them were not included in that list which was only of incorporated companies. This has all been said before, but it is in order now to say it again.

IF, as claimed, it has been successfully demonstrated that the cathode or X rays used by Prof. Roentgen to produce photographs of the interior portions of the human body, and to photograph ordinary objects through opaque substances, can be focused, a most important discovery is made in connection with these wonderful scientific experiments which will make it more valuable. By being able to focus the rays, any particular organ of the body may be photographed without the surrounding tissues being shown. A St. Louis, Mo., dispatch says Dr. Wellington Adams and Prof. Nipher of Washington University have been thus experimenting with the Roentgen system of photography, and have succeeded, yet from the nature of the shadows (for shadows only they are) and their method of production, it seems impossible to talk of a focus in connection with the matter.

AMONG the most important investigations which are being conducted with a view of determining the value of the Roentgen rays are those made by Mr. Charles M. Scribner of the Western Electric Company in their laboratory at Chicago. "I am particularly interested," says Mr. Scribner to the representative of the MINING AND SCIENTIFIC PRESS, "in ascertaining the worth of the process considered from an industrial standpoint. If I can be able to say to my company, 'This shaft has a flaw in it,' or, 'The composition of that metal is imperfect,' my work will be of a value scarcely to be estimated. This will, I believe, soon be determined. Every day some new development is recorded. The first plate I made was so inferior to those sent me from Germany that I concluded the German photographs had been retouched. After three days, however, I had made as good photographs as any of those imported."

PARTS III and IV of the sixteenth annual report of the U. S. Geological Survey for 1894-95 are received. Part III is devoted to the metallic products, part IV to the non-metallic products. Of part III the first 217 pages are devoted to an exhaustive discussion of the production of iron ores in various parts of the world, a reconnaissance of the gold fields of the southern Appalachians occupies the next seventy-two pages, the next thirty-seven pages are taken up with a dissertation on copper, and articles on lead and zinc occupy the next thirty-two pages. The best article on manganese that has so far come under our observation takes up from page 389 to page 457, the production of tin is given the succeeding seventy-eight pages, aluminum and bauxite have fifty-seven pages, quicksilver nine pages, and chromium, tungsten, antimony and platinum occupy the remaining twenty-five pages of a work that is a model production in every respect; the tables, maps, statistics and descriptive information make the book valuable. Part IV, a companion volume, is of equal value as regards the non-metallic mineral products of the country. To coal and coke are surrendered 300 pages, petroleum has eighty-nine pages, stone has nearly 100 pages, and the clay industry is given corresponding space. The volumes are admirably indexed, and the arrangement of their contents reflects credit on Dr. David T. Day, chief of division. The volumes can be procured through members of the California Congressional delegation.

THE mineral land bill passed the House of Representatives without dissent on the 17th inst. It is now in the hands of the Senate Committee on Public Lands, and when passed by the Senate and signed by the President will become a law. The present bill is not as satisfactory as the last one commented on. The Johnson bill, as noticed last week, was about right. The bill which passed last Monday is really a substitute measure introduced by Congressman Bowers on the 11th inst., as H. R. 5819. There are some changes in it as to the definition of what constitutes mineral land, the section in the bill passed being susceptible of different interpretation from the wording of the Johnson bill in that regard. The Johnson bill provided that all the twelve Commissioners should be residents of this State: the Bowers bill requires that but one of each of the four Boards of three Commissioners each shall be a resident of California. There are other changes, but the two indicated are believed to be the most important. Secretary of the Interior Smith is not satisfied with the bill and may want to make further modifications and changes in it. However, as it now stands it is probably the best that can be done, and for this reason should, we think, meet with the approval and endorsement of the miners. To amend it now would mean that it would have to again run the gauntlet of the House; then, if not approved, a conference committee would have to be appointed, composed of members from the Senate and House, and the result of their agreement (if they did agree) would have to be passed by both Houses before being submitted to the President for his signature. Hence as there is no active Congressional opposition to it in its present shape, and there is a strong probability of its becoming a law, it is, probably, better to acquiesce and do all possible to have it pass the Senate and receive the Presidential signature.

AT the greatest depth ever attained by miners in the history of the world, the miners in the vertical Red Jacket shaft of the Calumet & Hecla copper mine have stopped sinking at a depth of 4900 feet, as this is the required depth necessary for this company to reach the limit of its underground territory. (The No. 3 and No. 4 shafts of the Tamarack mines had to be sunk nearly this enormous depth before the copper-bearing conglomerate was reached.) The Red Jacket shaft is the largest and best constructed mining shaft in the world. Its inside dimensions are 14x 22½ feet, divided into six compartments and timbered throughout with pine. President Agassiz, in his report for 1893, stated that "the Red Jacket vertical shaft was planned after the two mine fires of 1887, in order to insure against the loss of the northern extremity of the mine, in case of a similar disaster in the future, and to give access to the lower levels of the mine." The shaft was started in the fall of 1889. He further states "that nothing but the losses incurred by the succession of fires from 1884 to 1888 would have warranted us in starting so expensive an undertaking, and one of so doubtful utility, for the ordinary working of so narrow a belt as the Calumet conglomerate, which can be worked far more economically by slopes such as we have laid out in the South Hecla." The new shaft-rock house, which will be built of iron and will be made fireproof throughout, is the only part of the work necessary to put this deep shaft in commission, as the hoisting machinery, which consists of two pair of triple expansion engines of 3000 H. P. per pair, and will hoist a load of ten tons 60 feet per second, was planned and put in place while the sinking of the shaft was going on. With the exception of the terrible accident caused by the engineer pulling the cage up to the roof of the shaft, and by which ten miners were dashed to atoms at the bottom, no other serious fatality occurred.

## U. S. Gold Product for '95.

Full returns of the gold production of the United States for 1895, received by telegraph at the Mint Bureau, afford a total of $53,031,800. This is an increase of about 35 per cent over the production of 1894, which was $39,500,000, and a still larger percentage over the production of 1893, which was $35,995,000.

The estimate for 1895 has not yet been fully accepted by Director Preston. He is still unwilling to place the final verification figures higher than $48,000,000, and declares that the production will range between this maximum and $46,500,000, as a possible minimum. The reports from the special agents, which make up this total, are always subject to comparison with the deposits of gold at the mints and assay offices and with the product of private refineries. The final results usually reduce the estimates of the agents about 10 per cent, which would leave the production of 1895 close to $48,000,000.

The most recent reports have not been received from Arizona nor Michigan, but the figures given below for these communities are based upon earlier reports during the year or upon the figures of 1894. There has always been some trouble at the Mint Bureau regarding the figures from Oregon and Washington, and one of the agents puts them at $1,281,600 and $206,700, respectively, instead of the figures given in the table. The table represents, however, the official estimates of expert employes of the Mint Bureau, and presents a more accurate view of the production of 1895 than has ever before been presented so promptly at the close of a calendar year. The value of the production of gold, by States and Territories, for the past two years, foots up as follows:

| *States and Territories.* | *1894.* | *1895.* |
|---|---|---|
| Alaska | $1,113,550 | $1,500,000 |
| Arizona | 1,784,485 | 2,500,000 |
| California | 13,579,397 | 15,600,000 |
| Colorado | 9,491,514 | 15,000,000 |
| Idaho | 2,081,281 | 2,790,700 |
| Michigan | 44,444 | 50,000 |
| Montana | 3,651,410 | 4,392,600 |
| Nevada | 1,137,819 | 1,700,000 |
| New Mexico | 567,751 | 1,075,000 |
| Oregon | 1,422,056 | 2,200,000 |
| South Dakota | 3,299,100 | 4,255,000 |
| Utah | 868,031 | 1,352,300 |
| Washington | 195,100 | 300,000 |
| Appalachian | 273,072 | 316,200 |
| Totals | $39,500,000 | $53,031,800 |

If these figures are borne out by the final reports, the year 1895 will occupy a unique place in the history of the production of the precious metals.

Previous estimates which have put the gold production of the United States at $46,000,000, have put that of the world at $200,000,000. The present increase in American production will carry the total for the world to $205,000,000, as compared with $118,848,700 in 1890, $130,650,000 in 1891, $146,815,100 in 1892, $157,297,000 in 1893 and $179,965,600 in 1894.

Silver production in the United States has not fallen off so much as was anticipated, and the reports of the special agents put the figures for 1895 at about 51,000,000 ounces.

## Concentrates.

EIGHT diamond drills are in operation at Leadville, Colorado.

A POSTOFFICE has been established at Star, Tuolumne Co. Wilbur Long is postmaster.

LAST month the miners of Virginia City, Nev., subscribed $1424.50 to the orphan asylum there.

TO be in the fashion, St. Louis, Mo., sends word that a mining exchange is to be organized in that city.

THE Cripple Creek, Colorado, *Mail* of the 15th inst. contains 223 notices of application for U. S. mining patents, etc.

THE sale of the mining machinery belonging to the Gladstone mine, Shasta Co., took place yesterday at Redding.

THE Central Hill hydraulic mine, Nevada county, resumed operations this week under a permit from the Debris Commission.

SOME of the officers of the San Francisco Stock Exchange are organizing what is styled the Development and Investment Co.

THE Live Oak Consolidated Gold Mining Company has levied an assessment of ten cents per share, delinquent March 9.

THE California Mining Company, of Nevada County, Cal., has levied an assessment of two cents per share, delinquent March 12.

THE Argonaut shaft, Amador Co., has reached a depth of 1100 feet, with 100 feet more to go, when drifting to the ledge will be in order.

SUPERINTENDENT LAMAN of the Con. Cal. & Va. reports that the output of the mine for the past week had been 195 tons, assay $38.58 per ton.

L. A. DUNHAM, manager of the Revenue mine, Madison Co., is stated to be operating the only successful cyanide plant in the State of Montana.

A SHIPMENT of gold bars, valued at $87,500, being the product of a three months' run, was received this week from the Apollo mine of Alaska.

IT is estimated that over 1200 men have left Ballarat, Australia, and adjacent district during the past few months for Coolgardie and South Africa.

ARTICLES of association of the Leland Stanford Gold Mining Company, an English corporation, have been filed at Prescott, Arizona; capital, £60,000.

"THE manufacture of alkaline cyanide from black muck" will engage the attention of the American Cyanide Company, recently organized at Glenville, N. J.

THE Idaho & Pittsburg M. & M. Co. are about to buy the Phillips & Sullivan group on Florida mountain, Silver City, Idaho, and consolidate the two properties.

A NEW water-power hoist is building for the north shaft of the Kennedy mine, Amador Co. The shaft is now 2000 feet deep, and is to be carried down 200 feet farther.

BAKER CITY, Oregon, wants a chlorination plant built there and claims that sufficient mines exist in that vicinity to make such reduction works a paying investment.

"INQUIRER," De Lamar, Nevada, is informed that since Jan. 1st, 1888, silver's highest quoted price was on August 20th, 1890, when it sold for $1.19½. To-day it is 67¼c.

'TIS easy at present to dub a claim a "wild cat," but not always truthful. What was the wildest of wild cats yesterday may be a paying mine and a good buy to-morrow.

SUCH a flow of water was struck in the Hecla shaft at Mercur, Utah, one day last week, that the water overflowed the shaft and ran in a stream down the main street of the town.

EIGHT truckloads of dynamite exploded at Viedendorp, near Johannesburg, South Africa, last Wednesday, killing over 100 people, wounding 200 more and devastating the surrounding country.

POTTER & TIGNER, representing the Iowa Mining Co., of Des Moines, Iowa, have secured possession of the White Swan mine, Virtue district, Baker Co., Oregon, and will resume work thereon.

THE Le Roi Mining and Smelting Co., owner of the Le Roi mine at Rossland, B. C., has paid a dividend of 10 cents a share. The capital stock of the company is divided into 500,000 shares.

THE *Alaska Mining Record* tells all and sundry that no one should think of attempting the Yukon expedition "who is not possessed of an iron constitution, $500, and some knowledge of mining."

E. R. DODGE of Reno, Nev., has bonded all the placer claims in Sandorus district, Humboldt county, for Nevada men. Survey is making for a ditch from the Little Humboldt, twenty-two miles distant.

SOUTH AFRICA is not the only country where American miners get big salaries. General Manager Plummer, of the De Lamar Mining Co., Idaho, is credited with receiving an annual salary of $25,000.

"TO SETTLE A BET," it is stated that a ton of gold, troy, is worth $496,123.20; a ton of gold, avoirdupois, $602,921.93. When buying gold by the ton always insist on the seller furnishing it on the avoirdupois basis.

AT the Alaska mine, Pike City, Sierra Co., Cal., about twenty men are at present employed by the English company which recently bought the mine, repairing the mill and machinery. Active work will soon be resumed.

"NINETY-FIVE per cent gold and five per cent silver" is the alleged constituency of ore in a mine the stock of which is offered by a Chicago mining broker to a confiding public for the ridiculously low price of 2½ cents a share.

A SHASTA COUNTY subscriber writes that he "wouldn't be without that page of Concentrates for a dollar a copy." Glad he is so appreciative, but "Concentrates" believes the other nineteen pages are of equal value with this one to every mining man.

THE January cleanup at the South Eureka, Amador Co., yielded $11,000—nearly $15 per ton. The twenty-stamp mill only crushes thirty tons per day; the average crushing capacity of mills of modern construction is double that. The January run represents a net profit of $6000. A contract to sink the shaft 200 feet deeper was awarded last Wednesday at $13.80 per foot.

"SO FLEET the works of man back to earth again; ancient and sacred things fade like a dream." Suggested to the *Oasis* by the fact that in Prescott last week the sole remaining house in Arizona charging "two bits" a drink reduced its prices to twelve and one-half cents.

THE Good Hope Mining Company, Amador Co., has levied an assessment of five cents per share, to pay off its indebtedness. A meeting of stockholders has been called for the 21st day of April to consider the advisability of increasing the capital stock from 50,000 shares at $10 each to 700,000 at $1 each.

CONSIDERABLE hydraulic piping is sent from here to British Columbia, but that a good deal more is used is evinced by the fact that during 1895 twenty-five carloads of iron pipe were brought from the New England States to Ashcroft, B. C., the freight on which to Kamloops was over $10,000.

OREGON has a little mining "boom" at Gates, Marion Co., where several thousand dollars has recently been spent developing the Lawler group of mines. The ore is locally stated to exceed $15 per ton in average value. A stage line has been started from Lebanon and there is considerable stir.

F. D. NOWELL of Juneau, Alaska, is reported in the Alaska *News* to have bought eight claims on Sheep Creek, Alaska, for $200,000. F. C. Hammond is superintendent, and is credited with immediate intention to buy considerable in the way of stamps, concentrators, electrical appliances, drills, compressors, etc.

VERY little is being said and a good deal is being done at Keswick, Shasta Co., this State, where an English company paid $300,000 for a copper-gold property, put 1000 men to work, built a railroad 12 miles long, is putting in four smelters, has spent nearly a million dollars and will shortly begin shipping copper matte and making money.

DURING January, 1896, the Tacoma, Wash., Smelting and Refining Co. produced 3200 bars of bullion, weighing 328,071 pounds, containing 1433.70 ounces gold, at $20.67 per ounce, $29,634.58; 24,857.14 ounces silver, at 67 cents per ounce, $16,654.28; 326,268 pounds lead, at $2.95 per hundredweight, $9624.90, a total of $55,913.76.

OVER at Butte, Montana, the Union Iron Works of this city will shortly install the largest plant of hoisting machinery in the State, at the St. Lawrence mine for the Anaconda Co. It will be of 3000-horse power, will have a capacity for hoisting six cars of ore from a depth of 6000 feet in two and one-half minutes, the reels holding 6500 feet of 8-inch flat cable.

IT is soberly stated in the press dispatches that "a number of well-known New York capitalists have formed a company with $5,000,000 capital stock," to mine for diamonds in California. Diamonds have been found in various parts of this State, notably in El Dorado county; and if these New York men do sufficient development work, they can doubtless find some more.

LAST Sunday's San Francisco *Call* has an effective cartoon representing idle California mines, a safe marked "U. S. Treasury, empty," a giant ready to sluice the gold from the hills; in the foreground Uncle Sam seated dejected, a female figure typifying California standing by, leaning on a shield and saying "Open the mines and you will have no need to borrow gold."

T. L. FORD is working hard in Washington for the mining legislation delegated to him. If he can effectively aid in securing the passage of the appropriation bill he will be particularly fortunate, for this is a bad year for the most worthy measure in the national legislature, if it carries with it a dollar of appropriation out of the federal treasury. The justice and equity of the measure should ensure its passage.

THE Georgetown, Colo., *Courier* says that the owner of a lode in Clear Creek county, Colo., had some ore assayed which showed values in both gold and silver. But, whether because he was a disgusted silver advocate or a more than usually idiotic goldbug, he seemed displeased because the ore carried silver, and requested the assayer to make out a certificate showing only the gold value. He wanted to have nothing to do with silver.

A CABLEGRAM last Tuesday from the Rand, South Africa, says that John Hays Hammond and the other prisoners have been liberated by the Transvaal Government under $10,000 bail each. They will remain under police surveillance. The Robinson mill has shut down for lack of native labor. To a deputation representing 5000 of the Rand unemployed the Transvaal Government replied that it would do its best to relieve their situation.

BY a gas explosion in the Vulcan coal mine at Newcastle, Colo., last Tuesday, all the workmen in the mine, over forty in number, were instantly killed. All the buildings were wrecked. The reputed cause was a half-lighted fuse igniting the gas in one of the new chambers where the men were blasting down coal. The State Coal Mine Inspector had visited the mine on the 8th, ten days before the explosion, and pronounced everything in satisfactory condition.

CONGRESSMAN GROVE L. JOHNSON denies the statements wired here this week that he was opposing the national legislation asked for by the miners, and says he is in accord with the proposed measures. He pledged himself before the recent election and again at the Miners' Convention in this city last November, and says now that he will vote and work for the passage of the appropriation bill. The California delegation is united on this measure and there is good reason to look hopefully for its enactment.

THOUSANDS of old prospectors, and many more who are looking for gold ore for the first time, will be out this season in every part of the country. The old laws of supply and demand apply in this case. With gold at $20.67 per ounce, and silver the same minus the $20, with a gold mine worked more cheaply than a silver mine, and with little immediate prospect of favorable national legislation, no wonder that every nook of the coast is now being searched for gold-producing properties.

AN interesting discovery was made when the $1,300,000 in gold which was taken out of the stranded steamship St. Paul was received at the sub-treasury in New York. It turned out to be the identical gold that had been taken from the subtreasury only a few days previously. It had made the round trip to Europe and back, endured the peril of shipwreck and came into the treasury for examination again as fresh as foreign gold. It was no new revelation, however. It is a trick that has been played repeatedly.

OF SOME interest to mining machinery men is a decision last week of the Idaho Supreme Court. The Colorado Iron Works sold machinery to the value of $535 to William Reikenberg, of Owyhee county, Idaho, and brought suit to foreclose a mechanics' lien on certain property. The Supreme Court of that State holds that plaintiff was entitled to judgment for the amount, but was not entitled to a mechanics' lien, for the reason that there was no express contract that the goods were to be furnished for the particular "mine, mill or structure upon which the lien was claimed."

AMONG the probable "rushes" and "booms" this spring it is likely a good many are thinking of going to Alaska. Those who've been there and who are entitled to credence, and who are not interested in steamship or transportation companies, say "go slow." There will be many a disappointed man, many will lose all they have now, and more than one poor fellow will lose his life. It is not a poor man's country and no one should think of going unless prepared in every way for toil, hardship and exposure.

SOME of the Western roads are stirred up over the invasion of their territory by the seaboard air line. That road carried last week a large party of miners from Denver to New York, with the object of participating in the opening of the New York Mining Exchange. The Western roads offered the party a rate of $63 for the round trip. The seaboard air line took it for $50 each for the round trip. It made a combination with the Denver & Gulf and the Southern Pacific and took the party via New Orleans. The other roads are worked up over the incident, their ire being aroused on account of the invasion of their territory more than over the loss of the business.

A CALLED MEETING of the Executive Committee of the State Miners' Association was held in the Union League Club rooms last Wednesday evening. Secretary Sonntag read a series of resolutions passed by the Sacramento Chamber of Commerce promising support to any bill now before Congress which would not in their judgment be detrimental to the interests of valley residents. A resolution drafted by S. B. Christy was adopted, acknowledging the receipt of the resolutions, asking for copies of the river improvement bill for examination, and reciprocating in courtesy the Sacramento communication. A resolution offered by J. M. Wright was adopted, authorizing the appointment by President Neff of a committee of five to pass upon the qualifications of applicants for Commissionerships, and make recommendation thereon in the event of the pending mineral land bill becoming a law. Inquiry was made as to Congressman Johnson's attitude toward the miners, Delegate Ford's actions were endorsed, and an appeal ordered made to the several county organizations for funds which which to defray his necessary expenses.

A MAN with a "divining rod" was reported dousing out on the Comstock this week. There are men who believe in a "mineral indicator" or "dousing rod" or "hoodoostick." Dr. Childs, a Los Angeles man, has one of those concerns that has produced "wonderful results." He says: "It is of my own design; it comprises a thin strip of steel, half an inch wide and eighteen inches long, with a copper plumb in the center. That copper top is a battery, filled with chemicals and sealed so it is always loaded. These chemicals have a proper affinity with gold, silver or quicksilver, and when I come into the atmosphere adjacent to a mineral deposit, an electric shock tells me, while the steel slip leans toward the lead. It will often fall with a jerk. By forcing it over by hand, it takes at least a two-pound pressure." It, doubtless, affords harmless amusement to the operator, but reliable assays of the ore found by means of it will still probably be insisted upon before much development work ensues. There are also men who believe in the transmutation of metals, the Keeley motor, perpetual motion, etc.

A PAYSON, ARIZONA, SUBSCRIBER writes: "The PRESS will do a number of Arizona miners and prospectors a favor if it can give, through its columns, the legal construction of the U. S. mining law, viz.: A. locates a mining claim on January 1, 1895, and claims to have until the 31st day of December, 1897, to perform his assessment work. B. claims that he (A.) locates with the assessment or calendar year and that he (A.) will have to perform the work for 1895 or it is subject to relocation on January 1, 1896. Which is correct?" A. is manifestly wrong. It has been held that the time in which the requirement of the statute begins to operate commences on the 1st of January following the date of location. If this obtains, B. is also wrong. The year in which the location is made doesn't count in the federal requirement for annual assessment work. If A. locates his claim any time in '95, he has till December 31, 1896, to do the required $100 worth of work or improvements. But whatever work or improvements he puts on the claim up to Dec. 31st, '95, won't count for 1896; he must do the required assessment work for '96 before Dec. 31st of that year, regardless of what he did or didn't do in that direction in 1895. But whether he does or does not do any assessment work this year, the claim is not subject to relocation till Jan. 1st, 1897.

A SIERRA CO., CAL., SUBSCRIBER writes as follows: "Will you kindly inform me concerning applications for patents to mining claims? There is a certain mining claim here that was surveyed and a patent applied for twelve or fourteen years ago. There has been a mill on the property, which was worked by the company unsuccessfully; afterwards it was leased and finally abandoned. The mill and all removable property was sold and removed from the ground. No assessment work has been done or taxes paid for the last year. Is this property subject to relocation, or does the application for patent hold the ground for the original owners?" Presuming that the facts are as stated by our inquirer, the property is subject to relocation. An application for patent does not absolve the applicant from any requirement as to holding the claim. Till the final entry and payment of the amount required to purchase the claim, the assessment work must be done. Pending the issuance of the patent—that is, from the time the application is made—there is by usage a period during which, apart from the sixty days of publication, etc., nothing in the way of active work is exacted; but the holder of a claim cannot continue in possession of it simply by making an application for a patent for it, neglecting to perform the required annual assessment work and neglecting or refusing to perfect title by making final entry and paying the Government price.

## Notes on Gold Milling in California.

NUMBER XIV.

By E. B. PRESTON, M. E., Field Assistant State Mining Bureau.*

No. 13 *Plumas County.* — The ore is hauled to the mill by wagon, and is broken and fed by hand. The stamps weigh 750 lbs. each, drop 5 inches to 6 inches, 80 times per minute, with a discharge varying from 6 inches to 8 inches, through a No. 9 slot-punched, Russian-iron screen, crushing 1¾ tons per stamp per twenty-four hours. The battery is supplied with an inside plate, about 6 inches wide, attached to the screen; the latter is set slightly inclined. The screen-frame leaves about 4 inches at the upper end of the mortar-front open, in front of which and reaching nearly to the lip is a canvas curtain. The apron-plate is 5x4½ feet, set on a grade of 1 inch in 11 inches; below the apron is a drop-box, from which the pulp passes to the sluice-plates; these are 10 feet long by 15 inches wide. The aprons are scraped every day with rubber belting, and the plate on the screen is cleaned once or twice a week. In dressing the plates, brine with an addition of sulphuric acid is used. About 20% of the amalgam is saved in the batteries, and about 80% on the plates. Neither concentrators nor canvas-tables are used. One tank of quicksilver is used every six months, using twenty stamps.

No. 14. *Shasta County.*— The ore carries 1½% of iron and copper sulphurets, besides free gold, averaging $9 per ton. There are 30 stamps, weighing 850 lbs. each supplied with Challenge feeders, working from the second stamp. These stamps are hung and dropped somewhat at variance with the usual custom, No. 1, the end stamp on the left, being placed 1 inch farther from the side than is No. 5, the end stamp on the right, and the sequence of the drop is 5, 4, 3, 1, 2; the stamps never rising out of the water. It is claimed that by this arrangement a better swash is obtained in the battery. The stamps drop 5 inches, 92 times per minute, with a discharge of 6 inches to 7 inches, and crushing 2 tons per stamp per twenty-four hours. The mortar is supplied with front and back inside plates. The apron-plate is 4x4 feet, set on a grade of 1¼ inches to the foot, followed by a double set of sluice-plates, 16 inches wide and 16 feet long, with a grade of 1 inch to the foot. The apron-plate is kept wet with mercury by frequent dressing. Burr-slot screens, Nos. 40 and 45, are used. About 66% of the amalgam is derived from the battery. The pulp is concentrated on four Triumph and ten Frue vanners, and is then passed to two canvas-platforms, 36 and 24 feet long, respectively, and 20 feet wide, divided into sections 2½ feet in width, covered with twill instead of canvas, which is said to give equally good results, and is considerably cheaper. These tables have a grade of 1¼ inches to the foot. The plates are scraped once a day, and the mill is cleaned up twice a month. The company chlorinate their own sulphurets, roasting in a small two-hearth furnace, with a capacity of one ton per twenty-four hours.

No. 15. *Sierra County.*—On account of topography, the ore has to be elevated by a lift to the top of the mill. The stamps weigh 850 lbs. each, and drop 5 inches, 80 times per minute, with a 6-inch discharge through No. 7 slot-cut screens. The cams, bosses, and tappets are steel; the shoes and dies iron. The apron is 4x4 feet, with a grade of 1¾ inches to the foot, and is followed by a double sluice-plate, 16 inches wide, 12 feet long, and pitched 1¾ inches to the foot. The plates are not scraped at regular intervals; in dressing them, lye is used occasionally. The plate on the screen, 6x52 inches, is cleaned every other day. About 86% of the amalgam is saved in the battery, and the tailings only show a trace of gold. Johnston concentrators receive the pulp from the plates; these concentrators are run with 110 to 112 side-strokes per minute, the belt revolving once in seven minutes. The waste from the concentrators is forced to a higher level by an "ejector" and then passes through a pointed box. The heavy material is then passed through a series of drop-boxes and discharged into the river.

No. 16. *Sierra County.*—The ore carries a considerable amount of clay and is delivered to the mill over an incline track to a Blake crusher. The stamps weigh 850 lbs. each, and make 75 to 78 drops of 6 inches per minute, with a discharge varying from 7 inches to 9 inches, using a No. 10 slot-cut screen. The inside of the mortar is furnished with front and back plates, the former 8 inches, the latter 4 inches wide. Cast-iron shoes and dies are used, crushing 1½ tons to the stamp per day. The order in which the stamps drop is 1, 5, 2, 4, 3. The apron-plate is the width of the mortar, is 6 feet long, and is set to a grade of 2½ inches to the foot, followed by 12 feet of sluice-plates, 14 inches wide. As there are but few sulphurets, no concentrators are in the mill. The apron and sluices are dressed every day, but only scraped once a month; cyanide of potassium is used in dressing the plates. The battery is cleaned once a month. About 5 lbs. of quicksilver is used to every 1,500 tons. About 70% of the amalgam is obtained from the battery.

No. 17. *Tuolumne County.*—This mill of 10 stamps crushes quartz containing little or no free gold, but with 3 per cent of sulphurets, chiefly iron. The stamps weigh 1,000 lbs. each (fed by self-feeders), working at 96 drops of 6 inches, crushing 2½ tons per stamp. Chrome steel shoes and dies are used, which wear about 1-inch per week. No. 30 brass wire screens are used, the screen having a slight inclination, 10°. There are no plates used on the inside of the battery, and only one apron-plate, 4½x6 feet, to each five stamps, which is dressed daily. It is set to a grade of 1¾ inches to the foot. Nearly all of the amalgam is derived from this apron. The plup passes from the aprons through a series of troughs to four Frue concentrators with corrugated belts, using a large amount of water. These are succeeded by wooden troughs, 8 inches wide at top, spreading to 16 inches, which divide into three troughs, carrying equal amounts of pulp, thinned by adding 3 miner's inches of clear water above the forks. These deliver into a V-trough running at the head of a canvas-platform, divided into twelve sections, 22 inches wide and 75 feet long, set on a grade of 1½ inches to the foot. These tables are covered with No. 7 duck, which last 90 days. The V-trough has extending over its entire length a square 8-inch trough, for clear water. The pulp flows from the V-trough through 1-inch auger holes (two to each section of the canvas), supplied with wooden plugs to regulate the flow of the pulp, the clear-water trough being similarly supplied. Every half hour the flow of the pulp is arrested on a section, while the flow of clear water is continued until the lighter sands are washed off, leaving the sulphurets on the canvas. The flow from the tables is delivered into V-boxes running across the end of the canvas-platform, with a garde from the outer edges to the center, and delivered to a second canvas-table trough, where it undergoes a similar treatment. After removing the lighter sands from the upper platform, a sheet-iron pan is placed below the end, which extends to a separate trough into which the sulphurets adhering to the canvas are swept with the aid of the flowing clear water, and conveyed to a settling-tank divided into two sections in such a way that when one section is filled, the sulphurets are run into the second section, allowing the first to be shoveled out, each section being treated consecutively. When No. 1 is being swept, No. 2 has the plup-flow shut off, making the operation continuous. After sweeping down a section, the plugs from the pulp trough are removed and the clear water shut off, permitting the concentration to be renewed. It requires the attention of two persons, night and day, to attend to these two platforms. Everything but the sweepings pass over the second canvas-platform, and then goes to waste. The sweepings from the second table are treated in a manner similar to those from the upper one. Accessory to these two sulphuret settling-tanks are two large slime settling-tanks; these are divided into twenty-sections, 2 feet square, 20 feet long divided from each other by 2-inch plank extending entirely across the tank. Within 2 feet of the ends, on alternate sides of these divisions, slots 4 inches deep and 2 feet wide are cut to permit the water, which is clouded with the fine slimes, to pass from one division to the other. At the end farthest from the entrance, the water (still somewhat clouded) runs to waste. The slime water from the first settling-tank passes through the second. The sulphuret settling-tanks are shoveled out every few days, while the slime settling-tanks remain undisturbed for months. The material from the vanners, upper and lower settling-tanks, and sometimes from the slimes, is mixed by weight before going to the chlorination works. There are 2,400 sq. ft. of canvas-tables and 5,000 sq. ft. of settling-floor.

No. 18. *Tuolumne County.*—This mill is working on quartz carrying both free gold and sulphurets. The ore is delivered from the mine at the top of the mill, into a general ore-bin, for the entire 40 stamps, after passing through the rock-breaker. The bin has a capacity of 650 tons, and delivers the ore into the self-feeders direct. The stamps weigh 850 lbs. each, and steel shoes and dies are used. Each stamp has its separate guide, made of two blocks of hard maple, fitted together and bored through to receive the stem. The front block is first put in place, the stem set in, and the rear block dropped in behind a cast-iron piece, which is secured by wooden wedges driven in from above, so that when required it can easily be removed. The pulp from the battery falls over a 9-inch silvered plate, the width of the mortar, into a box 12 inches square, supplied with six 1-inch holes, 8 inches apart, near the front lower edge, that permit the pulp to flow onto a 4x5-foot silvered plate, divided in two parts by a wooden strip down the center. The fall from the box to the plate is 3½ inches. The apron-plate is mounted on a carriage, which can be pushed back, giving access to the battery, the 4-inch grooved wheels in front running on a half-round iron strip placed on the sides of the lower plate-frame. From the movable apron the pulp passes over 12 feet of plates, divided into three 4-foot sections, with a dividing strip down the center. Sixteen concentrators are used.

No. 19. *Tuolumne County.*—This mill presents some peculiarities in its construction. There are 10 stamps of 850 lbs. each, with steel shoes and dies. The stamps are given 100 drops per minute, dropping 4½ inches, with only 2½ inches discharge to commence on, through a No. 50 brass-wire screen. The rock-breaker (Wheeler pattern) and ore-bin are set on a rock foundation, the frames being entirely disconnected from the rest of the building, to counteract the vibratory motion of the crusher. In placing the mortar-block and mortar, the space around the block was filled in with concrete, and a double thickness of tanned belting laid between the block and the mortar, after which a fire was built in the latter until it settled into the belting. The wear of the shoes and dies is about 1 inch per month, and the duty of the stamps 1½ tons per stamp. When the dies are partially worn, a 2-inch iron plate is placed under them, to maintain a regular discharge. The inside of each mortar is provided with cast-iron side plates and a sheet-iron covered board at the back, to prevent wear on the mortar. The apron-plates are set 12 inches out from the mortar. The pulp from the battery passes over a 9-inch plate into double-pointed boxes of iron, bolted on the front of the mortar, and thence through a couple of 2-inch pipes to a spreader and to the silver-plated apron. The apron is followed by double sluice-plates, each 2 feet wide and 10 feet long, all set on a grade of 1¾ inches to the foot. Two-thirds of the amalgam is obtained from the battery. No concentrators are used.

(*To be Continued.*)

* Bulletin No. 6, California State Mining Bureau.

## Capital Invested in the Ore Business of the Lakes.

In July, 1892, the late George H. Ely of Cleveland, who first enlisted capital in the Vermillion iron range of Minnesota, which is now controlled by the Minnesota Iron Company, one of the largest mining corporations in this country, prepared a statement showing the capital invested in mining and transporting by rail and water to furnaces the iron ores of the Lake Superior region. Mr. Ely spent a large part of his time for several years previous to his death in the preparation of statistics relating to the iron mining business of Lake Superior and the commerce of the lakes. Since his death no effort has been made to supplement the statistics referred to by additions due to the development of the Mesabi range, the construction of new railways and docks in the Lake Superior region, building of new ships for the ore trade, etc. Before going to Washington last week, however, the *Marine Review* says Attorney Goulder of the Lake Carriers' Association concluded that these statistics might be brought up to date, and made available for arguments bearing upon legislation, by obtaining from ore dealers and vessel owners the best possible estimates of new investments in the various lines connected with the ore industry. After careful inquiry among ore dealers and reference to the *Inland Lloyds Register* and the files of the *Review* for the value of ships built since July, 1892, it was found that the investments in the various branches of the ore business now aggregate $233,242,085. The increase is mainly in the value of leases and fees on the Mesabi range, new ore railways in Minnesota and new docks at Duluth and Two Harbors. These figures seem enormous and can only be comprehended by those who have a knowledge of the capital required to mine and move to furnaces, in some cases more than a thousand miles distant, full 10,000,000 gross tons of ore in a single season of navigation, as was done in 1895. Or, the figures may be better comprehended by considering that 97,556,866 gross tons is the output of the mines since 1855, when the industry was begun. Mr. Ely's figures and the additions covering the period between July 1, 1892, and January 1, 1896, are contained in the following table:

| | Mr. George H. Ely's figures July 1, 1892. | Increase since July, 1, 1892. |
|---|---|---|
| Capital in mines in the four Lake Superior districts in 1889, as per United States census | $54,825,122 | |
| Increase to July 1, 1892 | 15,000,000 | $69,825,122 | $26,500,000 |
| Capital in docks and their equipments at Lake Superior and Lake Michigan ports, built and used exclusively for shipping ore (official) | 9,885,665 | 4,300,000 |
| Capital employed exclusively in railroad transportation of ore from mines to shipping ports on Lake Superior and Lake Michigan (official) | 27,014,594 | 5,350,000 |
| Floating capital on the lakes, employed exclusively in ore transportation, from upper lake ports to lower lake ports (estimated) | 29,933,107 | 16,747,100 |
| Capital in docks, and their equipments, for receiving and forwarding ore exclusively, at Lake Erie ports between Toledo and Buffalo, inclusive of both (official) | 12,392,880 | 3,100,000 |
| Capital employed exclusively in railroad transportation of ore, inland to mill and furnaces from Lake Erie ports (official) | 26,343,617 | 1,850,000 |
| Totals | $175,394,985 | $57,847,100 |
| Increase, July 1, 1892, to January 1, 1896 | 57,847,100 | |
| Total, January 1, 1896 | $233,242,085 | |

An American firm, which has just finished the connecting link of fifty miles in the chain of railroads encircling the island of Jamaica, has performed a great feat. The road runs entirely through mountains and morass. It has 27 tunnels, 193 girder bridges, 13 viaducts and 11 tower bridges. It is said that no such tremendous obstacles were ever met by engineers in a fifty-mile stretch. The cost will average more than $100,000 a mile.

## Testing the Ores.

To the uninitiated but observant stranger who wanders up and down in the labyrinth of shafts and tunnels, diggings and dumps of a genuine mining camp, perhaps there is no subject more full of interest than the process by which a lump of ore—which, to his inexperienced eye, looks not the least attractive—is made to yield its share of silver and gold, or the means and methods by which the mining man at his side so confidently assures him that a ton of that ore will go 82.33 ounces in silver and $17.55 in gold. Even the Eastern mining expert or graduate from some mining school will wonder how, in the log cabin or pine shanty, destitute of all the elaborate paraphernalia to which he has been accustomed, these results are so readily and accurately obtained.

As a general rule, the majority of the ores, except those containing the precious metals, for purposes of purchase and sale, are valued according to the cost of mining and shipping, so that, except for metallurgical purposes, it is unnecessary to seek to determine with much accuracy the contents and value of such ores. In the case of ores rich in the precious metals, however, it is entirely different, as in their purchase and sale both parties—the buyer as well as the seller—want to ascertain accurately and to a certainty the value of the entire lot. The methods by which this knowledge is obtained are so simple as to be easily understood and practiced by many a man who does not know the technical symbols of the metals he is determining or could not give a scientific exposition of the process; but, nevertheless, in his line, he is an accurate and successful assayer. When a quantity of ore is to be sampled, it is first broken by an ordinary rock crusher into pieces the size of an English walnut, after which it is shoveled back into the car, but in such a manner that every fifth shovelful is thrown aside by itself, the remaining four-fifths being finally taken away. This fifth portion, known as the "sample," is then reduced to a much greater degree of fineness by means of Cornish rolls. It is then piled on the floor in a cone, flattened out and divided into four equal portions, and two opposite quarters are then removed. The remaining quarters are again thoroughly mixed and again piled in a cone, flattened and quartered, this operation being repeated until the sample is reduced to 100 pounds. It is then weighed repeatedly for the purpose of determining the amount of moisture contained in the ore, which in some ores, especially those of the concentrates, is so considerable as to make a very appreciable difference in the weight. The moisture is then expelled and the ore is crushed to such a degree of fineness that it can be passed through a sieve containing 100 holes in the linear inch. The sample is next put up in small bottles, which are sealed with sealing wax and then stamped for the purpose of preventing the possibility of their being opened or tampered with without detection.

The above is the process of sampling used among the mines, and the sample is now ready to be assayed, but only a small portion of it will be used for that purpose, and the quantity generally taken is what is known as an "assay ton," which weighs 29,166 milligrams, or a little more than 450 grains Troy weight. The definite amount is taken, partly as a matter of convenience, and also because the assayer wishes to ascertain, as quickly as possible, how many ounces of the precious metals to the ton are contained in this ore. The method used depends upon the following principle: The avoirdupois grams ton of 200 pounds contains 29,166 ounces Troy weight; hence, when 29,166 milligrams of the unassayed ore are taken, the weight of the resulting "button" of gold or silver in the milligrams represents at once, without any further calculation, the number of Troy ounces of gold or silver in the avoirdupois ton of ore.



FIG. 3.—VIEW OF TURN STRUCTURES.—(See page 141.)

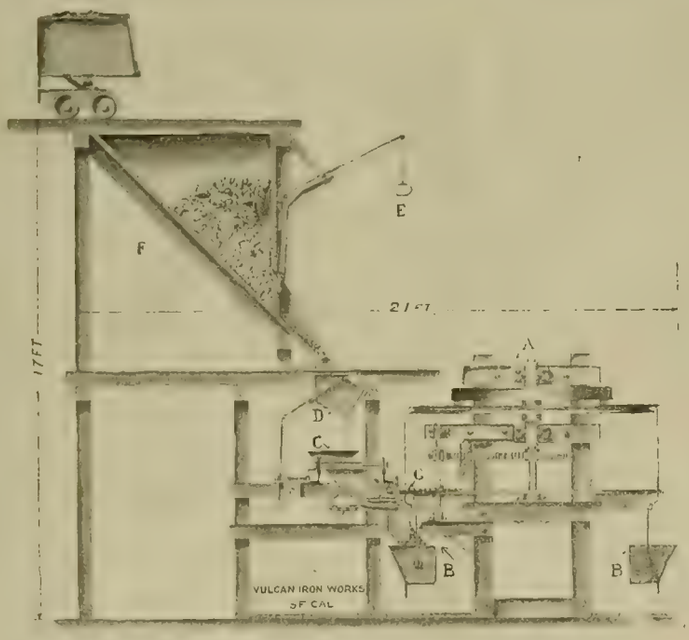



FIG. 4.—VULCAN AUTOMATIC LOADER.

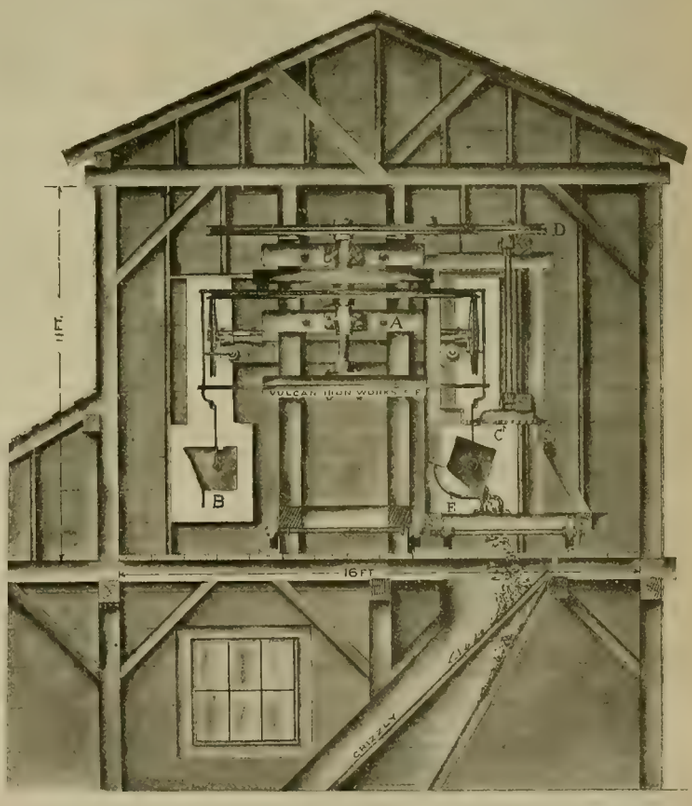



FIG. 5.—DELIVERY TERMINAL.

(See page 141.)

THE belief is common that a thorough chemical analysis will indicate precisely the character and quality of steel; yet those who are more familiar with such matters have long been aware that this is not at all the case, and it is a fact that two different brands of steel which will appear to be precisely identical, so far as the most rigid chemical analysis can show, will be totally different when put into service, and will give different results under physical test.—Machinist.

## Venezuela's Clear Title.

It was on the coast of Venezuela, says the Chicago *Tribune*, that Columbus first set foot upon the American mainland. This was in 1498, on the occasion of his third voyage in quest of a new world. By virtue of discovery and the conquest of the Indian tribes, which up to that time had been its only inhabitants, the country passed into the possession of Spain, and that nation retained undisputed control until the Venezuelans revolted in 1810. Venezuela had then grown to be quite a power. Its people were rich and brave, and, although of Spanish descent, rebelled against the exactions of the mother land. Long years of war followed; and while victory was virtually won in 1821, Spain was able to delay recognition of the independence of the country until 1845. With independence from foreign control came internecine trouble, growing out of the desires of various aspirants for political power and place, and there was a series of revolutions and civil wars lasting almost to the close of 1870. But during all this time no country, except England, thought of questioning the right of the Venezuelans to the possession of the land. The title is a clear one, so lawyers say. Spain obtained it by the discovery of the country and subjugation of the natives, and it passed to Venezuela itself when Spain, at the end of a long and bloody war, conceded independence to the colony and a republic was established.

ONE peculiarity of pearls is that, unlike other precious gems, they are liable to decay. Occasionally a valuable pearl changes color, seems to be attacked with a deadly disease and crumbles into dust.

## Magnesite.*

*Occurrence.*—Magnesite (carbonate of magnesia) occurs in several of the United States, but is mined commercially only in California. Some years ago a small quantity was taken from magnesite quarries at Goat Hill, Chester county, Pa., but the work was continued only a short time. In that State it also occurs at Low's chrome mine in Lancaster county, at Scott's mine in Chester county, and in Delaware and Lancaster counties in small masses. The other localities in the United States where the mineral occurs, but is not mined, are as follows: North Carolina—Webster, Jackson county; Hampton, Yancy county, and McMakins, Cabarras county; New York—New Rochelle and Rye, Westchester county; Warwick, Orange county; Stoney Point, Rockland county, and Serpentine Hills, Staten Island. In all these localities it occurs in thin veins and seams. New Jersey at Hoboken (with serpentine). In Arizona the mineral is abundant, but is not utilized.

The localities where the mineral occurs in California are numerous, but it has never been mined except at two places, one in Alameda and the other in Napa county. In Santa Clara county there are several known deposits. One is on Coyote creek, about two miles from Madrone station, on the Southern Pacific railroad. It occurs in the shape of small nodules in and near serpentine. In the report of the California State Mineralogist it is stated that a close examination of the magnesite, particularly the poorer quality, reveals traces of the surrounding country rock, greenstones and shales. There are several deposits in the immediate neighborhood. Another locality in this county is the Red Mountain district, where, on the Jarvis & Ryan claim, large, irregular masses of magnesite crop out, and in some places more than 10 feet are exposed. On the Favill & Martin, or Mammoth, claim there is a large quantity exposed. These Red mountain claims are twenty miles from a railroad, too far to be useful at present.

In Alameda county, on the shore of San Francisco bay, the mineral occurs at Cedar mountain, and a few tons were shipped from there in 1886, but the experiment was evidently not a success, as work has not been carried on since. The mineral has also been found in the hills near Livermore valley.

In Mariposa county a heavy bed of magnesian rock, chiefly magnesite[1] charged with crystals of iron pyrites, accompanies the chief gold-bearing vein of the county. The rock is associated with mariposite, a green micaceous mineral containing chromium.

In Fresno county, in S. 5, T. 13 S., R. 24 E., is a large vein or deposit of magnesite, which crops to the surface. At Arroyo Seco, Monterey county, a vein has been found 2 feet wide; and the substance has also been found at Mansfield, near the gold mines. About forty miles east of Visalia, Tulare county, a large deposit has been found near Mineral King district. In the same county, near Visalia, below Four creeks and Moore's creek, it occurs in solid beds of pure white mineral, hard and fine-grained, like unglazed porcelain. The beds are from 1 to 6 feet thick, interstratified with serpentine and talcose slates. In this same county it is also found on the south side of the Tule river, ten miles from Porterville. In Placer county magnesite occurs in quantities at Gold Run, Iowa Hill, and Damascus, in the same region as the large hydraulic and drift gold mines. In San Luis Obispo county it has been discovered near Port Harford.

The mineral is also known to occur near Los Alamos, Santa Barbara county; at several places in Humboldt and Napa counties, and in San Mateo, Lake, Tuolumne, Sonoma, Solano, Contra Costa, San Bernardino and Calaveras counties in isolated instances. In none of these places mentioned, however, is the mineral now mined.

In 1886 work was commenced on the deposit at Cedar mountain, Alameda county, and several carloads were shipped, but work has been stopped for some years, the experiment not proving a financial success. The mineral occurs here in a decomposed serpentine rock and in a yellow clay, in which are embedded large boulders. It lies in pockets and small veins, the latter running in every direction. The richest spots were found under the boulders, where the mineral is quite pure. At this place every piece of mineral had to be cleaned by hand, and the whole was carefully sorted according to purity, being divided into three classes. It was then packed on animals down the mountain.

*Production.*—The only deposit in California which has been utilized to any extent on a commercial basis is that in Childs valley, Napa county, ten miles from Rutherford and sixty-five miles from San Francisco. Here the mineral occurs in a lode 5 to 7 feet thick, standing at an angle of 70° and having regular walls. Most of the deposits found elsewhere occur in beds from 2 to 6 feet in thickness. This lode consists of a white carbonate of magnesia, the mineral being broken out in slabs several inches thick and from 2 to 6 feet in width. The output from this mine is employed in the manufactures and the arts to some extent, and experiments are being made for its larger utilization in new branches. The main uses to which it is put at present are for furnace linings at rolling mills and for paper manufacture. Small lots are used in experimental work in the manufacture of artificial stone, paint, epsom salts, flocculent magnesia, and other chemical processes.

The product of this mine for the past four years has been as follows:

| CONDITION IN WHICH SOLD. | 1891. | 1892. | 1893. | 1894. |
|---|---|---|---|---|
| | *Pounds.* | *Pounds.* | *Pounds.* | *Pounds.* |
| Raw ore | 234,440 | 1,215,155 | 526,685 | 2,880,000 |
| Calcined ore | 643,748 | 794,085 | 880,613 | |

In these figures only the raw ore is named which was sold as such, the rest of the output having been calcined. It takes nearly two tons of the raw ore to make one of the calcined. Of the last season's output all but fifteen tons of the calcined material was used by the Willamette Pulp and Paper Co., Oregon. About 100 tons of the raw ore was used by the Pacific Rolling Mills, of San Francisco, for furnace lining.

The mill and furnaces at the mine can readily be enlarged should demand for the calcined ore warrant. At present Chicago and Pittsburg obtain their supplies from New York and other Atlantic seaports, into which it is imported from Europe. In Pittsburg and other large manufacturing centers dolomitic limestone is employed in making basic steel. For this stone magnesite would be substituted if it could be obtained at prices somewhat lower than now has to be paid for the imported calcined material, on which there is imposed a duty of twenty per cent, the raw coming in free. There is an abundance of this ore in California, as may be seen from the number of localities noted, but distance from large manufacturing centers prevents shipment under present conditions.

*U. S. Geological Survey: Sixteenth Annual Report, 1894-95.

1 According to Prof. Silliman (Proc. Cal. Acad. Sci., Vol. III, p. 380), the magnesian mineral accompanying the great quartz vein of Mariposa county is chiefly ankerite, a carbonate of calcium, magnesium, and iron.—H. W. T.

## The Great California Gold Belt.

DAN DE QUILLE, in the Salt Lake *Tribune.*

In the "mother lode" of California we have one of the greatest gold belts known in any part of the world; indeed, probably the very greatest now known. There, extending along the western slope of the Sierra Nevada range for a distance of 120 miles, and having a width of twenty-five to thirty miles, we have a great mineral belt, within which is found a wonderful system of gold-bearing quartz veins. The immense auriferous belt follows the trend of the main Sierra Nevada range, and within it are found parallel veins of quartz of all sizes, which have the same general course. Very many veins show upon the surface, having been exposed by the wearing away of the mountains in the course of ages, but there are doubtless as many more that erosion has not yet reached and brought to light. These deep-lying veins are frequently discovered during the progress of underground work in the mines of the old producing camps, and they doubtless exist everywhere along the great belt.

The placer deposits of California were the greatest and richest of any of which we have reliable data, or even vague traditions, and as all the hundreds of millions found in these—not to speak of what still remains in the deep diggings—came from the quartz mines of the big gold belt, we need not doubt the existence of untold auriferous wealth at the source of supply. The quartz miner could ask for no better indication of rich lodes above in the mineral belt than is to be found in the immense amount of gold thrown off by them and scattered far and wide over the country below. The gold thus scattered came from quartz veins through the processes of decomposition and erosion. It first found its way into the streams of the ancient river system, then was to a great extent swept away, spread abroad and redeposited by the present creeks and rivers of the country.

Of course, no one knows to what depth the quartz veins at and near the surface were worn down—whether ten feet, fifty feet, or a hundred feet—but we may safely calculate upon the greater part of their golden contents being still in the remaining undisturbed sections of the lodes. The gold lost from the veins was merely that dislodged and scattered through the action of the elements and the changes incident to the seasons and the occasional wild freaks of the uneasy earth. As we see gold-bearing quartz veins being worked to the depth of 2000 feet and over in the older camps of California, with no diminution in the quantity or quality of the ore obtained, no one need fear the permanence of the veins on the mother lode system. The hundreds of millions thrown off and scattered in the placers are the best possible indication of the richness of the veins above.

One would imagine that the very first thought of a miner of any experience, on seeing the immense amount of gold sown broadcast in the placers, would be to seek the source of so much wealth, but when the idea of the golden fountain head being somewhere above in veins of quartz first occurred to the average California miner of the early days he had too good a thing where he was in gathering the gold which nature had through the ages washed down and deposited in the creeks, gulches and river bars ready to his hand and easily secured. The few who did rush up into the wilds in search of the source of the placer gold came back with dismal reports. Instead of finding huge reefs of almost solid gold and digging out the metal by the ton, or at least by the pound, as they had anticipated doing, they had only been able to find here and there a vein from which they could pan out prospects of a few cents.

Such reports coming from the quartz veins up in the mountains gave the "sources of gold" a "black eye" and soon thoughts of a great fountain head became mere dreams of the past. Many began to believe that the golden nuggets were blown out of volcanoes or that they grew, like potatoes, where they were found.

When at last some work began to be done on the quartz veins it was mostly by a class of new-comers. The drilling, blasting and battering at flint quartz with sledges and poll-picks did not suit the old miners. Their easy gains of gold in the gravel of the creeks and flats had spoiled them for the more difficult and less romantic work of quartz mining. As there were still places where paying gravel was to be found, the old-timers clung to the placers. They would rock out little patches of ground, scrape old bedrock—anything but turn quartz miners. No fun in that.

Thus it has happened that California's big gold belt—the greatest in the world—is so little developed. The placer mines lasted too long. They were so extensive and rich that in the many years required to exhaust them—or those most accessible—the grand source of all the gold they contained was almost forgotten; at least, save in a few instances, was neglected in a manner that now begins to strike us as simply astonishing.

But now, at last, there is a general awakening to the great value of the big California gold belt and its wonderful system of veins of auriferous quartz, the source of the hundreds of millions of gold found below in the placers. Men of means are securing properties in many places on and along the line of the mother lode, and soon the new producing mines will be numbered by scores. For their encouragment the new beginners have but to take a look at what is being done in some of the older camps, where quartz mining was commenced by a few more than three decades of years ago. At Nevada City, Grass Valley, Angels and other old mining towns are to be seen some of the richest and best paying mines now in operation in any part of the world. The many years that a number of these mines have been worked affords the best evidence as to the persistence and richness at depth of the veins of the mother lode gold belt.

## The Anti-Debris Association.

The Executive Committee of the Anti-Debris Association held its monthly meeting in this city yesterday, at which the reports of Manager Phipps and the watchmen employed to keep track of hydraulic mining operations were read.

These reports show that some hydraulic mining is being done on the American and Yuba rivers without permits, and that several dams, in addition to those heretofore reported, were washed out or injured by the storms of January. The Henning's dam in Placer county, the Wolf dam in El Dorado county and the Valentine and Gardner Bros.' dams in Shasta county, were entirely ruined.

The attention of the California Debris Commission had been called to these conditions of affairs.

The photographs of dams taken by the association have been distributed as educators on the insufficiency of dams.

The report of the attorney for the association shows the present condition of the suits in court commenced by the association, or in the prosecution of which it is assisting, and also correspondence on matters pending in Congress.

The Legislative Committee, through Mr. Ohleyer of Sutter county, submitted a report of its correspondence and work.—Sacramento Record-Union, 19th.

## Internal Heat of Mines.

In last week's issue, page 129, was published an interesting article on "The Internal Temperature of Rocks," showing that in the deep levels of the Calumet & Hecla the usual claims that the internal heat of the earth increased 1 degree for every fifty feet of vertical depth does not hold good. It is further ascertained that the exact temperature at the bottom of the Red Jacket shaft, a depth of 4375 feet, when the drilling machines are working is 78 degrees, and when the machines are shut down, and have remained shut down for some time, the temperature does not exceed 81 degrees. There are places in the Calumet & Hecla where the thermometer registers 105 degrees, and even 108 degrees, but this is in the pump rooms at the eighth, sixteenth, twenth-fourth and thirty-third levels of Nos. 4 and 5 shafts, and this excessive heat is caused not by the internal heat of the earth, but by the big 4-inch steam pipe which carries the steam from the boiler house on the surface to the various pumps underground to the last one on the line, 3300 feet below the surface. Even at that great depth there is a pressure on the steam chest of the pump of 125 pounds.

### Modification of the Chlorination Process.

Bruno Mierisch of Managui, Nicaragua, has devised a modification of the chlorination process to prevent injurious effects of the residues of the sulphur, arsenic and metallic oxides in oxidated and roasted ores by the hypochlorites and chlorates of the alkalies and alkaline earths, by mixing the ores with a calculated quantity of sodium hydrate and adding as much calcium hydrate as is necessary to separate the thus obtained sulphuric acid and arsenic acid in the form of insoluble calcium salts, and thus prevent the deterioration of the sodium chloride lye by sodium sulphate.

The ore is pulverized as usual to such a state of fineness that no residue is left on a forty-mesh sieve and dampened with a lye containing twenty-five per cent of common salt to such a degree that small balls can be made of it with the hand—60-70 liters of lye is required per ton of ore. This done the ore is put in fixed chambers of one-half meter height and about the same length and there exposed to the action of chlorine gas. If the ore absorbs a considerable quantity of chlorine—but not so much that it would be advisable to roast it before in order to reduce the consumption of chlorine to a reasonable amount—it is best to add a small quantity of lye of caustic soda, or if the consumption of chlorine is caused by the sulphur contained in the ore, slacked lime, preventing in this manner the forming of acid in a free state, as by such acids part of the worthless metals would be dissolved.

The chlorination chambers are simple boxes covered on the inside with sheet lead. They contain two openings, one on the upper side for putting in the ores and one on the lower side for taking them out after the chlorination is over. The time which the ore has to be exposed to the action of the chlorine gas is not a fixed one; it is determined by the nature of the ore that has to be treated. Ore on which the action of chlorine is slow requires several chambers for chlorination in use at the same time in order to be able to treat the same amount of ore. As, however, the first cost of these chambers is extremely small and the place they occupy is also not very great, as they can be put above each other where space for the establishment is limited, the cost of these chambers can never come in consideration where the application of this process is advisable.

In general the time required for treating the ores in the chambers with chlorine gas is less than twenty-four hours as in consequence of the presence of the hydrate of sodium, the mass of ore after the gas is introduced in the chamber heats itself and the subchlorides of sodium or lime in statu nascendi act energetically.

After the chlorination is finished air is introduced at the upper end of the chamber in order to expel the chlorine gas; the ore is taken out through the opening at the lower part of the chamber and falls in the conveyor provided there for its being carried off. Directly above the opening at the lower end of the chamber a conduit with an absorber is placed in order to carry off the gas that always will rise from the treated ore, and protect in this manner the workingman against the obnoxious effects of the chlorine. The air mixed in this way with chlorine can, either in order to regain this gas or in order to avoid reclamation from neighbors, be conducted through a box where hydrate of lime is stored in trays placed above each other. The absorbed chlorine forms with the hydrate of lime subchloride of lime, which is used again in the process instead of the hydrate of lime, as it is stated in the document describing the patent, where it is shown at the same time that the chlorine is regained in this way in active or gaseous form.

The chlorinized ore is carried by the conveyor into tanks provided with an apparatus to stir it up continuously; at the same time such an amount of a concentrated solution of salt is added to the mass in the tank as to form a thin paste. After this a lye of salt containing hydrate of sodium is added, until the whole gives a slight alkali reaction, and to this is added again chlorine in the form of a solution of salt saturated with chlorine until the alkali reaction has disappeared.

The addition of hydrate of sodium is made in order to separate copper, iron, lead and zinc that may be contained in the solution, in the form of hydroxides; at the same time arsenic and antimony are separated in the shape of salts of these metals or of lime. If too much hydrate of sodium is added part of the oxides of lead and zinc is dissolved again, and for this reason the alkalic reaction has to be neutralized again by the addition of chlorine, by which operation the hydroxides of lead and zinc will be finally separated. The lye of salt after this can contain only the chlorides of quicksilver, gold and platinum. During the whole of this operation the ore is continuously stirred.

The tank has the same form as the agitator used in the amalgamation process; that is to say, it is a simple round wooden tank with a stirring apparatus. In order to protect it against the attacks of the chlorine it must receive, before used on its inside, a coat of asphaltum or a thin covering of sheet lead. In the bottom of the tank quicksilver or amalgamated copper plates are put, which are connected with the negative pole of a dynamo or accumulator, while the arms of the stirring apparatus are connected with the positive pole. Through the arms of the stirring apparatus in this way continuously a weak electric current is flowing towards the quicksilver, which separates the precious metals contained in the lye, and these in their place are amalgamated by the quicksilver. On the suspended hydroxides and particles of ore the current has no effect whatever, while the coarser particles of metallic gold and silver are amalgamated by the quicksilver. The paste of ore flows through three or more tanks, to give the electric current sufficient time to act upon the chlorides contained in the paste.

The paste of ore from which all the precious metals are extracted is carried off to a centrifugal rotator, a filter press, where the lye is separated from the ore residue. This residue will retain, according to the pressure exerted on it, more or less lye; under ordinary circumstances this might be 50 l., and these 50 l. will contain 12.5 kgr. of salt. If chloride of sodium is cheap, but fuel expensive, the residue of ore is thrown away in this shape; but if the reverse is the case, the residue is washed again with water and this diluted lye concentrated again until it contains twenty-five per cent of salt.

The lye of chloride of sodium without further cleaning is used over again in the process, as a small amount of subchlorides offers no disadvantage whatever to electrolytic treatment, and by adding it to the powdered ore it only has a beneficial effect, as it replaces an equivalent amount of chlorine. It is not necessary, when the lye is separated from the residue of the ores, that it should be absolutely clear, as it does not contain any precious metals and only serves to make the powdered ore liquid; but the part of lye which is used in the electrolytic process must be free from slime. With clayey ores the separation of liquids from ores is extremely difficult, and very often can only be effected by submitting the ore to a clear red heat before treating it by a lixiviation process.

The amalgam is treated afterwards in the usual manner. The product containing the precious metals will be pure, as the lye from which it was precipitated could not contain copper, lead, zinc nor arsenic and antimony. The separation of the gold from silver is effected in the best way by means of chloride gas, after the process of Miller.

### The Dog-in-the-Manger Policy.

Finally the *Democrat* has compelled the managers of the Anti-Debris Association to define their position relative to the betterment of the Yuba and Feather rivers, the same having appeared in these columns yesterday. Briefly stated in condensed form, they are opposed to any work being done other than such as meets the approval of their attorney, Mr. Devlin, and themselves. And they are opposed to the pending appropriation in Congress to be expended under the direction of the Government engineers because they fear it may benefit the miners, who would get $250,000 of State money to be expended under the direction of the State Debris Commissioner, John F. Kidder of Grass Valley. In other words, they are in favor of a policy of obstruction and prefer to see our rivers fill up year after year and to continue to draw money monthly from the treasury of Yuba county rather than to see a restraining wall at Deguerre Point. This is the position of the men who claim the name of State Anti-Debris Association.

Now let us see who they are and how many of them stand on this platform of obstruction as outlined in the communication published in the *Democrat* yesterday.

There are only four counties represented in the association; nor has there been any more during the two years last past. These are Colusa, Sacramento, Sutter and Yuba, and they pay $200 a month each to pay the salaries and expenses. There are two members from each of the four counties, who are styled the executive committee, and one member of each Board of Supervisors, who are to see that the money of the taxpayers is not improperly expended. The whole number is twelve, and a majority can rule, and they do, particularly in the present opposition to the appropriation mentioned, as two of them, at least, are in favor of it. Now, to put it mildly, this is a case of the tail wagging the dog of the most pronounced and malignant form.

There is another organization of the same kind called the Sacramento Valley Anti-Debris Association, having representatives from the same counties and just as strong, numerically, as the other.

These gentlemen recently met and adopted resolutions in opposition to dams to facilitate hydraulic mining, but they are not obstructionists who oppose an appropriation to perform work in the betterment of Yuba and Feather rivers. The so-called State organization draws from the four counties $10,000 a year, all of which goes for salaries and expenses. The Sacramento Valley Association has not drawn any money from the treasury of these counties in two years, yet in the matter of betterment of these streams the last-named association has been just as successful as the other, except that they have not taken any photo views of holes in abandoned dams. But the real live question now is, how long will the people remain passive and not make an effort to obtain an appropriation to be expended in the betterment of these rivers?—as it is time to fish or cut bait.—Marysville Democrat, 18th.

### Thinks Them a Good Investment.

D. B. Huntley, of Telluride, Col., talking of the silver mining outlook, says:

"Now is the time to buy up silver mines, tie them up and salt them down. For any one who has money to spare, the investment in silver propositions is the very best thing one can engage in. Silver is about as low as it will ever be as bullion, and any marked change will be for the better. In the first place it cannot be mined at as low a figure as it has been in the past; for one reason, because the big deposits of rich silver ores are not found near the surface as in the past. Then again, the modern appliances and inventions do not cut so much of a figure in the cost of smelting silver ores as one naturally supposes. The smelting of silver ores is as old as the bills themselves, and the improvements are not so great as the industry itself. It is mostly a matter of deep mining, too, nowadays, and deep mining adds to the cost of production. But that is not all. The use of silver in the arts and manufactures increases with civilization, and furthermore, as the population and civilization of Asia increases so will the demand for the white metal increase. The United States will have to supply the demand; for while Central and South America have rich silver mines, it will be many years yet ere they will be in a position to make an output to compete with the mines of North America. All of these conditions are outside of the free coinage issue. If the free mintage of silver is granted, it will be that much more of a step toward the rehabilitation of the silver industry, and for my part, if I had to have a property that at the present moment was unproductive, I would prefer to have a silver property. At no distant day it is bound to be a paying proposition. After all this turmoil is ended and the national financiers can see 'where they are at,' it will be concluded that the remonetization of silver is the only road to a sound money system, and steps will be taken to get there. Then will come the chance of the owner of silver mines. There is no use talking; silver must be one of the moneys of ultimate redemption, and it will be placed on a parity with gold. The United States cannot have prosperity without bimetallism, and bimetallism we must have. Therefore, I say, a good silver mine, even if not now paying, is as good a holding as any other non-productive property."

### Preliminary Announcement 29th Industrial Exposition, Mechanics' Institute, 1896.

The Mechanics' Institute announces that its 29th Industrial Exposition will open to the public from Tuesday, September 1st, to Saturday, October 3rd, 1896, inclusive. The feature of the forthcoming Fair will be an exposition of the industries of California, to which end the efforts of the managers will be specially directed.

The Mechanics' Institute is and always has been the earnest exponent of "home industry," and the experience of the past will be joined to the energy and enterprise of the present in making this feature the controlling and predominating one in the 29th Exposition.

Although recent industrial expositions have adopted rules which entail directly or indirectly heavy expenses on exhibitors by charging for space, power, etc., the Mechanics' Institute sees no reason why it should deviate from its practice of allowing exhibitors to enter and maintain acceptable exhibits free of charge, and the Board of Trustees of the Mechanics' Institute announce that as heretofore there will be no charge for space, power, water, or general lighting, and that all exhibitors will be placed in this respect on the same plane.

The Exposition building is situated in the heart of the city of San Francisco, adjoining the City Hall, and is reached directly by all the car lines, and is within fifteen minutes' ride of all the ferry and railroad stations.

It occupies an entire block of land, and is surrounded on all sides by wide streets. It has a floor area of 150,000 square feet; the main nave is 412 feet long, 100 feet wide, 80 feet high, and has a promenade gallery surrounding it 825 feet long by 16 feet wide.

The building will be brilliantly illuminated during the evening and admirably lighted during the day.

Ample power will be supplied exhibitors without charge, including all necessary shafting, pulleys, etc.

Orchestral music by a band of sixty of the best musicians under the most distinguished leader the country possesses will add to the other attractions of the Exposition.

The art gallery is 280 feet long and 50 feet wide, and will be made a source of especial attraction to visitors.

The restaurant and cafe will be in charge of a responsible and experienced caterer, and all other necessary conveniences and comforts for visitors and exhibitors will be provided.

A telephone and telegraph exchange will be established in the building, as also a reading-room supplied with all the current newspapers.

There will be no better opportunity for the manufacturers and producers of California to place in an advantageous manner before those interested, and the public at large, the result of their skill and industry, as the purpose of the management is to make this essentially a grand Exposition of California's Industrial and Natural Productions.

These Expositions held by the Mechanics' Institute are, and always have been, exceedingly popular, as from 250,000 to 400,000 visitors from all parts of the Pacific coast and abroad have attended each fair, the building being crowded afternoons and evenings.

Communications will be addressed to J. H. Culver, Secretary Twenty-ninth Industrial Exposition, 31 Post St., San Francisco, Cal.

By order of the Board of Trustees.

A. S. HALLIDIE, President.

ERNST A. DENICKE, Recording Secretary.

San Francisco, Feb. 20, 1896.

# Scientific Progress.

### Effect of Using Corrugated Glass.

It has frequently been found in large factories where the rooms were broad that insufficient light was obtained on either side between the windows. It has recently been discovered, however, that, if the glass used in the sashes be ribbed or corrugated instead of flat, the light will be diffused much more effectively. Some experiments tried by Charles L. Norton, of the Massachusetts Institute of Technology, with different specimens of this glass, show that about twenty ribs to the inch give a better effect than a smaller number. Of course, one cannot look through such windows. At a short distance they appear like ground glass. It has been suggested that, where the employes are likely to object to the loss of view thus occasioned, it might be well to put clear glass in the lower part of the window and ribbed glass in the remaining portions. It seems to be necessary to use panes which are rather thicker than those of clear glass, and, consequently, heavier. On this account it may be well to have the greater part of the window stationary, with a sort of transom above, for ventilation.

Ordinarily, daylight comes into a window and strikes the floor slanting, at an angle of about forty-five degrees. A big bright patch can be seen on the floor opposite each window. From this spot some light is reflected upward, and then a still smaller portion is thrown down and scattered about the room by the ceiling. But if ribbed glass be substituted for the plain kind, the bright patch on the floor disappears. The light is spread out into a fan-shaped beam, reaching far around on each side. This expanding effect is sideways if the ribs run up and down, as they ought to; but if they run horizontally, the diffusion is upward and downward. But the latter arrangement is undesirable, because the glass itself, in that case, acquires a brilliancy painful to the eye. The effects attributed to the new glass by scientific men are almost incredible. Even directly in front of the window the amount of light apparently received is almost trebled; and well around on the side, at an angle of sixty degrees, it is about doubled. It is not alleged that more light actually enters, but that the distribution is such as to give these results, if special light-measuring instruments be used for tests a few feet away.

### Revealing Hidden Solids.

Further particulars of Prof. Roentgen's method of photographing objects under the influence of electric radiation, solely, are awaited by the whole scientific world with some interest. It is now stated that one experimenter has succeeded in obtaining pictures through an intervening medium consisting of aluminum plates an inch thick. This statement, pending the receipt of more exact information, must be accepted with caution. There seems little reason to doubt, however, that vacuum tube lighting makes it possible to photograph through opaque bodies, and this discovery has evidently been prepared by the demonstration of the penetration of the Hertzian waves through various bodies. It is suggested that if all that has reached us by cable be true, there will no longer be any privacy in a man's home, as any one armed with a vacuum tube outfit can obtain a full view photograph of any interior through a brick wall. Possibly an indispensable part of the construction of the house of the future will be a photograph-proof screen. Medical men are already discussing the probable effect of the new discovery in their profession. They propose, with different strengths or gradations of the radiant energy, to bring different substances or structures into view in any part of the body. Thus, with one strength they hope to detect metals; with another, bone or bony tumors; with a third, the various kinds of degeneration to which the structures of the body are liable. For instance, solidified parts of the lung where the structure may have shrunk away may be made apparent. In the heart may be detected the difference between fatty degeneration and brown or amyloid degenerations. Applied to the abdominal cavity, the new process may be used in the discovery of tumors, abscesses, hardened parts of the liver or other abdominal organs, and very possibly calcareous deposits in all parts. In the treatment of gunshot wounds its value would seem to be unquestionable.

### The New Photographic Process.

The possible uses of the new process of photography, in determining the existence of secret flaws in metals, is about to be tested thoroughly at the Carnegie works, where a large amount of naval armor construction is under way. Proper apparatus has been secured, and experts there are now at work to demonstrate whether or not rays will penetrate bodies of metal. If this can be done the importance of this process from an industrial standpoint can scarcely be overestimated. It will be possible to secure an exact knowledge of the nature of the metal of great guns without running the risk of explosion, and the defects in the shafts of ocean steamers can be discovered before the shafts break and thereby cause loss of life and property, and steel castings used for structural purposes can be accurately tested before being put in place.

By way of showing the effect of improved methods upon prices, Lord Playfair stated at a technical education meeting in England, that since 1856 aluminum has fallen in value from $90 to 50 cents a pound. Simultaneously, nearly all machine-made commodities have cheapened by 30 per cent; and the cost of transport has been so far reduced that the flour in a quarter loaf is brought 4000 or 5000 miles for 1 cent. These declines are attributable to the advance of science, through whose istrumentality we are now enabled to do with comparatively little trouble that which formerly required the expenditure of much energy.

# Mechanical Progress.

### Hardening Steel.

Consul Monaghan, of Chemnitz, reports to the State Department that the Germans are interested in a new process for hardening steel by means of gas. The invention originated with the famous French steel and iron firm, Schneider & Co., of Creuzot. It is a well-known fact that gas, under great heat, deposits carbon in solid form. Upon this depends its light effects and also the formation of the so-called retort graphites, a thick covering of pure carbon on the walls of the gas-light retorts. The gas that strikes the retort walls deposits parts of its carbon upon them. This is the fact on which Schneider based his invention—a process for cementing together (uniting) steel armor plates.

It is said to be very important in the production of armor plates to have them comparatively soft inside and hard outside. This hardening is obtained by the application of carbon. Formerly the process of hardening consisted in covering the plates with layers of coal and heating them till they glowed. Schneider's process puts two plates into a furnace, one on top of the other, with a hollow space between. This space is made gastight by means of asbestos packing put on around the edges, and the plates are heated red hot, while a stream of gas is poured into the hollow space indicated. The carbon thrown out by the gas is greedily taken up by the glowing plates until they are thickly covered. The depth of this carbon covering can be regulated by the amount of gas admitted. In order to secure regular and uniform action during the process, and to prevent the pipes that carry the gas to the hollow space from absorbing any of the carbon, they are insulated in other pipes, through which water is constantly circulating.

### A Big Leak.

In a recent lecture before a Marine Engineers' Institute, Professor Weighton said that the economy of propulsion in steamships divided itself into two parts: (1) So far as it related to machinery, the friction of the mechanism, the maximum horse power, the fuel. (2) The form of ship which would give the least resistance in carrying a given dead weight at a given speed, with a maximum amount of power. He would only deal with the first. We had nothing to boast of as regarded the efficiency of modern machinery. If we reduced one pound of coal to horse power we would have 327 horse power, and for every pound of coal we burned we ought to get, if the machinery and the boiler and the furnace were each fulfilling their purpose with perfection, 327 horse power; what we actually got was 17⅞ horse power. Prof. Weighton then illustrated by diagrams representing disks, the various approximate losses of power from the boiler to the propeller. The first disc, or the pound of coal, represented 327 horse power; the second disk, the boiler, 216; the third disk, the engine, 34½; the fourth disk, 29⅛, and the fifth disk, the screw, 17½. He showed how these various losses of power accrued—namely, at the furnace by the radiation of heat, by latent heat, and by heat passing off in the form oxide. Friction was another medium which minimized the power. He pointed out the difference between Welch coal and Newcastle and Scotch coal, and the best methods to burn them. The coal, required, he said, for 1000 horse power was thirty-six tons per day, but if the machinery utilized all the latent heat in the fuel, we would only require about two tons.—The Engineer.

### Soldering Glass.

Recent investigations pursued by Margot have established the interesting fact that an alloy composed of ninety-five parts of tin and five of zinc melts at 200°, and becomes firmly adhered to glass, and, moreover, is unalterable and exhibits a most attractive metallic luster. He has further ascertained by this experiment, that an alloy consisting of ninety parts of tin and ten of aluminum melts at 390°, becomes strongly soldered to glass, and is possessed of a very stable brilliancy. With these two alloys it is possible, it is claimed, to solder glass as easily as it is to solder two pieces of metal, and this operation may be done by soldering the pieces of glass, when heated in a furnace, by rubbing their surface with a rod of the solder, the alloy as it flows being evenly distributed with a tampon of paper or a strip of aluminum — or an ordinary soldering iron can be used for melting the solder.

### Why Presses Are Succeeding Hammers.

The great steam hammer at the Bethlehem Company's works in Pennsylvania is at this time the largest one ever made. It is single-acting, that is, the falling movement or blow is by gravity alone. The falling weight is 125 tons, and the range 16.5 feet. The whole structure is 90 feet high from the floor, and the foundations extend 30 feet below, so the whole height is 120 feet. The piston rod is of steel, 16 inches in diameter. There are in use two other hammers of 100 tons, one at Creuzot and one at Rive de Gier, France, and one of 109 tons at Terni, in Italy. The next largest is 80 tons at St. Chamond, France.

The largest double-acting hammer is at Aboukoff, in Russia, rated at 50 tons, but this rating will not do to compare with gravity hammers. The blows may equal in force 100 tons falling only. The great hammer at Bethlehem is outdone by a hydraulic forging press recently erected there that exerts a pressure of 14,000 tons. The force is not accumulated, but is direct by steam pistons acting on the water with a force estimated as equal to 16,000 horse power.

If the effect produced by these vast engines could be accomplished irrespective of speed or velocity there would be no need of such great weight, but an element of time enters into these forging processes, necessary because of inertia in large masses to be reduced, and also because some time must be allowed for the heated metal to flow when under pressure. This is more nearly attained by a heavy weight falling slowly.

The increase of hammers to the enormous proportions named is to acquire this time required, the principle culminating in the forging presses, more commonly employed all over the world for heavy work, especially in England, where hydraulic apparatus has attained great development. The presses acting slowly permits the metal to move uniformly throughout, or "to the center," as it is called, while a quick blow acts only on the surface.—American Manufacturer.

# Electrical Progress.

### Making "Scorchers" of Some Use.

Among the recent developments to which the widespread use of the bicycle has led is a machine for enabling the cyclist to train or take advantage of his exercise indoors in bad weather. The rider sits in the saddle and works the pedals in the usual way, and while the wheels revolve, their force is expended on the turning of an endless belt, and the bicycle never moves from the spot. It has occurred to a French electrician that some useful work can be done at the same time. He has accordingly designed an apparatus in which the driving wheel of a safety bicycle of the usual type is raised from the floor and, by means of a strap and speed gearing, made to drive a small dynamo, which is used to charge accumulators. This idea of turning exercise into a useful product outside of its own special purpose, is capable of wide application. One instance of it will be readily remembered. Nansen, in fitting out the Fram for his Arctic expedition, had a capstan placed on deck, the shaft of which was connected by gearing with the ship's dynamo. The object of this was that in the long, dark winter of the polar regions, the crew should take daily the exercise needed for health, by doing their shift at the capstan, and at the same time generate the electricity needed for lighting the ship. In some English prisons, where the energy derived from the working of the treadmill by the convicts has hitherto been insufficiently utilized, it is now proposed to turn it to the generation of electricity for lighting the buildings, making the prison industries more remunerative, and giving the prisoners a training which will enable them to live honestly when they are discharged.

Much comment has been excited by the putting into practical shape of an idea that talking machine makers have been long commending to the public. A Congressman is using the phonograph for the reproduction of speeches in which he wishes his constituents to be abreast of his political work. He finds he can thus address them in a distant city without neglecting his duties at the national capital. After the speech is uttered into the transmitter of a phonograph, the cylinder is removed, shipped to its destination by express, and placed in an instrument with a megaphone attachment at the other end, where the speech can be listened to by a large assemblage, and repeated, if necessary. It is suggested that the telephone could be employed for still more direct delivery of Congressional eloquence. It might even be used to enable every con-

stituent to hear his representative's speeches as they are uttered on the floor of the House.

### Success in Electrical Engineering.

The question, "Are we educating too many electricians?" has brought out a great number of replies, most of which are in the affirmative. One professor while believing that too many electricians are now being educated in this country, is convinced that the electricians turned out of many institutions owe much of the tardiness, if not absence of success of their efforts, to the fact that they are not properly equipped for their work. The tendency in some colleges is to concentrate the students too much on the theoretical side of their preparation, to the manifest detriment of their practical training. This practical training he would make as wide and as thorough as it is possible to make it. To show this, he relates an instance that came within his knowledge. At Cornell all the mechanical engineering students have to learn seven trades. One of these trades, that of a blacksmith, is very distasteful to some of the students, but it has to be learned, all the same. One young fellow, who was unusually averse to soiling his hands, begged hard to be exempted from wearing the leather apron, but the professor took special care that there was nothing lacking in the thoroughness of his training at the forge. Last fall, the student went to the professor and thanked him for being compelled to learn blacksmithing. "You see," said the former dude, "I am now superintendent of a mine away back in Colorado. Last summer our main shaft broke and there was no one in the mine but myself who could weld it. I didn't like the job, but I took off my coat and welded that shaft. It wasn't a pretty job, but she's running now. If I couldn't have done it, I'd have had to pack that shaft on mule back and send it 300 miles over the mountains to be fixed, and the mine would have shut down till it got back. My ability to mend that shaft raised me in the eyes of every man in the mine, and the boss raised my salary.

THE Attorney-General of Ohio has decided that electric roads in that State, carrying passengers, express and mails, "are under the jurisdiction of the Railroad Commissioner and subject to the same regulations that govern steam railroads."

## Practical Information.

### Some Mile Recods.

A mile is not a thing requiring such an extraordinary time to cover, provided the coverer of it is properly equipped with a sufficiency of speed-producing powers. Below is given a partial list of some exceedingly speedy milers and their performances, and some slow but sure travelers as well:

Light—0.000005102 of a second, or 196,000 miles in one second.

Electricity—0.00000347 of a second, or 188,000 miles per second.

Earthquake—¼s., as calculated by delicate instruments, or around the world in 3½ hours.

Sound in Water—1s., or 4,900 feet in one second.

Cannon Ball—1 1/5s., if it traveled at the muzzle velocity of 3,300 feet per second obtained by some guns.

Sound in Air—5s., or 1090 feet in one second.

Birds—18s. It is said the frigate bird flies 200 miles an hour; a mile in 24s, by the kestril, or sparrow-hawk, which is said to fly 150 miles an hour; in 1m. 9s. by a pigeon, when flying 200 miles in an actual race; in 1m. 15½s. by a pigeon when flying 400 miles in an actual race.

Railway Train—32s., in May, 1893, the Empire State Express, of the New York Central and Hudson River Road, drawn by engine "999," with Engineer Hogan, near Crittenden, N. Y., or a rate of 112½ miles in an hour.

Tandem Bicycle on Straightway Road—1m. 17⅕s., on December 16, 1895, on a straightaway road built for the purpose at Cheyenne, Wyo., with a wind blowing 30 miles an hour, by two riders, John Green and Charles S. Erswell.

Bicycle Straightaway—1m. 25s., John Green, Cheyenne.

Duck—40s. or 90 miles an hour.

Electric Railway—50s., on the Baltimore and Ohio Railway, at the Baltimore Tunnel in September, 1895.

Ice Boat—1m., at Newburg bay, Hudson river.

Horse Running—1m. 35⅘s., by Salvator, at Monmouth Park, August 28, 1890.

Bicycle on Track—1m. 40⅗s., by P. J. Berlo, New Orleans.

Dog—1m. 43½s., if the greyhound coursed one mile, the usual distance of 200 yards having been run in 11⅛s.

Boat—1m. 45s., torpedo boat Sokol, made by Messrs. Yarrow, of England, for Russia, and which developed in October, 1895, a speed of 34 miles an hour. Steamship Lucania in 2m 13⅘s.

Bicycle Quadruplet—1m. 47⅘s., on October 17, 1895, at Denver, Col., unpaced, flying start, Connibear, Dickson, Stone, and Swanbrough.

Bicycle Tandem on Track—1m. 52⅕s., on October 27, 1894, at Waltham, Mass., flying start, paced, Haggerty and Williams; on August 17, 1894, at Denver, Col., flying start, unpaced, Titus and Cabanne, in 1m. 55⅕s.

Horse Pacing—2m. 1½s., by Robert J., at Terre Haute, Ind., on September 14, 1894, against time.

Bicycle Triplet—2m. 1⅘s., unpaced, standing start, Kennedy, Murphy and Saunders.

Horse Trotting—2m. 3⅕s., by Alix, at Galesburg, Ill., September 13, 1894.

Horse Team Trotting—2m. 12⅕s., by Belle Hamlin and Honest George, driven by E. F. Geers, at Providence, R. I., September 23, 1892.

Man Skating—2m. 12⅗s., by J. F. Donoghue.

Horse Under Saddle—2m. 13s., by Johnson, pacing at Cleveland O., August 3, 1883, against time; in 2m. 15⅗s., by Great Eastern, trotting at Fleetwood park, September 22, 1877.

Crow—2m. 40s., or 25 miles an hour.

Horseless Carriage—4m., a carriage running 750 miles, from Paris to Bordeaux, in the international race of 1895, or 15 miles an hour throughout.

Man Running—4m. 12⅗s., professional, W. G. George; in 4m. 17⅘s., amateur, T. P. Conneff.

Man Rowing—5m. 1s., by Ellis Ward, on the Savannah river, Florida, April 1, 1872.

Man Walking—6m. 23s., professional, W. Perkins, of England; in 6m. 29⅗s., amateur, F. P. Murray, of the United States.

Man Swimming—27m. 21⅘s., J. H. Tyers, Englishman; in 28m. 55⅘s., G. Whitaker, American; both amateurs; both with seven turns.

Man in Tub—1h. 10m., by Gus Frates, in Oregon, in 1895, paddling in a tub 6 miles in 7 hours.

As will be seen by a study of the above list, in the case where figures are given of speed production wherein man is a factor, the bicycle is beaten only by the railway train, the electric railway, and the ice boat, and its nearest competitor is the running horse, and he is 18 seconds slower. Relatively, it seems as though it were impossible for the bicycle to attain a higher position in the speed world, 17½ seconds separating it from its nearest leader, the ice boat, a lead which looks almost impossible to overcome, if the idea is accepted that anything in the speed line is a cycling impossibility.—The Wheel.

### Care of Lamps.

Burners need a monthly boiling if they are to give the clear, steady light which well regulated households desire. Vinegar with a little salt sprinkled in it, is the fluid in which they should be boiled. Wicks should never be cut, but the charred portion should be rubbed off every day with a card or cloth and the loose threads clipped with small scissors. Wicks should not be used until they are very short, but should be changed frequently. An old wick becomes tightened and the webbing is no longer loose enough to draw the oil easily. Chimneys should not be washed but should be cleaned every day with a cloth wet in alcohol. This will keep them shining and brilliant. Shades should be deep enough to keep the light from striking through the clear glass to the eye, no matter how low one is sitting. The tank should be filled every day almost to the brim, but not quite.

### Some Wasted Sun Force.

The London *Electrical Engineer* gives some interesting figures in regard to wasted energy. The heat energy of the sun is the source from which we mostly draw our utilizable mechanical energies. Part of this heat energy is expended in vaporizing and lifting water, and it is calculated that in a year 31,000 cubic miles of water are so vaporized, of which 13,000 cubic miles run back by rivers into the ocean. This water falls through a height equal to the mean level of the land, which may be taken for the whole world at at about 1,000 ft. The total water volume shed over England and Wales is about 20 cubic miles per annum, and we may assume the mean level of land at about 400 ft. Thus in England and Wales 20 cubic miles of water fall 400 ft. each year. A cubic foot of water weighs 62½ lbs., therefore a cubic mile of water will weigh 9,199,872,000,000 lbs., and falling 400 feet gives us 3,679,948,800,000,000 foot pounds available from each cubic mile of water so falling. Then if 20 cubic miles so fall we have no less than 73,598,976,000,000,000 foot-pounds available, or about 2,230,272,000,000 H. P. per annum. Of course only a small fraction of this can be utilized, but for the sake of having the figures before us we have ventured to give what may be called the annual quantity of water on tap. It will be seen that a vast store of energy is now going to waste which will certainly be to some extent utilized when coal gets scarcer and therefore dearer.


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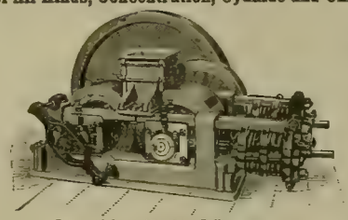
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*And all kinds of*
✦ ✦ MACHINERY FOR MINING PURPOSES.
Flour Mills, Saw Mills and Quartz Mills; Machinery Constructed, Fitted Up and Repaired.
FRONT STREET, Bet. N & O,
SACRAMENTO, CAL.

# Mining Summary.

## CALIFORNIA.

### Amador.

Seventy stamps are now crushing at the Wildman-Mahoney mine.

THE ONEIDA.—A three compartment shaft is being sunk about 800 feet east of the old shaft. The engine and machinery of the steam hoist are on the ground. Ross Browne is manager.

PETROLEUM FOR FUEL.—*Record:* An experiment is to be tried at the Gover mine in substituting crude petroleum for wood in the generation of steam. Wood is getting scarce and high-priced. As the point of supply is pushed further back in the mountains its value will continue to enhance. It is estimated that by the time it is placed in the furnace the wood costs from $10 to $12 per cord. C. E. Purrington, the superintendent of the Gover, believes that better results can be obtained with petroleum. He has had two new boilers made for the purpose of making the experiment.

### Calaveras.

HEXTER MINING COMPANY.—Of the Hexter Gold Mining Company, recently incorporated, Superintendent Robinson says: "The Hexter mine is one mile from Mokelumne Hill and consists of a quartz claim about one mile in length, by 600 feet in width, under United States patent. It is one of the mother lode veins of Calaveras county, with a trend conforming to all of the mother lode veins in the mother lode zone. The formations of the country rocks are green stone and slates. The Hexter lode lies midway between Gwin mine lode on the west of the mother lode belt, and the Esperanza mine on the east wall of the zone, and is therefore known as the Central Lode or vein of the mother lode series of veins. It is often the case in some of the mother lode veins that they have a dip to the west, as in the case with the Hexter lode, for 100 feet or so in depth, when they right up and pitch east. This is caused by local disturbances and rarely effect the vein to any great depth.

THE UTICA MILL.—At the Utica mine, the biggest single gold producer in the United States, the ore is quartz, schistose and slaty diabase, and chloritic and talcose schist, with iron sulphurets. It is crushed in jaw-breakers at the head of the shaft, after passing over grizzlies, and is dropped into bins, from which the ore is conveyed in cars to three other bins in the mill, one for each section of 20 stamps, having a capacity of 600 tons each. The bins discharge into Challenge self-feeders. The 60 stamps weigh 775 pounds each, and drop 105 times per minute, the drop being 6 inches and the discharge 19 inches from the new die. Only one chock-block is used, causing the height of discharge to constantly increase. The duty of the stamps is four tons in twenty-four hours. Round-punched tin screens 10x14 inches, are used. They are lightly burned before using. Three and a half of the screen sheets are tacked on the screen frame on three sides; the top side is secured by a long, narrow strip of wood screwed to the frame. The superficial area of the discharge is about 287 sq. in. The screen frame is braced by six cross ribs, to which the screens are tacked. A splash board is suspended in front of the screen by eye-bolts and hooks, with a strip of canvas tacked along the bottom, the full width of the screen. An iron apron or table is secured to the front of the mortar below the screen, the bottom of which falls 1 inch below the lip of the mortar, permitting the insertion of a rough inch board, 9 inches in width, in front of the mortar, flush with the upper edge of the lip of the mortar; on this the pulp falls from the screen, and it is claimed to be superior to a plate in retaining the amalgam. Three inches below the board, runs a trough, in which are two apertures one-third the distance from each end, which allows the pulp to fall on a short, 6-inch wide copper plate with a pitch toward the mortar, and from thence to the apron plate 2 inches wide and 24 feet long, set to a grade of 3 inches to the foot. An inside front plate is used in the mortar. From the apron plate the pulp passes to a sluice box and is conducted to the spreaders of the vanners, of which there are twenty-four. After leaving these the pulp is led through a sluice box and flume one mile long to the canvas plant. The plates are dressed every morning; a battery is hung up, the water shut off, the splash board removed and washed off, as also the screen and the entire front of the battery, to remove all sand; the plate is then vigorously scoured with a whisk-broom to loosen the amalgam. A very dilute solution of cyanide of potassium is sometimes used during this operation, and the loosened amalgam brushed to the foot of the plate. The plate is then scraped upward with a piece of rubber 4x4 inches and ¼ inch thick; a piece of rubber belting would answer the same purpose. The collected amalgam at the head of the plate is removed in a scoop and placed in a safe. The plate is then sprinkled lightly with quicksilver, which is spread evenly over the entire plate, the water turned on and the stamps dropped. The operation for all the plates requires nearly three hours.

A cleanup of the mill is made monthly or semi-monthly, according to the condition of the battery amalgam, at which time all necessary repairs are made, and new shoes or dies are fixed if required. Shortly before hanging up, the feed is shut off to permit the ore to be crushed down as low as possible. The water is then shut off from the battery, splash board and screen removed, and all hosed off; the inside plate is removed and the amalgam scraped off. The contents of the battery are now removed and placed in the revolving cleanup barrel, the dies replaced, tappets set, screens replaced and the mill started. The pulp that leaves the mill carries considerable auriferous pyritical slimes, as might be inferred from the high discharge used in the battery. This is conveyed through a sluice, 12x8 inches, to a canvas plant one mile distant. Just before entering the building set apart for the recovery of these slimes, the sluice is widened to eighteen inches, and divided into three sections by two narrow strips fastened to the bottom. These divisions fork off into separate sluices, which are again subdivided. Three of these subdivisions are carried directly through the building and there divided, and the other three are divided off in five separate sluices, one for each section of the canvas table. There are forty-five sections for each table—ninety in all. They are forty-two feet long, twenty-two inches wide, and set on a grade one and one-eighth inch to the foot. No. 8 duck canvas is used, and when worn on one side it is turned; it lasts about one year. The last division of the pulp, outside the building, is into five boxes, four inches square, each of which terminates in a receiving box, reaching across three canvas sections, about five and one-half feet. The five divisions supply one-third of the sluices on one side of the building, the pulp passing to the canvas through an auger hole in the side of the box. The flow is regulated by a slide suspended over the whole. Above the pulp distributing box is a clear-water box, and at the lower end of the canvas tables are two sluices side by side—one to receive the concentrates, the other for the reception and discharge of pulp. The current must be thinned and distributed so that no accumulations form.

THE ESPERANZA MINE.—The Esperanza mine at Mokelumne Hill is running a 20-stamp mill steadily, and six men breaking quartz keep the mill busy day and night. The six-ton chlorination plant will be in running order by March 20th. Stoping in the mine is chiefly from the 100-foot level below the tunnel level to keep the mill running. Grading has begun for the new hoisting works and ground will soon be broke for the additional ten-stamp mill.

### Del Norte.

*Record:* The work of preparation for mining the Jones & Fisher placer claim, on Coon creek, was completed last week. A storm is now awaited to commence mining, the water supply at present being limited to surface water caught during storms. The owners will, during the coming summer, dig a ditch four miles long to intersect Coon creek, which will furnish the necessary water to operate the claim almost continuously. The mine at present is equipped with the piping formerly used at the R. W. Miller claim on Smith river.

### El Dorado.

The Steward mine near Volcanoville, on the Georgetown divide, is being fitted out with a ten-stamp mill. They have a twelve-foot ledge of high-grade ore.

The Zantgraf, twenty-four miles southwest of here, made its first cleanup after a three weeks' run, which yielded $16,000. This is the property of E. W. & T. Chapman.

Gillmwater, Roberts & Melton have bonded two claims from W. F. Lupold, twenty-four miles east of here. There are two arrastras in operation at present, which will soon be supplanted with a twenty-stamp mill.

Pearson Brothers have bonded their electric power plant in course of construction three miles from here, on the south fork of the American river, to San Francisco capitalists. The object of the plant is to furnish power to mines within a radius of thirty-five miles. Construction work is being rapidly continued.

Superintendent Richards is supplying the Church mine with an electric light plant, and a large reservoir and pipe line.

Capt. Geo. H. Breymann, a capitalist of Toledo, Ohio, a stockholder in the Big Sandy mine, reached town to-day. This is the Captain's first visit to this coast. As reported in these columns a week ago, the owners of the Big Sandy, which was closed down at water depth two years ago, concluded to rehabilitate the property. Work is well advanced to pump the shaft and sink to a depth at present of 500 feet. Mr. Breymann is a member of Breymann Bros., contractors and submarine engineers, and of Thatcher & Breymann, owners of four of the largest dredges in the United States, and he is also owner of a line of steamers on Lake Erie. He says capital will not be spared, to delve deep as money will go so long as ore can be found, nor will capital be lacking to place as many stamps as can be furnished with material to grind.

The Big Sandy with its ten-stamp mill proved a lucrative property in its day, even to shallow depth, and may become a dividend-payer. The property is four miles north of Placerville, in the Kelsey district.

Placerville, Feb. 18, '96.

### Inyo.

D. C. Lane intends putting in a 12-H. P. gasoline engine at the Sorba mine to be used in operating a hoist. A 15-H. P. plant is to be put in at Snow's Canyon to run the new mill.

REOPENING THE PANAMINT MINES.—J. W. Keeney of Riverside has relocated several claims at Panamint and has nine men doing development work. These mines were famous as the base of supplies of Senator John P. Jones twenty years ago, when silver was in demand. From September, 1875, to May, 1876, a period of eight months, the yield was $344,333.82, or an average of $38,259.20 per month. Although the price of silver has declined, there is still profit to be made in working the old mines. The company has thirteen claims in all, some silver and some gold. The mills of the old company, under the Jones regime, are still there and have been leased by the new company, and within two weeks Mr. Keeney says he expects to have them under full blast and will add to the force of men from time to time.

### Mariposa.

*Gazette:* At the Pinon Blanco Capt. A. H. Ward is about to erect a twenty-stamp mill. He has purchased forty acres of land from J. H. Hallinan. The Pinon Blanco mines have now passed out of the prospecting stage and will shortly take rank among the producers.

HITE'S COVE.—The late lamentable accident at this mine had a very depressing effect on the men employed. Mr. Minear could not get some of them to go to work again in the mine. Their places have been filled by a fresh crew from Coulterville.

MERCED GOLD MINING COMPANY.—Work is progressing steadily on all the company's properties. The new mill at the Potosi is nearly completed and before the end of this month the stamps will be pounding out some return for the heavy initial outlay that the company has been under. The pay roll of the Merced Gold Mining Company runs from $30,000 to $40,000 a month.

THE TENDRON MINE.—This mine is usually known as the Whitlock, but the Sierra Buttes Co., Limited, the owner, has called it the Tendron as a compliment to Mr. Tendron, the chairman of the Board of Directors. About eighty men are employed at present. Development work is going on rapidly. The twenty-stamp mill is running, and so far as things have gone hitherto the mill has paid for the full cost of development of the mine.

At the Santa Rosa mine prospecting and development work is going ahead, and the owners are now just as well satisfied that their negotiations with Messrs. Hayward, Lane & Co. did not result in the mine passing out of their own control. The mill is now running, and about a dozen men are at work.

LUDWIG'S MILL.—The five-stamp battery is working steadily day and night. At the present time some remarkably rich ore is being run through. There is plenty of rock ready for crushing from several sections of the Grant.

PERSIA MINE.—W. H. Wright has started up his new ten-stamp mill on Saxon creek. In the future the Persia will probably take rank as one of the best gold producers of Mariposa. At the present time about sixteen men are on the pay roll.

THE CROWN LEAD.—Little is going on at the present time on this valuable property. It is understood that negotiations are pending with English capitalists. W. B. McSherry, the manager of the property, has been in San Francisco for some time past but is expected back daily. In the Merced river, just below the old Crown Lead dam, Robert McSherry and Mr. Pullen have been getting some good results sluicing, before the water got too heavy for them.

### Nevada.

The Superior Court has made an order ordering Messrs. Scadden, Thomas & Roberts to surrender possession of the Scadden Flat mine to the North Star Co. The order was immediately obeyed. The North Star employes resumed the work of timbering the old shaft, and will erect a pumping plant on the mine.

### Plumas.

Weather lovely, air like spring, trees budding; scarcely any snow here and not over six feet on top of Spanish peak, at 7000 feet altitude; miners muddying the water slightly; the Plumas Imperial Company is piping; the Quincy M. & W. Company has not yet got to work—some of its dams went down to Yuba City during the freshet and have not since been heard from, but will furnish some good planks for an anti-debris platform. E.

Quincy, Feb. 16th.

### Riverside.

The Briggs mine, in the Menifee district, will reopen next week with a large force of men.

The Indian Queen and Golden Chariot mines, near Perris, have received new hoists and pumps.

The Morning Star mine will soon have active development work.

### San Diego.

(Special Correspondence).—Mr. Q. R. Smith, the owner of the Jolly Boy and Oxide mining claims in Crescent Valley district has begun work.

The Geneva Gold Mining and Milling Co. begins development work on its property in Escondido this week.

Several owners of prospects are now at work in this section trying to ascertain the value of their properties. B.

Escondido, Cal., Feb. 18, 1896.

PICACHO MINES.—*Sentinel:* Work is being crowded days, nights and Sundays on the six new shafts now being put down on Senator Dorsey's mines. The seventh shaft was begun Monday and the eighth on Tuesday. The first six are now down from 45 to 70 feet each. The miners are able to sink from two to three feet in twenty-four hours.

Judge O'Connor has decided to sink three shafts, each 100 feet deep, on the mines he purchased from Richards, Josselyn and Adams.

The Santa Rosa has laid off a number of miners and hung up ten of its stamps the past week. The reason for this is attributable to a scarcity of water in the mine. Some method will shortly be adopted by which a supply of water will be obtained sufficient to keep the twenty stamps running steadily.

### Shasta.

The feed pipe, which collapsed at the Gladstone mine some time since and caused a temporary closing down of the mill, has been repaired and twenty stamps are now running steadily on good ore.

### Sierra.

*Messenger:* The Bald Mountain Extension mine directors met last Monday. H. H. Purdy was elected president and H. T. Briggs secretary of the company. The cleanup at the mine last week amounted to 103 ounces.

THISTLE SHAFT.—The Feather Fork Gold Mining Company has over 100 men employed at its mine situated in Sierra county near the boundary line of Plumas. Five hundred loads of gravel are taken out each day and it is reported that a heavy gold output is being made.

SQUIER SHAFT.—Owners of the Squier Shaft property are preparing to resume work.

At the North America mine men are taking out gravel.

### Siskiyou.

G. B. Temple refitted the Wingate Hill mine, near Clear creek, which was worked extensively a number of years ago and has yielded from $100 to $400 per day, and was stopped in the belief that it was worked out, but from present indications there is considerable good ground left. They are working at present on a high channel about 900 feet above the level of the river.

At the Bunker Hill mine, recently purchased by A. J. Hughes and Hilbert Brothers, they are rebuilding four and one-half miles of the flume and ditch, and expect to commence running the mine about the 1st of May.

The Siskiyou mine, near Clear creek, has commenced washing pay dirt. The main water right, taken from Clear creek, is conveyed through four and one-half miles of four-foot flume and several miles of ditch. There is also a ditch about three and three-fourths miles long from Crawford creek leading to the main ditch. The two creeks furnish about 1400 inches of water. From the ditch the water is conducted through a twenty-two-inch pipe until it reaches the mine, at which point is a distributor through which it is turned into two fifteen-inch pipes leading to the giants, a No. 2 and No. 3, where it is discharged through four and one-half-inch nozzles under a 350-foot pressure.

GENERAL MINING NOTES.—*Journal:* The biggest strike in quartz mining which has been made in Siskiyou, and without a doubt the largest in northern California, has just been made at French creek, seven miles from Etna. The ledge is twelve feet in width, and all the rock which has been taken out runs $350 to the ton. The ledge has been tapped at a number of places from 100 to 600 feet apart, and the rock in every instance has gone about $350. On last Saturday we were shown several pieces of quartz taken from the mine, and streaks of gold could be plainly seen running through them, the quartz being of a light and free character. This mine is owned by Engler & Atkinson, capitalists of Oakland, and was bonded to a man named Swift for $14,000 before this rich strike was made. The mine is worked under the superintendency of T. B. Dillon and employs twelve men at present. There is a small Huntington mill on the property, but a proposition is now under consideration to erect a 100-stamp mill, which will be one of the largest on the coast. The mine was formerly owned by J. O. Welsh and up to last December was worked by A. B. Chamberlain, whose tunnel when he stopped work was within 18 inches of the rich ore which has just been found. This property will go ahead of the rich ledges of Cripple Creek, and will be an immense thing for Siskiyou.

The general manager of the American Bar Mining Co. informs us that they have leased to Thomas Glinn and others the lower portion of their bar. Glinn & Co. put in their own plant and pay all expenses of mining, and also pay the American Bar Mining Co. a certain percentage of the gross yield. The American Bar Co. is not interested in any way in the expense, cost or operations of Messrs. Glinn & Co. other than to obtain their percentage of the yield. The upper portion of the property will be worked this season under the management of the American Bar Mining Co., who have let a contract to Mr. B. F. McCrary to build the necessary dip and overshot wheels, derricks, etc., and rig the claim ready for mining by April 1st, at which time the company will commence mining under their own management, with about thirty men employed. We understand that Messrs. Glinn & Co. will employ about 100 men after they have the portion leased by them opened up so that they can get room to place the men, as they expect to move over 50,000 yards of ground this season.

The favorable weather of the present month has enabled Supt. Booth of the Seattle Placer Mining Co. to complete the ditch to the west branch of Thompson creek, a distance of four miles. Members of the company from Portland and Seattle, the Messrs. Smith, have visited the property, and decided to flume the rest of the distance to the main creek, on account of the steepness of the mountain side and the tendency of the soil to slide. They are figuring with parties to put up a sawmill for cutting the required amount of lumber. The ditch and flume together will, when completed, be six miles long. In this distance it takes the waters of three creeks, two of them branches of Thompson creek.

### Trinity.

This week Tom Morton sold the talc mine discovered by him last summer in his claim at Trinity Center to Major Lyons of Redding, says the Trinity *Journal*. The purchase price was $4000. The talc carries a large amount of gold and the mine is a good piece of property.

### Tuolumne.

MINING NOTES.—*Independent:* The Bonanza mine started up last week with six men. The pumps are at work clearing the mine of water.

The Louisiana mine was experted and an offer to purchase the property for $25,000 was made by a mining company this week. The offer will undoubtedly be refused, as the mine is valued far above that sum.

## NEVADA.

ON THE COMSTOCK.—Leading Comstock mines still hold out well. The Con. Cal. & Virginia extracted during the past week 132 tons of ore that averaged over $50 a ton, which is better than twice as much $25 ore. At the old Ophir works they are now beginning to get some pay. They have a considerable body of ore that averages $12 a ton. This is

of such a character that by a little careful assorting the average can be brought up to $30 a ton. The vein of gold quartz struck in the Occidental, west of the main ledge, still holds out well. In the face of the drift it now averages $30 a ton, but in places is much richer. At the Utah, Supt Lyman is opening up an old surface tunnel that was run to the west many years ago. It was aimed to strike an immense dike of peculiar rock which lies on the north side of Cedar Hill, but for some reason work in it was discontinued before the dike was reached. In view of what has occurred at the Occidental, a good gold discovery may be made near the dike.

KENNEDY DISTRICT. The Austin *Reveille* says there are about seventy five persons at Kennedy and twelve men are working on the Irish mine for J. A. Blossom. The Sweitzer Company is still paying rent on the Kennedy mill and looking for a mine in the district on which to erect their electric plant for the reduction of ores. The company offered Mart Wiggin $5000 for his mine, which offer he refused.

ESMERALDA COUNTY.

A new mining camp has sprung up 20 miles from Palmetto. Ten locations have been made in the past few days. The average rock gives $30 in gold. It is free milling.

ELKO COUNTY.

MARDIS MINES. T. M. Charles is at Deeth arranging to resume operations. He has paid the debts against the mining properties in Mardis, has purchased machinery for working the base ores there, and as soon as it arrives at Deeth it will be hauled to Mardis and placed in working order.

LYON COUNTY.

A GOOD SEASON. *Times:* With the Rock Point mill running on Como ore this summer, the Douglass mill and railroad in operation on tailings, and the La Grande Oro and Pro Bono Publico mining companies running a steam shovel or two, and the Dredge Co. operating its plant on the Carson river, Dayton would experience quite a little boom this season. And there is pretty good reason to believe that something will be done with all of the above enterprises in a few months from now.

Five men are now working in the Boston and Lester mine in Silver City. The mine is still producing rich rock. The last working of ten tons produced $2700.

STOREY COUNTY.

Virginia *Enterprise*, Feb 19: Mr. Franklin Leonard of the Comstock Tunnel Company was in Virginia yesterday. Mr. Hogg has settled his shortage with the Comstock Tunnel Company by giving his note, which has been sent East to receive the endorsement of some of his wealthy relatives.

WHITE PINE COUNTY.

OPENING UP RICH.—*News:* The work on the Chainman mine is being pushed rapidly. Every day adds new proof that the ore body, in which the company is now sinking, is of vast extent and much richer than any that has heretofore been developed, also much freer and altogether a higher and better character of ore. The lowest assays that have so far been made are $35, and running from this amount up to $446 in gold. A winze is now being sunk to connect the sixty with the 130-foot level, which is the tunnel level and through which the ore will be extracted.

## OREGON.

BAKER COUNTY.

THE COLUMBIAN.—From Baker City is reported a strike of water in the Columbian at a depth of 215 feet, of much importance, as it is reported flowing in sufficient volume to justify the erection of a twenty-stamp mill with which to handle the ore.

AN EIGHTY-STAMP MILL.—The North Pole Mining Co., with basis of operations at Bourne, Baker county, intends to erect an eighty-stamp mill plant. B. L. McLain, who recently finished a twenty-stamp mill for the Bonanza Mining Co., recently received instructions from the London office of the North Pole Mining Co. to prepare plans and specifications for an eighty-stamp mill, which have been forwarded to Alexander Baring, London, England. The proposed new plant is in addition to a twenty-stamp mill now in operation by the North Pole Co. The new plant will be built at the mine, while the present plant will remain where it is on Cracker creek.

JOSEPHINE COUNTY.

An item in the issue of the 8th inst., credited to the Kerby *Union*, should have been credited to the Wedderburn *Gazette*.

The returns for the carload of ore shipped to the Selby Smelting Works from the Ashland mine a short time since amounted to $3142.88.

## WASHINGTON.

THE COLVILLE RESERVATION.—Over three hundred mining men and prospectors left Spokane this week for Colville Indian reservation in anticipation of the President signing the bill extending the mineral laws to the north half of the reserve. Several hundred men are in camp at Marcus, but others have gone in regardless of the warnings of the Indian police. During the past summer several hundred claims were staked out on the reservation, it being a legal point as to whether the mining laws were not already in force. Most of those now going in have been there before, and their purpose now is to stand guard over their claims. Miners and prospectors are also coming down from the camps of British Columbia. The reservation is now covered with snow, but the weather is mild, and as fuel is plentiful no hardships are anticipated.

## BRITISH COLUMBIA.

THE SMELTING BONUS. — The marvelous liberality of the Dominion Government in giving a bonus for the amount of ore smelted in the country does not work quite fairly, says the Nelson *Miner*. Comparatively rich ore that goes straight to the furnace earns its 50 cents a ton. But poorer ore has first to be concentrated. The Blue Bell ore, for instance, is concentrated in the ratio of 5 to 1 before it goes to the roasters even. The 50 cents is concentrated, too. It is only paid on ore smelted, not on ore mined, so the Kootenay Mining and Smelting Company only gets 10 cents a ton bonus on the ore. Is not this something like one law for the rich ore and another for the poor?

There was shipped over the Kaslo & Slocan railway last week 552 tons of ore, of which 252 tons went to Great Falls, and 174 tons to Everett. Forty tons of iron ore was shipped from the Iron Hand to the Nelson smelter.

W. P. Harvey has submitted a proposition to the City Council of Vancouver to build a smelter. The Council is considering the proposition.

A bond has been arranged with parties in England giving them six months in which to prospect the Swan Lake claim near Vernon, B. C., and then to have the option of taking it up at $350,000.

TRAIL CREEK.—A. P. Curry has commenced suit against the Le Roi Mining Co. for the recovery of $50,000. In his complaint he states that he subscribed for and was the owner of over 10,000 shares of Le Roi stock, at that time valued at 25 cents per share. It was understood that he was to pay for it from time to time, when assessments were made. He did pay $100 and subsequently tendered the balance—$150—which the company refused to accept and also refused to issue to him the certificates of stock. The stock, he says, is now worth $5 per share.

## ALASKA.

During January the Alaska-Mexican Co.'s mill of sixty stamps crushed 7498 tons and treated 156 tons of sulphurets, netting $24,651, of which $8700 was from the latter. The ore averaged $3.29 per ton. Expenses for the month, $13,279.

## UTAH.

CAMP FLOYD DISTRICT.

The Camp Floyd mining district of Utah, forty miles from Salt Lake City, has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71 by the development of the Sparrow Hawk and Last Chance mines, which produced $1,000,000 in the white metal. At that time there were 1000 people in Lewiston and the district was very lively; but the rich pockets having worked out, Lewiston's fame began to wane. The next big strike in the district was in the Carrie Steele, from which some parties scraped out $83,000 in about three months' time. This caused great excitement—so much so that in '72 and '73 the hill was swarming with prospectors. Then the camp again declined until '79 and '80, when it was abandoned. In 1890 attention was called to the MacArthur-Forrest cyanide process, and a test of the ore was made, with such results that the old Sparrow Hawk or Marion mine was brought out of a $40,000 or $50,000 indebtedness and put on a dividend-paying basis. The formation at Mercur is similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single-blanket vein theory.

SOME DIVIDEND PAYMENTS.—*Tribune*, Feb. 17: The Centennial-Eureka will lead off today with the distribution of $30,000 among the holders of its 30,000 shares, which will increase the total dividends to date to $1,560,000, and with ore enough in sight to repeat the day's performance for an indefinite period. Following it closely will be the Bullion-Beck, which will distribute $25,000 among the holders of its 100,000 shares of stock, which will advance the total dividends to $2,000,000, and with the ore coming out steadily. Then there is the Silver King dividend in the sum of $37,500, while the Mercur will come forward with its regular dividend of $25,000 on Thursday next, making a total to its credit of $400,000. The Ontario has paid its dividend for the month, which was the first since October, 1892, and it is not unlikely that the Daly will join the procession again at an early day, the last paid by the bonanza being in May, 1893, at which the total reached $2,850,000.

## IDAHO.

AT BURKE.—The Mammoth mine is running steadily, with about forty men employed.

The Standard tunnel is being pushed. It is now in about 1100 feet, leaving about 900 feet to bore. The rate of progress is from 20 to 40 feet a day.

The Canyon Creek Electric Co. has incorporated to furnish lights for Burke and Gem. N. Ebbley, W. Miller and H. L. Jackman, all employes of the Tiger Consolidated and Frisco mining companies, are the incorporators. The company will furnish the arc lights for the Frisco mine.

AT GEM.—The Milwaukee Co. is drifting on the Gem ledge, and expect to resume shipments of ore before long. The Helena & Frisco Mining Co. is running full time and employing 125 men. The mine and mill output is from 400 to 500 tons per day.

AT SILVER CITY.—*Avalanche:* The affairs of the Morning Star are unchanged—the miners still operating the mine—but we learn that money is en route to settle the indebtedness, when everything will assume its normal course.

AT WARDNER.—The Bunker Hill is running. Beside the steadily productive operation of the mine, four power drills are employed for development work.

The Hunter mine at Mullan is again in steady operation. At this season of the year it is not likely that it will receive further interruptions from lack of water.

SHOSHONE COUNTY.

(Special Correspondence.)—Pierce City at present has about three and one-half feet of snow and still the placer miners wish for more. H. E. Howes, manager of the American Placer Mining Co., arrived in Pierce City to-day. J. Dunn, manager of the Crescent Gold Mining Co., also came in from a visit to Kendrick. The Bond is working as usual. The Idaho mill has closed down for improvements and will start up about the 1st of March. Placer miners are getting ready to catch the water at the first thaw. Messrs. Murch & Templeman are getting supplies over to the Big Six placer group. This is a promising piece of property and it is being opened up in good shape. Locators are plentiful at present, not a day passing without one or two new locations being made and a number of them prospect very well. Messrs. Morrow & Morris are going to commence work on the Granite Lode; it is only a prospect as yet. A. Johnson & Co. have struck a ledge of ore in their crosscut tunnel on the Snowbird, that runs $206.70 to the ton; it is about fourteen inches wide. This claim adjoins the Idaho. Messrs. Miller & Sevey have a very fine showing on the Sulphide Lode; the ore is refractory; the ledge runs from twelve inches to four feet in width. Messrs. Ellis & Morris recently gave J. B. Williams of Spokane an option on the Golden Ribbon, but as he failed to take it up they have resumed work in the shaft. The Oro Fino Placer Development Co. has constructed a big reservoir on Thompson gulch and is going to boom-sluice the gulch. This is the first time booming has been tried in the camp. A company is being formed to work the Caledonia, Caledonia Annex, Caledonia Extension. This property is to be opened by a tunnel, which will be run on nearly all the way, and at 1500 feet they will have a back stope of 400 feet. The ledge is large, and low grade on the surface.

Pierce City, Feb. 5, '96.

## WYOMING.

BALD MOUNTAIN.—Frank Viox is running a mill at Bald Mountain, Wyoming, sixty miles west of Sheridan, for the Fortunate Mining Company. The mill has five steam stamps that drop at the rate of 160 strokes per minute. He had to shut down four of the stamps on account of water. The ore is free milling and will run $7 or $8 per ton and would pay a handsome profit with a good stamp mill, but the steam stamps are a failure. The mill is a one-story, round log structure and cost $11,000. The company, he says, will put a 100-stamp mill in during the year.

## SOUTH DAKOTA.

THE SOUTHERN HILLS.—The J. R. mill, three miles from Hill City, is crowded with custom ore at present from the Golden Slipper, the Dalcoath, the Hazel and a number of other mines about there. The Dalcoathe is cleaning up $25 per ton upon its ore and has a good force at work. The Golden Slipper and Hazel mines are active and other properties in their neighborhood are brightening correspondingly. The Holy Terror cleaned up last Sunday after a six days' run and a $6000 retort was the result, being deposited in the Hill City Bank Monday. The five stamps are probably capable of crushing between ten and fifteen tons of ore per day, and as the cleanup gave an average of $1000 a day during the run, the ore must have run $75 to $100 per ton. The Holy Terror shaft is undergoing overhauling and some new timbers are being put in.

## COLORADO.

The El Paso, the first mine located at Cripple Creek, is still a bonanza. A big body of ore was uncovered the other day which will assay from $1500 to $2000 per ton.

"WHERE WILL IT END?"—*Record:* At the rate mining companies are incorporating in Colorado, the question may well be asked, Where will it end? Doubtless all are glad to see such manifestations of interest in mining matters, if the proper channels could always be in that manner reached, but the mere speculation or gambling in mining stocks does not always tend to develop mines. Besides, legitimate mining cannot be overdone, while stock jobbing can—and very easily, too—as has been proven in far too many instances, and to the great detriment of good mineral sections, as well as to the mining business itself. Within the last year all Europe was flooded with mining stocks, and became correspondingly disgusted with mining ventures in consequence. For more than a hundred consecutive days Colorado has chartered and stocked at the average rate of more than twenty million dollars a day, and there is no abatement. Again the question, Where will it end?

## ARIZONA.

At the La Fortuna mines fifty men and as many horses are employed. A well has been dug in the Gila valley opposite Blaisdell station on the Southern Pacific railroad. The machinery for the mine is arriving daily at Blaisdell and is being hauled by wagon to the mine. The pipe from the well to the mines is being laid.

Mention was made some time ago of a placer-mining enterprise at Temple Bar, on the Colorado river. Two large boats of the catamaran style were built, were anchored in mid-stream, and a big water-wheel constructed between them. The force of the current turned this wheel, which was attached to a pump which forced the water out on the land to wash the rich gold-bearing gravel. The machinery cost $15,000, and probably as much more was spent on the enterprise. *Mineral Wealth* says: "The Temple Bar hydraulic plant broke from its moorings recently, and started down the river on a jamboree. It grounded a few miles down, and there it will probably stay."

V. E. Frost has sent supplies out to Groom creek to commence work on the Leland Stanford and Snipe claims. It is stated that the parties who purchased this property have put up $25,000 to be expended in development work.

AT JEROME.—The January payroll of the United Verde Copper Company at Jerome for men employed at the mines was $42,000. The company also expends thousands of dollars monthly for timbers, supplies, etc.

THE HARQUA HALA.—The Harqua Hala mines, near the Colorado rim, have evidently struck bottom, after having produced millions. The present owners will ship their machinery to South Africa, having no further use for it at Harqua Hala. The mine seems to be completely worked out. For several years it produced from $50,000 to $100,000 per month for its owners. The present owners, however, bought it about a year ago, paying therefor something over $1,000,000. They have succeeded in getting only a small portion of their $1,000,000 back again; but there are many thousand tons of valuable tailings, now valuable because of the cyanide process, which will now be worked, and the owners think their purchase price can be realized. About a year ago a gold brick was shipped from the Harqua Hala mine over the Southern Pacific railroad of the value of $110,000, the result, so it was said, of one month's run and being the largest single gold brick ever made from any Arizona mine in one cleanup. It was taken from Harqua Hala to Yuma by a six-mule team, armed guards riding before and behind. The brick was inside a nail keg in a large lumber wagon, and just as they were entering the town of Yuma the driver cracked his whip, the wagon ran into a deep rut and the nail keg with the brick went through the bottom of the wagon box. The heavy weight condensed into so small a space was too much for the $1\frac{1}{4}$ inch of the wagon box.

The old Hillside mine has been again started up, it having reverted to the original owners, Lawler and Wells, of Prescott. This mine at one time had the reputation of being the richest silver mine in the territory and attracted a great deal of attention. It was sold for $800,000 and partially paid for when some trouble arose over the balance of the purchase price. The ore is of a high grade. Two carloads are now on the track at Hillside switch ready for shipment. It is the hope of the present owners to soon ship a carload per day. The ore carries good value in gold, although the great value is silver.

A. G. Simpson, a Scotch mining engineer, has completed an examination of the Waters mine, now known as the Santa Maria mine, about thirty-five miles from Congress. The mine is owned by Chauncey Clark, of Chicago. The Santa Maria has a vein exposed about 2000 feet, has seven tunnels driven in on the vein at successive intervals of 100 feet, the ore being of uniform quality and easily treated by stamp mill. Twenty stamps are now at work night and day and sixty more stamps are on the way.

BISBEE.

THE COPPER QUEEN.—The mining department, since the death of the late Mr. Howell, is under the direction of Mr. Clawson. There are about 300 miners at work on day and night shifts. The Czar shaft, where the main hoisting works are established, and where the ore is all brought to the surface, is down 400 feet. Drifts have been made at each 100-foot level in several directions, and rails are laid to the several ore beds, so that now the tracks are about forty-five miles in length. One drift runs back under the mountain about one mile. There are about 800 tons of ore raised every twenty-four hours. The shaft at the Holbrook is down to the 500-foot level. There are hoisting works there also, but nothing but the waste is raised there. The ore between the drifts is obtained by putting in stopes, and the miners work upward and dump the ore below, where it is conveyed through a chute to the cars that carry it to the central shaft.

The treatment of ore is under the direction of Lewis Williams. Four smelters are running day and night, which reduces between 700 and 800 tons of ore daily into what is called matte. It contains from forty to fifty per cent pure metal. This is broken into small pieces and run through another smelter, where it is melted and run into the Bessemer convertors, where everything except the metal is burned up and blown away, so that which is drawn from these convertors is pure metal. The output of bullion is about thirty tons per day.

## MEXICO.

SONORA.

SOME BIG STATEMENTS.—*Oasis:* At La Colorada last week one of the most important mining deals in the history of Sonora was consummated, the Grand Central mine being sold by Mr. F. H. Seymour and associates, to Mr. Howell Hines and those associated with him, for a consideration of $150,000 gold. It is stated that eight hours after the deal was closed Mr. Seymour received a telegram that a representative of an English syndicate was on the way to La Colorada, prepared to pay him $500,000 for the property, and every effort was made to induce him to refuse to convey the property to Mr. Hines; but with a fairness extremely rare the gentleman refused to break his word. When the English syndicate representative arrived at La Colorada he offered Mr. Hines $50,000 in gold to release Mr. Seymour from his contract, but the offer was declined and the transfer was made. It is stated that the would-be purchaser (Mr. R. R. Symon, vice-president of the Sonora railway) then offered Mr. Hines $1,000,000 gold for the Grand Central and Amarillas mines and the two mills belonging to them, but that his offer was likewise declined. Mr. Hines at once took possession of the Grand Central, set a large force of men at work making necessary alterations and repairs.

## Coast Industrial Notes.

—January's foreign imports to this city aggregated $3,415,393.

—The Central Lumber Trust is expected to go into effect March 15th.

—There are 6635 houses in Sacramento, Cal., of which 6101 are occupied.

—The Golden Gate Woolen Mills started up last week with 150 employes.

—Over 700 people are now employed at the Potrero Sugar Works, this city.

—Oakland's city engineer proposes to expend $100,000 in a driveway and drainage system for Piedmont.

—Opposition on the route from Puget Sound ports to this city has lowered ocean freights northward from $2.40 and $3 per ton to $1.

—The line of the Nevada County Narrow Guage railway is to be rebuilt, shortening by three miles the distance from Colfax to Grass Valley.

—The preliminary announcement is received of the 29th Industrial Exposition of the Mechanics' Institute, to be held in its pavilion in this city from Sept. 1st to Oct. 3, '96.

—The machine shops of the Mexican International railroad at Ciudad Porfirio Diaz, Mexico, were destroyed by fire last Saturday with two locomotives. The aggregate loss is $200,000, with no insurance.

—The Pacific Rolling Mills are now using three carloads of oil daily, which will soon be increased to four. It has been their experience that oil at $1.25 per barrel is cheaper and more satisfactory than coal at $7.50 per ton.

—Another 30-ton rifle was added to the Fort Point battery this week. There are now two 30-ton and one 50-ton, which, with the three dynamite guns lately tested, make San Francisco the best defended harbor in the United States.

—The largest stick of timber ever cut on Grays Harbor, says the *Washingtonian*, was turned out in January by the Northwestern Lumber Co. at Hoquiam. It was 119 feet long and 22 inches square and is for a mast for the schooner Volunteer.

—Whyte & De Rome, of this city, are building a newly invented propeller, the joint invention of two machinists, Hall and Sloan. It is to be used on the tug Reliance. It is to be 6½ ft. long, 6½ ft. in diameter, 4-bladed, each blade to have a 5-inch flange. The propeller is to be of gun metal, and weighs 3000 pounds.

—The Southern Pacific shops in Sacramento are again running full blast. The force now numbers 1700. A new federal law compels all railroads to equip freight cars with automatic couplers by the 1st of January, 1898. It is a big job to do this, as the Southern Pacific system has two couplings which cost $10 each, and all cars which leave the State will have to be equipped. The cost to the railroad will be $294,000.

—A deal is reported between the Southern Pacific and the seaboard air lines whereby all the traffic that can possibly be diverted to the former's Sunset route will be delivered by the latter at New Orleans, which is considered to be a direct blow at the Southern Pacific direct connections at Ogden. Its object is said to be to divert as much traffic as possible from the Central Pacific road, the Southern Pacific having entered upon a deliberate and systematic policy of impoverishing that part of its system with the view of forcing the United States to settle its claims against the road on the easiest terms possible.

—H. R. Robertson, who built the cigar-shaped raft from Stella, Wash., to San Francisco last year, after two disastrous experiments in the same direction, has arranged to commence felling timber immediately for three rafts to be put together in March and sent to California. They will probably be gotten out at Stella, though the cost of towing would, it is stated, be $150 less, or $1450 from Puget sound, as against $1600 from the Columbia river. The rafts will be cigar-shaped and of uniform size, each 527 feet long, 52 feet wide, 30 feet deep, and drawing 20 feet of water when floated, and will contain some 5,000,000 superficial feet of lumber each, board measure. The lumber shipped, which includes piling and spar timber, saw logs and long timber of every description, will be packed in a cradle, constructed for the purpose.

## Recent Mining Incorporations.

Horseshoe Consolidated Mining Company, San Francisco. Directors—N. T. Messer, H. Zadig, O. F. Giffin Jr., J. W. Twiggs, E. L. Parker; capital stock, $10,000,000.

Florence Gold Mining Company; directors, G. J. Bucknall, C. T. Dennis, H. E. Poehlman, W. O. Scott, J. H. Ginder and G. M. Spencer, San Francisco; capital stock, $150,000, of which $3500 has been subscribed.

Rogue River Water and Mining Company; directors, J. W. Northrup, W. F. Hyde, D. Suter, C. T. Dennis, A. N. Hungerford; capital stock, $5,000,000, all subscribed; San Francisco.

The Florence Gold Mining Co.; principal place of business, San Francisco. Directors—G. J. Bucknall, C. T. Dennis, H. E. Poehlman, W. O. Scott, J. H. Ginder, G. Senn, G. M. Spencer of San Francisco; capital stock, $150,000, with $3500 subscribed.

## Obituary.

CAPT. C. JEFFERSON CLARK died last week in London, England. Deceased was a well known California miner. Till recently he was manager of the Gladstone mine, Shasta Co., when he went to Buluwayo, South Africa, where he was amassing a fortune when stricken by fever. He went to England, where his illness proved fatal.

## Commercial Paragraphs.

THE California Powder Works report having sold over 4000 tons of dynamite last year.

THE Fort Wayne Electric Co. has opened its branch office this week at 16 Second street, San Francisco.

THE General Electric Co. has a contract for the Mount Tamalpais electric road, 33,000 feet long, average grade 6.1 per cent, maximum grade 8.2 per cent. The company will furnish one 100 Kilowatt generator, and one car, of the double fifty H. P. motor type, fitted with improved electric brake. The road is to be completed in sixty days. There are now over 200 men at work.

The Jos. Dixon Crucible Co. have opened an office at 1315 Monadnock Block, Chicago, Ill., which is in charge of Mr. F. W. Musson, and have added to their office force Mr. W. C. Mahaney, formerly Western manager of the *American Machinist*. Mr. F. W. Musson will have the leadpencil cinch for the West and Mr. Mahaney will look after their Chicago interests in the lubricating and paint departments.

LARGE ORDERS have recently been received by the H. Channon Co. of 24-26 Market St., Chicago, for their Ajax transmission rope from the following: The Boston & Montana Consolidated Copper and Silver Smelting Co. of Butte, Montana; The Helena Light and Power Co. of Helena, Mont.; The Illinois State Penitentiary at Joliet; The North Chicago Electric Street Railway Co.; The Cleveland Linseed Oil Co. of Chicago; The Independence (Ia.) Water Works; The Mankato (Minn.) Mills; The Minneapolis General Electric Co.; The Syms & Dudley Paper Co., Vatervliet, Mich.

THE Westinghouse Electric and Manufacturing Company of Pittsburg, Pa., recently shipped two of the largest electrical generators for the operation of an electric railway that have ever been turned out anywhere. These two machines were of 1500 H. P. each, and they were contracted for by the Nassau Electric Railway Company of Brooklyn, N. Y. Last summer the Westinghouse Company constructed and delivered to the same railway company three generators of 750 H. P. capacity each, making the total capacity of the electric railway plant 5250 H. P.—one of the largest in the country. The new generators are of the style known as engine-type, being direct connected to a Cooper Corliss engine running at a speed of 75 r. p. m.

THE Cliff Paper Co. of Niagara Falls is building a new power-house, in which it will generate electricity for use in its paper mill. This paper company has a pulp mill, driven by two Leffel wheels, of 2500 horse power, at the water's edge below the Falls, and a paper mill on the top of the high cliff, thus securing a double service from the water. This double use of water is quite an innovation, and has brought discredit upon the saying that "the mill will never grind with the water that is passed." Now this progressive company is about to take another step to practice economy, and it will adopt electricity to succeed steam to run its paper machines. When this proposed electric plant is installed, it will drive out three steam engines of over 200 horse power. Preparatory to the adoption of the electric current, this company will build a stone power-house, 20x30 feet in size, close to its pulp mill. The penstock, leading to the pulp mill, will be tapped, and a portion of the water diverted to run a 250 horse power James Leffel turbine, to which will be attached two 125 horse power generators. The headwater on this turbine will be 125 feet. At the top of the cliff will be two electric motors, of 100 horse power each, attached to each of the paper machines. Besides, there will be two motors of five horse power each, to furnish power for the small machinery about the mill.

## Personal.

F. J. CAROLAN heads a Chicago company that proposes to buy the Kirkham mine, two miles west of Nevada City.

LIEUT.-GOV. F. H. LUCE of Washington State, speaking of his Triune mine near Davenport, Wash., says he expects to increase from ten to twenty stamps this spring.

ASSISTANT STATE MINERALOGIST PRESTON is inspecting the Grass Valley and Nevada City mines this week. Assistant W. H. Storms is writing up the notes of his recent field work.

FRANK L. BROWN, of the Washburn & Moen Manufacturing Co., has returned from Worcester, Mass. In accordance with the recent action of the Pittsburg manufacturers, there will be an advance of 15 cents in the price of nails next week.


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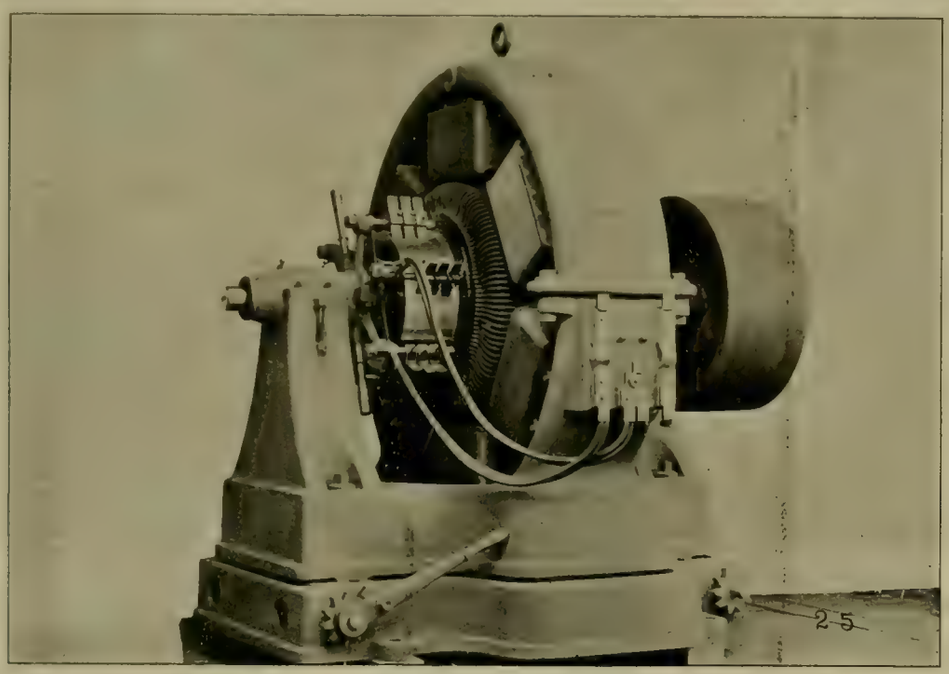
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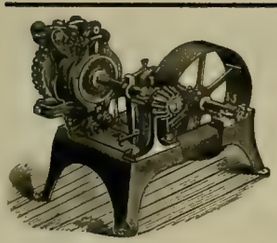
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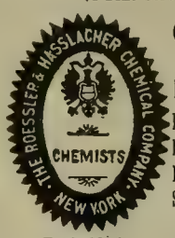

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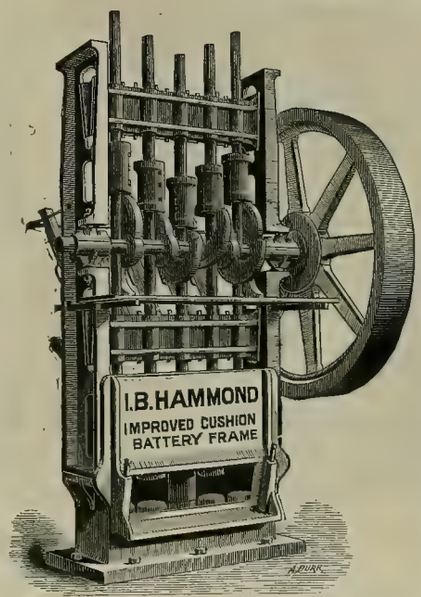
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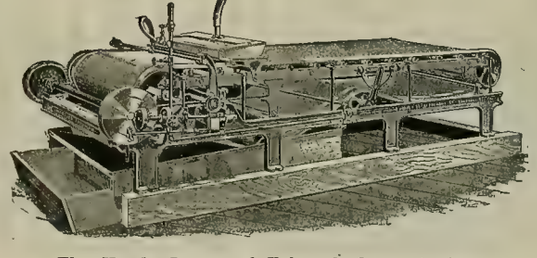
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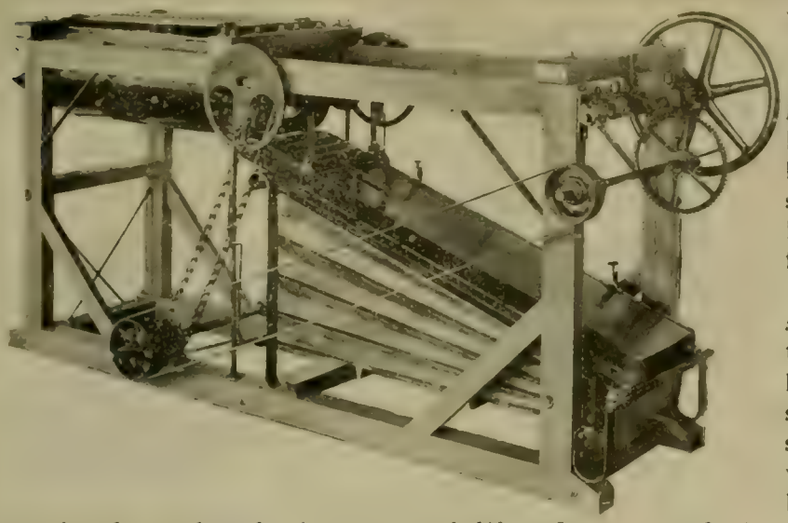
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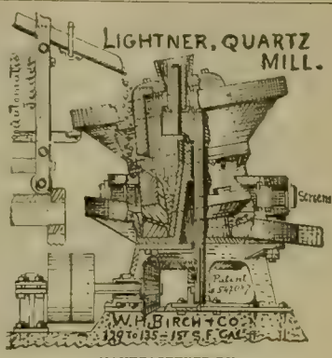


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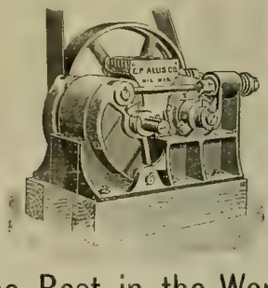
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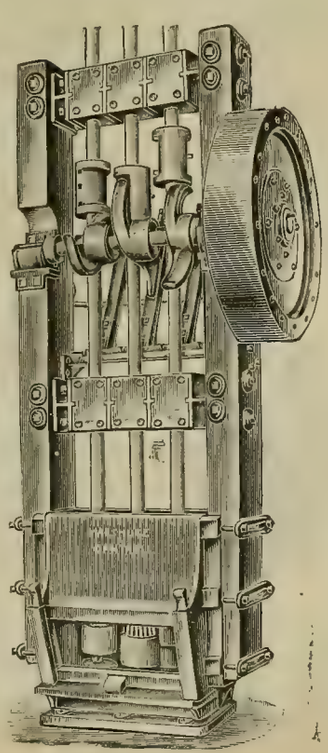
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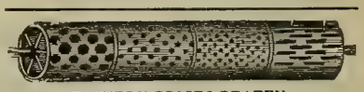
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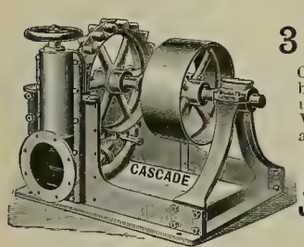
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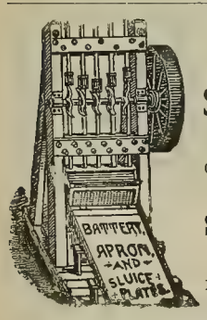

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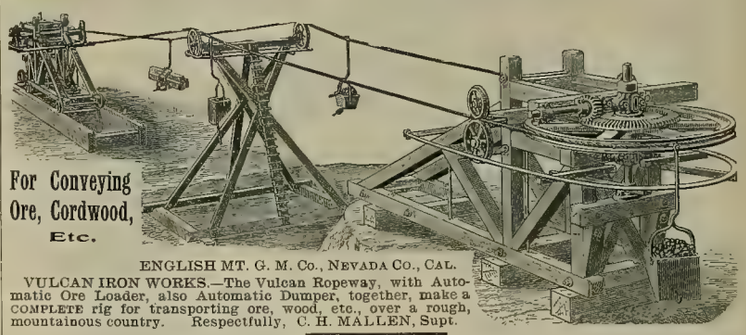
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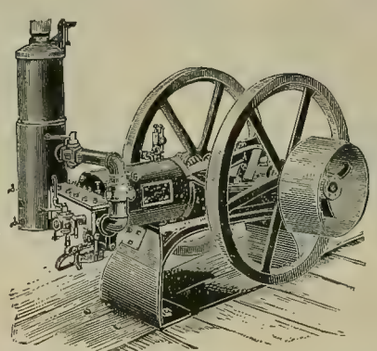
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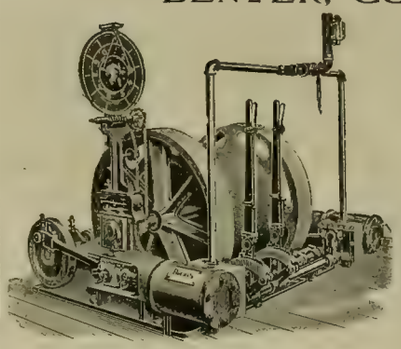
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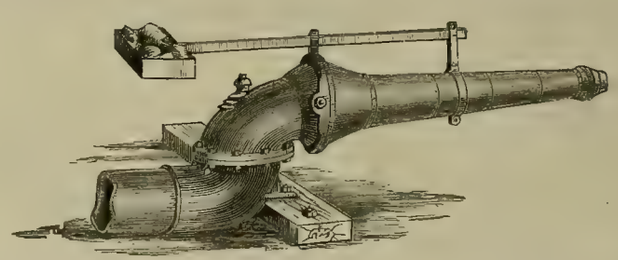
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—AND—

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LIGHT STEEL RAIL.

# Market Reports.

## The Markets.

SAN FRANCISCO, Feb. 20, 1896.

There is a general improvement in all the metals to be noted this week. Even lead shows a little advance. Whether it was the bond issue, the increasing amount of daylight, or the regular spring advance, a better condition exists all round. The only noticeable exception is in the price of quicksilver, which was quoted last week at $37.50 per flask in New York, the London price being £7 2s 6d. Regarding copper, under date of the 3rd inst. James Lewis & Son, 5 Fenwick street, Liverpool, England, write:

Large purchases of good merchantable copper, made for the purpose of advancing the shares of the leading copper mining companies, followed by considerable buying on the part of smelters and manufacturers, has caused an advance of £3 7s 6d per ton since the 7th ult., when the price had fallen to £40 10s for cash—from £41 7s 6d on the 2nd ult. The closing value is £43 17s 6d for cash and £44 5s for three months prompt, although £44 10s was paid for the latter on the 31st. The sales amount to about 26,000 tons. In contrast with the experience of last year, when the English market followed slowly behind the advance which took place in the United States, prices here are considerably higher than those ruling in New York. While this lasts, shipments of American copper to Europe are likely to continue large, especially as the American demand for home consumption will probably not be very active for some months to come. Best selected in Birmingham now realizes £1 per ton more than lake ingots in New York. Quotations to-day are:—Chile bars and good merchantable copper £43 17s. 6d. for cash, and £44 5s. 0d. for three months' prompt, buyers, English best selected ingots £48 5s. to £48 10s. and tough cake £47 10s. to £47 15s. per ton. 8s. 6d. for ore of 20 per cent, and 8s. 9d. per unit for Chile regulus or American matte, free from silver.

Of coal in San Francisco, Harrison's circular says: During the week there have been ten arrivals from the Coast colleries with 20,846 tons; no cargoes from any foreign port. There is no new feature in this branch; business generally is dull. The retail trade has fallen off since the storms ceased, as it usually does, but prices are firmly sustained. The demand for steam uses is fair and quotations are fairly well maintained, as the arrivals of late have not been excessive and stocks on hand are not unusually large, except anthracite, of which an extremely bountiful supply has been piled up. As the number of vessels now loading at Swansea is very light, and freight rates being advanced, what is now in yard may prove to be profitable property later on. The sales of Swansea this year will not be as large as in 1895, as the prices of Australian shipments will be so much lower that the trade will be deviated in that direction.

**New York Metal Market.**

NEW YORK, Feb. 20.—PIG IRON—Southern, 12@13.00; Northern, 13@13.50.

COPPER — Brokers', 10.50c; exchange, 10.62c.

LEAD—Brokers', $3.00; exchange, $3.15.

TIN—Straits, 13c@13.50c.

SPELTER—Domestic, $3.90.

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.86¾ |
| London Merchants | $4.84½ |
| London Sight Bankers | $4.88 |
| Refined Silver, per oz., 1000 fine | 67½c |
| Mexican Dollars | 54½c |

**New York Silver Prices.**

NEW YORK, Feb. 20.— Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 30⅝ | 67¼ | 10 25 | ..... |
| Saturday | 30⅞ | 67⅜ | 10 35 | 3 00 |
| Monday | 30⅞ | 67⅜ | ..... | 3 10 |
| Tuesday | 30⅞ | 67⅜ | 10 50 | ..... |
| Wednesday | 30⅞ | 67½ | ..... | 3 15 |
| Thursday | 30⅞ | 67½ | 10 50 | ..... |

**San Francisco Metal Market.**

COPPER.

| | | | |
|---|---|---|---|
| Bolt | ¼ & 5-16, 21c; ⅜ and larger, 18c | | |
| Lake Superior Sheathing | 23 | @ | — |
| Ingot, jobbing | — | @ | 19 |
| Ingot, wholesale | 18 | @ | — |
| Sheet copper | — | @ | 18 |

LEAD.

| | | | |
|---|---|---|---|
| Pig | — | @ | 3 90 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.

| | | | |
|---|---|---|---|
| Drop, sizes *smaller* than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and *larger* sizes, " " | | | 1 65 |
| Buck, Balls and Chilled, do. " " | | | 1 65 |

IRON.

| | | | |
|---|---|---|---|
| American Soft | 22 00 | @ | 26 00 |
| Pig, per ton | 18 00 | @ | 20 00 |

STEEL.

| | | | |
|---|---|---|---|
| English, lb | 16 | @ | 19 |

QUICKSILVER.

| | | | |
|---|---|---|---|
| Home trade, per flask | 39 00 | @ | 40 — |

BORAX.

| | | | |
|---|---|---|---|
| Refined, in car lots | — | @ | 5½ |
| Refined, in sacks and barrels | — | @ | 5¾ |
| Powdered, in car lots | — | @ | 5¾ |
| Concentrated, " | — | @ | 4¾ |

LUMBER.

SAN FRANCISCO—WHOLESALE.

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

COAL.

SPOT FROM YARD—PER TON.

| | |
|---|---|
| Wellington | $ 8 00 |
| Greta | 6 50 |
| Nanaimo | 7 00 |
| Gilman | 6 50 |
| Seattle | 6 00 |
| Coos Bay | 5 00 |
| Cannel | 8 50 |
| Egg, hard | 10 00 |
| Wallsend | 7 50 |
| Scotch Splint | 7 50 |
| Brymbo | 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 50 |
| Liverpool Steam | 6 00 |
| Scotch Splint | 6 50 |
| Cardiff | 6 25 |
| Lehigh Lump | 9 00 |
| Cumberland | 13 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

## Mining Share Market.

SAN FRANCISCO, Feb. 20, 1896.

For the week under review the market has held remarkably steady. There has not been a ten-cent rise or decline for several days. Legitimate transactions have been scarce, but cross-orders and accommodation sales, it is said, constituted the larger proportion of the buying and selling. So light has the business grown to be that last Tuesday the brokers had to go on the sidewalk during the informal session, to keep from going to sleep. At the close of yesterday the market began to give signs of doing better, but at this writing it is hard to say how much. Thus more life will have to be shown to draw in outsiders. It looks very much as if the little pools that have been trying to manipulate the market for many months past are getting tired of the game. They, like all else who have only from $50,000 up to $250,000 or even more to operate with, have discovered that it takes a brainy man to put up prices, and even be could not do it unless backed by several million dollars. In an active market shares in fully twenty mines are dealt in, which aggregate over two million shares. To handle over two million shares in a deal a pool must have plenty of money to take every share thrown at it, even when prices have been advanced to, say, three or four times what they were at the commencement of the deal, and if it is found necessary to send the market to still higher figures then the pool should be equally prepared to take all shares offered, even if they aggregate in value over a million dollars at any one board. Dealers and also those contemplating to operate should not forget that until moneyed men come in the market actively and openly it is a dangerous game. There never was and never will be good prices for shares until such men as Col. Hayward and J. W. Mackay come in openly, and they will not do this unless there is merit in two or more mines. Merit in one mine, unless it is a bonanza, does not count now. This was shown when Con. Virginia paid several dividends but the shares did not go up to any extent. Active work is being done in several of the mines to discover an ore body of more value than has been found for several years past; if success should crown the efforts then it can be asserted that moneyed mining men will enter the market and bring about a good old-fashioned deal. The writer holds to the opinion that some day this will be done, but how long time alone will tell; but the Comstock is prolific in surprises and it is by no means "played out."

The news from the Comstock points to the usual active spring work. There are reports current that some of the mines will take on more men, but these rumors are not substantiated. Those in position to know say that it is hardly likely that this will be done unless miners should work for less wages, for assessments come often enough now without increasing expenses to bring in more. In the Alta group the advices seem to be more encouraging from Alta, in which mine they are fooling around the Keystone ledge. In Overman the work is said to be growing in interest, but this has been the case so often that dealers prefer awaiting results than the surething assessment which has invariably followed good reports. In Seg. Belcher, Belcher and Crown Point the work is essentially unchanged. Not one of these companies is helping to pay expenses by extracting much ore. The work in the mines is in the proper direction, but it will take more time and money to see what there is to be found. No authentic information is allowed to leak out concerning the work under way in Yellow Jacket. In Challenge, Confidence, Con. Imperial and Alpha the work is largely on the upper levels, where it is known some good to high grade ore exists, but there seems to be some kind of fatality about the work, for when it seems just about ready to strike ore it is either stopped or turned. In the middle group there is more or less ore being extracted as the work is prosecuted on the different levels. But this does not help the shares, for the quality is not of sufficient moment to attract attention of dealers. There are miners who claim that some day the managers will find a big bonanza in one or two of these mines, but as these miners have lost money on the proposition, they do not seem to be good men to follow in a gamble. In Con. Virginia the usual active work is being done, with more or less ore extraction, but the latter is not in sufficient quantity or of high enough grade to pay current expenses. So far the work under way has been disappointing, for it was confidently asserted by miners that better things would result, and long before this, too. The president of the company, Mr. Fish, went to the Comstock this week and perhaps he may try to find out, but neither he nor anyone else can find ore unless it is in the mine. In Ophir and Mexican the work ought soon to grow more interesting, but whether it will result in a rich ore strike is entirely guesswork. In Union and Sierra Nevada the work under way is not attracting attention. Sometimes when this is the case it is that which results the most favorably.

Advices from the Brunswick lode are to the effect that active work is still the order. Cross drifts, winzes, lateral drifts and all such work is being done. It would seem to indicate that the managers are leaving nothing undone to lay the foundation for better work later on, with the hopes of discovering ore, if there is any to be found in sufficient quantity to justify working or extracting.

From the Bodie district the same old reports come to hand; no ore, but plenty of dead work seems to be the order. But assessments by the companies in this district are few and far between, which show economical working.

The following illustrates the changes of the week:

| MINES. | Feb. 13. | Feb. 20. |
|---|---|---|
| Alpha | ..... | $ 12 |
| Alta Consolidated | $ 15 | 14 |
| Andes | ..... | 16 |
| Belcher | ..... | ..... |
| Best & Belcher | 78 | 80 |
| Bodie | 35 | ..... |
| Bullion | 14 | 11 |
| Challenge | 41 | 40 |
| Chollar | 66 | 63 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 2 05 | 2 00 |
| Consolidated New York | ..... | ..... |
| Crown Point | 18 | 39 |
| Exchequer | ..... | ..... |
| Gould & Curry | 43 | 42 |
| Hale & Norcross | 1 25 | ..... |
| Justice | ..... | ..... |
| Mexican | 58 | 59 |
| Ophir | 1 30 | 1 30 |
| Overman | 16 | ..... |
| Potosi | 53 | 52 |
| Savage | 47 | 48 |
| Sierra Nevada | 42 | 40 |
| Union | 34 | 54 |
| Utah | 10 | ..... |
| Yellow Jacket | 40 | ..... |

## San Francisco Stock Board Sales.

SAN FRANCISCO, Feb. 20, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 200 Alta | 14 | 400 Kentuck | 05 |
| 400 Andes | 16 | 200 Mexican | 59 |
| 100 Best & Belcher | 80 | 1000 Occidental | 1 00 |
| 35 Bulwer | 17 | 300 Ophir | 1 30 |
| 200 Challenge | 40 | 250 Potosi | 52 |
| 300 Chollar | 63 | 300 Union | 54 |
| 300 Gould & Curry | 42 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 250 Gould & Curry | 40 | 100 Crown Point | 39 |
| 200 Best & Belcher | 77 | 50 Alpha | 12 |
| 400 C. C. & Va | 2 00 | 900 Bullion | 11 |
| 200 Savage | 48 | 400 Occidental | 97 |
| 300 Sierra Nevada | 40 | 2400 Mt. Diablo | 16 |
| 500 Chollar | 60 | 100 Bulwer Con | 19 |
| 100 | 59 | 300 | 18 |
| 100 Potosi | 49 | | |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., February 19, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| CALIFORNIA STATIONS. | Total Rainfall for the Week. | Total Seasonal Rainfall to Date. | Total Seasonal Rainfall Last Year to Same Date. | Average Seasonal Rainfall to Date. | Maximum Temperature for the Week | Minimum Temperature for the Week |
|---|---|---|---|---|---|---|
| Eureka | 24.73 | 31 60 | 26.81 | 70 | 56 | |
| Red Bluff | 13.83 | 24 37 | 17.11 | 76 | 36 | |
| Sacramento | * | 21.20 | 11.68 | * | 42 | |
| San Franc'co | 12.42 | 21.69 | 16.64 | 72 | 46 | |
| Fresno | 4.09 | 11.18 | 5.96 | 74 | 38 | |
| S. L. Obispo | 12.25 | 22.40 | * | 86 | 36 | |
| Los Angeles | 5.91 | 11.67 | 12.01 | 88 | 44 | |
| San Diego | 3.32 | 10 16 | 3.95 | 84 | 42 | |
| Yuma | .46 | 2.99 | 2.51 | 84 | 44 | |

*Indicates no record.


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# MINING SHAREHOLDERS' DIRECTORY.

**ASSESSMENTS.**

| Company and Location. | No. | Amt. | Levied | Delin't | Sale. | Secretary. |
|---|---|---|---|---|---|---|
| Alta S M Co, Nev | 51 | 10c | Jan 13. | Feb 17. | Mar 9. | J E Jacobus, 309 Montgomery |
| Andes Silver M Co, Nev | 42 | 15c | Jan 30. | Mar 6. | Mar 28. | J W Twiggs, Nevada Block |
| Bay State M & D Co, Cal | 30 | 2c | Feb 1. | Mar 9. | Mar 28. | F E Luty, 330 Pine |
| Bulwer Con M Co, Cal | 12 | 5c | Feb 5. | Mar 11. | Apr 3. | J E Jacobus, 309 Montgomery |
| Crown Point G & S M Co, Nev | 66 | 25c | Jan 16. | Feb 20. | Mar 12. | Jas Newlands, Mills Building |
| Gray Eagle M Co, Cal | 42 | 5c | Jan 6. | Feb 7. | Mar 3. | W J Gurnett, 308 Pine |
| Gold Bar Con M Co, Cal | 3 | 5c | Feb 10. | Mar 19. | Apr 10. | E C Godfrey, 38 Crocker Building |
| Julia Con Co, Nev | 27 | 5c | Jan 17. | Feb 20. | Mar 11. | J Stadtfeld, Jr, 309 Montgomery |
| Justice M Co, Nev | 60 | 10c | Jan 13. | Feb 17. | Mar 9. | R E Kelly, 309 Montgomery |
| Lady Washington Con Co, Nev | 11 | 5c | Jan 16. | Feb 17. | Mar 10. | J E Jacobus, 309 Montgomery |
| Mono G M Co, Cal | 36 | 10c | Dec 30. | Feb 2. | Feb 25. | M E Willis, 309 Montgomery |
| Orleans Mining Co, Cal | 1 | 10c | Jan 21. | Feb 29. | Mar 24. | W Olney, 101 Sansome |
| Osceola Con M Co, Cal | 5 | 1c | Feb 11. | Mar 14. | Apr 8. | H Smith, 307 Montgomery |
| Savage M Co, Nev | 88 | 20c | Jan 4. | Feb 6. | Feb 26. | E B Holmes, 309 Montgomery |
| Sierra Nev S M Co, Nev | 110 | 25c | Feb 3. | Mar 7. | Mar 27. | E L Parker, 309 Montgomery |
| Silver King M Co, Arizona | 13 | 25c | Jan 28. | Mar 9. | Apr 6. | J W Pew, 310 Pine |
| Union Con M Co, Nev | 52 | 20c | Jan 14. | Feb 17. | Mar 17. | A P Swain, 309 Montgomery |

**MEETINGS.**

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Hale & Norcross S M Co | A B Thompson, 309 Montgomery | Mar 11 |

# Assessment Notices.

ANDES SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 30th day of January, 1896, an assessment (No. 42), of 15 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, No. 22 Nevada Block, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of March, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 28th day of March, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

JNO. W. TWIGGS, Secretary.

Office—No. 22 Nevada Block, San Francisco, California.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 10th day of February, 1896, an assessment (No. 3) of 5 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 38 Crocker Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 19th day of March, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 10th day of April, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. C. GODFREY, Secretary.

Office, 38 Crocker Building, San Francisco, California.

## DELINQUENT SALE NOTICE.

ANCHOR COAL AND DEVELOPMENT COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Kelso, Cowlitz county, Washington.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 6) levied on the 2d day of January, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| B. E. Loomis | 845 | 5 | $ 15 |
| J. A. Christian | 155 | 500 | 15 00 |
| J. A. Christian | 156 | 500 | 15 00 |
| Mrs. Edith Grey | 222 | 100 | 3 00 |
| Mrs. Edith Grey | 223 | 100 | 3 00 |
| Geo. E. Alexander | 670 | 200 | 6 00 |
| Geo. E. Alexander | 671 | 500 | 15 00 |
| Geo. E. Alexander | 707 | 225 | 6 75 |
| C. S. Capp | 838 | 5 | 15 |
| Geo. F. Tuttle | 214 | 1,000 | 30 00 |
| Geo. F. Tuttle | 215 | 1,000 | 30 00 |
| Geo. F. Tuttle | 681 | 400 | 12 00 |
| Geo. F. Tuttle | 683 | 500 | 15 00 |
| James E. Ager, Trustee | 651 | 500 | 15 00 |
| W. H. Gregory | 688 | 500 | 15 00 |
| W. H. Greg ry | 689 | 500 | 15 00 |
| W. H. Gregory | 697 | 500 | 15 00 |
| Wm. Lynch | 705 | 150 | 4 50 |
| John Tarpley | 706 | 125 | 3 75 |

And in accordance with law, and an order from the Board of Directors, made on the 2d day of January, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, No. 632 Market St., room 5, San Francisco, California, on THURSDAY, the 5th day of March, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. D. FARISH, Secretary.

Office, No. 632 Market street, Room 5, San Francisco, California.

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## Mariposa Gazette.

While the great Mother Lode of California is attracting attention all over the world, it is to people right on the spot that we must look for correct information. With regard to the southern end of the great Mother Lode, the *Mariposa Gazette* is usually our most trustworthy informant. Established for over 40 years at Mariposa, the *Gazette* has always maintained a reputation for honesty and fearlessness. In the history of California 40 years is a long time, but the *Gazette* has profited by experience. In mining matters it is conservative to a degree. As regards its news of Mariposa mines it is to be relied upon, and persons wishing information about that locality, or desiring to advertise their wares among the mining community, should remember that the *Mariposa Gazette* is the paper that for 40 years has found its way into every household in Mariposa. *


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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING FEBRUARY 11, 1896

554,228.—TRACE HOOK.—J. W. Beckwith, Galt, Cal.
554,575.—CIGARETTE MACHINE.—H. Bohls, S. F.
554,145.—OIL BURNER.—W. Booth, Los Angeles, Cal.
554,146.—OIL BURNER.—W. Booth, Los Angeles, Cal.
554,664.—CABLE CLIP.—Cover & Tibbits, Everett, Wash.
554,213.—PAPER MOLDS.—S. Crump, Spokane, Wash.
554,506.—VALVE.—S. Elde, S. F.
554,580.—BOAT PROPULSION.—W. Forward, San Diego, Cal.
554,555.—NAIL SETTER.—H. S. Garr, Los Angeles, Cal.
554,310.—ENGINE.—J. L. Heald, Crockett, Cal.
554,375.—FIFTH WHEEL.—T. C. Reed, Los Angeles, Cal.
554,551.—ORE WASHER.—C. H. Thomas, Sonora, Cal.
554,143.—PRINTING TOOL.—W. S. Young, Lordsburg, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MINING PUMP.—Wm. Nance, Grass Valley. No. 554,082. Dated Feb. 4, 1896. This invention relates to improvements in pumps of that class which is employed for pumping from deep mining shafts, and it is especially adapted to pumps of that class known as the "Cornish" type. It consists of a vertically reciprocating pump rod, a pump cylinder with inlet and outlet valves; a piston reciprocating in the cylinder; a piston rod extending through a stuffing-box in the upper part of the cylinder; a distance block fixed to the pump rod, projecting to one side therefrom into the line of travel of the piston rod from the pump cylinder; a connection therewith consisting of a block with a dovetailed slot and a key by which the piston rod is secured to the block. In connection with this are bell-crank oscillating levers or pipes, a horizontal arm of one being connected with the pump rod, and the other carrying a counterbalance weight, the vertical arms being connected by pitmen with an engine crank intermediate between the two. A horizontal rod extends beyond the weight-carrying bob or lever and has a bumper mounted upon it adapted to make contact with a fixed cushion through which the rod passes so as to relieve the jar of the parts on the down stroke of the pump rod. Novel forms of packing are used in the pump cylinders, with a means for maintaining a constant pressure thereon so as to cause the lubricating material to constantly fill the interstices of the packing. The valves are peculiarly constructed, and in connection with the usual valves I have shown a supplemental inlet valve removably fitting the cylinder above the main inlet valve chamber, so that it can be introduced or substituted for the main valve at any time. The packing of the pump valve is cast integral, having a cylindrical enlarged upper portion forming an extended bearing with parallel sides, having the lower portion reduced in diameter, a metal ring surrounding the lower portion to clamp it upon the valve, and a ball or yoke with keys and means for retaining the ring in place.




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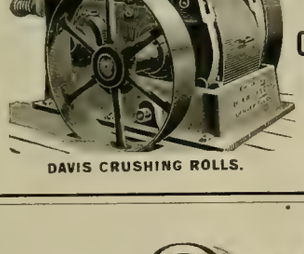
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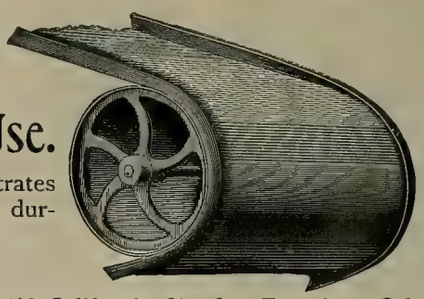
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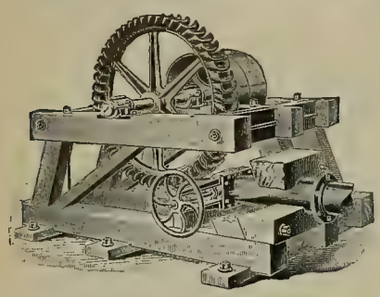
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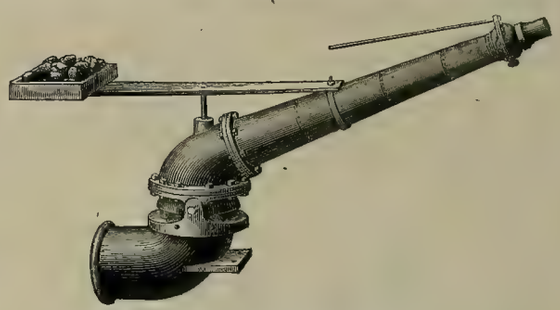
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## AND PACIFIC ELECTRICAL REVIEW.

VOLUME LXXII. Number 9. SAN FRANCISCO, SATURDAY, FEBRUARY 29, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.


### The Corral Hollow Coal Mines.

Much has appeared in these columns in the last year regarding the coal mines at Corral Hollow, Alameda and San Joaquin counties this State, their extent, development and economic value. Herewith is produced some illustrations of the general appearance of the mine and its vicinity and of its interior. Fig. 1 shows the entrance to the tunnel at the bottom of Corral Hollow. It is 10x10 feet, 3000 feet in length and has a double track. It cuts ten coal veins about 700 feet below the surface. The first vein is five and one-half feet thick, the second about eighteen inches, the third is six feet wide, the next ten and one-half feet in width. On this a drift has been run about 1800 feet and a shaft sunk over 400 feet. Fig. 2 is a reproduction of a flash-light picture, sho a coal vein on that level twelve feet wide. The entire property is being developed and after the expenditure of several hundred thousand dollars it is the opinion of many competent men who have examined the miles of underground workings, that there is enough coal there to solve the problem of cheap fuel for San Francisco manfacturers, at a distance from the metropolis of less than forty miles. Fig. 3, and Figs. 4 and 5 on page 165, give an idea of the general appearance of the country and its formation. In a previous issue was published an illustrated article, treating more particularly of the geological formation. In addition to the coal, the company has clay, limestone, and sand suitable for glass making. It is also claimed that cement equal to the imported article can be made there for 80 cents per barrel. It is further intended to erect a 4000 H. P. electric plant at the mines, to furnish light and power. If all the plans of the promoters are brought to fruition, the potency of such a factor in the industrial development of the adjacent country can scarcely be overestimated.



FIG. 1.—ENTRANCE TO 3000-FOOT TUNNEL, CORRAL HOLLOW MINES.



FIG. 2.—12-FOOT VEIN OF COAL, CORRAL HOLLOW MINES.



FIG. 3.—GENERAL VIEW OF CORRAL HOLLOW MINES.

THE Yreka, Cal., *Union* of the 20th has the first publication of application by the Central Pacific R. R. Co. for patent for several thousand acres of land in Siskiyou Co., being "supplemental list No. 32, A." Its character is illustrated by one "description": "Township 41, Range 6—all of sections 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35." Eighteen sections, 11,520 acres in that one line. There is a column and a half of finely set type of such "descriptions." Protests or contests may be filed at Redding up to April 20th.

THE semi-annual report is received of the general manager of the Broken Hill Proprietary Co., L't'd., Barrier Ranges, Silver Field, New South Wales, for the six months ending Nov. 30, '95. During that time, in the refining plant, 12,986 tons of bullion were treated, producing 3,864,362 ounces silver and 2,288 ounces gold, at a cost per ton of bullion of £1 4s 6½d. There was additional product of 12,267 tons lead. The gross product of all the furnaces and the leaching and amalgamating plant was 4,158,551 ounces silver, 13,712 tons lead and 168 tons copper. The net profit for the six months was £292,162 5s 6d. There were treated 222,324 tons gross of ore. During the period under review the company paid its one-hundredth dividend, and up to the close of the half-year had distributed £6,416,000 in cash, in additional to the nominal value of acquired shares in off-shoots of the company, amounting to £1,744,000, or a gross total of £8,160,000 in nine and a half years. The report gives minute detail of every part of the workings of the mine and all its appliances—an interesting financial exhibit of an enormous silver-producing property in a remote part of the world.

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J. F. HALLORAN.....General Manager

San Francisco, February 29, 1896.


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To THE State University at Berkeley is due the credit of having made what appears to be so far the most successful and direct application of the new Roentgen discovery in photographing with the dark cathode ray. The matter has attracted universal attention. Already the name of the new system is under discussion, the term "radiograph" being apparently the most applicable. Its practical value has now been demonstrated, and further scientific research will doubtless result in establishing the universal application of the new discovery. Scientists everywhere are experimenting, and while many of the results claimed must necessarily require suspension of judgment, yet it is evident that the result in this regard will be a permanent broadening of the scientific horizon.

U. S. SENATOR MITCHELL, of Oregon, has introduced in the Senate an amendment to the California Mineral Land bill which passed the House on the 18th inst., and which is now before the Senate Committee on Public Lands. The amendment provides that three commissioners shall also be appointed to examine lands along the line of the Southern Pacific in the Roseburg and Oregon City land districts in Oregon. The Oregon senator's action is doubtless actuated by the worthiest of motives, but any amendment in the Senate jeopardizes the passage of the bill. A bill originating in one house and passed therein, and then amended in the other branch of Congress involves so much subsequent conference and agreement, that a friend of the measure usually avoids any change in its original provisions after it has once passed either house.

THE statistician of the U. S. Mint in this city has sent to every part of the mining section of the State a circular saying: "Enclosed is a list of the mines in your locality with the request that you kindly correct it and add any new ones. It would be a great favor if you would make or obtain an approximate estimate of the product of any of these mines for 1895, which your familiarity with the section will doubtless enable you to do readily. Circulars have been sent to all these mines, but this many neglect to answer. In order that the county and State should receive its due credit for bullion product in the Government reports, it is important for us to get full returns. In obtaining these we have to depend largely upon gentlemen like yourself, who have a public-spirited interest in the mining industry. Will you please estimate also the average number of miners employed in the vicinity and the average rate of wages paid." Such information is of direct value to the mining industry of the State and coast, and a general compliance with the above request would be of material aid. Information so received is held as confidential, the aggregate of the figures, authenticated and compared, being alone given out for publication.

"SHALL We Abandon the Horse-Power Unit?" is the caption of a timely article in the current number of the *Scientific Machinist*. Our contemporary argues that the present conditions no longer justify a "horse power" as a unit of measure for power from an engine. The horse was to the age of Jas. Watt what the steam engine is to this. The decline of the horse as a commercial factor is manifest, and the time seems approaching when the term "horse power" will convey to the popular mind no more accuracy of meaning than any other obsolescent standard of comparison. It is argued that the mechanical world has advanced to a point that renders necessary a new unit of measurement, and it is suggested that the kilowatt, 1.34 H. P., be used. The present importance of the electric motor makes "H. P." a misnomer, and another unit is of present necessity. Direct connection of dynamos to steam engines suggests the use of a suitable unit of power applicable to both. There is something in the idea, but it will not immediately prevail. There is tremendous inertia in these things, and were mechanical engineers and manufacturers and every one connected in any way with the subject to agree to-morrow to adopt the kilowatt or some other symbol as the unit of power, it would be twenty-five years before the term "horse power" would be discarded. Conservatism and usage have much to do with those things. 'Tis thirty years since the United States formally legalized the use of the metric system; its superiority to the arbitrary denominations of ounces, pounds, etc., is conceded on all sides, yet we all go on using the terms "tons," "pounds," "feet," "yards," and "gallons," while agreeing that accuracy, universal application and scientific correctness justify the use of the terms "grams," "meters," "liters," etc. The term "horse power" may some day be discarded, but it is a remote contingency.

IN SACRAMENTO, CAL., exists some difference of opinion regarding just and equitable charges for electrical power. Our readers will remember the recent illustrated accounts in this paper of the successful completion of the great Folsom electrical transmission scheme, and the attendant celebration of the event, a noteworthy era in long distance electrical transmission in this State. Among the practical results was expected the economic ability of manufacturing establishments in and about Sacramento to substitute newer and cheaper means of securing power. It is now, however, claimed, with considerable show of correctness, that the power-using establishments in that vicinity, now using steam coal costing from $6 to $9 per ton, are unable to secure a rate from the Folsom Water Power Co. that would even justify any move toward discarding their present plants and putting in electrical appliances. It was generally assumed at the inauguration of the Folsom-Sacramento electrical transmission project that power would be furnished Sacramento consumers at a price that would have a relative cost considerably less than the prevailing figures. It is claimed that the owners of the electric plant represented that their electric power would or could be furnished at less cost than steam power, even were coal secured for $2 per ton. It now appears that the practical benefit resultant from the introduction of the new energy is of no present avail because of the high rates asked by the electric company. The PRESS is not prepared to state positively that such is the fact, but the assertion is made with great show of truth. The matter needs no extensive comment. It is purely a commercial proposition. According to ordinary business rules, the inducements for change must be made sufficient to justify discarding present power appliances for electrical apparatus. Regardless of what was or was not promised or expected, the question is solely a matter of business cost. The amount of the investment, and the cost of maintenance on the part of the power company, a fair allowance for interest thereon, a fair business profit, a due consideration for its own future and its permanent business relations—these are the questions that naturally occur to the electric power company. It is business every way for that company to make its charges as low as possible. Any attempt at extortion or overcharge would result disastrously to the company. Like any other industry, custom is to be fostered and encouraged by those who have a manufactured article they wish to sell. The company engender power; it is a marketable commodity; if those who by reason of location or manner of business find it economical to buy they will; otherwise they will not. The same intelligent skill and business judgment that enabled the projectors and present owners of the Folsom-Sacramento Electric Power Co. to successfully complete that great work will doubtless suggest the business action requisite to make it a financial success.

CONSIDERABLE attention has been given by this journal to the new acetylene gas, its possible importance to the mining world being recognized. Considerable discussion still goes on as to its cost, the strength of the argument so far being with those who claim that commercially the cost of production precludes its extensive use. Its opponents have also pointed out its danger. The Massachusetts Institute of Technology informs us that: "If stored in a steel cylinder of 600 to 700 pounds pressure, in the event of a fire in the building containing it it would be decomposed into carbon and hydrogen, and the latter would have a pressure of 20,000 pounds per square inch, which would burst the cylinder and cause great damage. A slight leak in the cylinder would be still more dangerous; 3 or 4 per cent of the gas in the air would cause a mixture of terrible explosive force. Acetylene gas alone can be exploded by fulminate of silver, and the copper salts of the gas are also violently explosive. One danger in keeping gas in tanks in houses would be in the formation of a copper salt near the acetylene tank." Still, undeterred by all these terrors, some fearless manufacturers are making this costly destructive compound, and its use is gradually extending. In Montana a plant is building at Great Falls that is expected to supply the mines of Butte. Doubtless the candle manufacturers will object; but if the Butte miners are furnished a better light, and if the Butte mine owners find their bills for light cut in two, it is probable the objections will be unheeded. Like all combinations of natural elements or forces, acetylene is doubtless liable under certain conditions to destroy. And, it is also probable that till produced in large quantities under more favorable conditions than have hitherto prevailed, it is more costly than its adherents claim. But it appears to have in it the same promise of economic value to the miner that has made so universal the use of many other appliances that at first were opposed and condemned.

THE cessation of Sunday work on the Comstock is a new phase of an old question. To-night for the first time since Virginia City assumed importance as a mining camp the mines there will close down till the following Monday morning. This is a matter of economy. The question of wages on the Comstock is still being discussed. For the last twenty years efforts have been made to get the wages down, but the ruling rate is still four dollars. Virginia has been the only mining center of any consequence where continuous work went on and the only place where the old $4 a day rate prevailed. The first mentioned distinction ceases to-day. The second distinction is argued for and against. It is claimed that a reduction of wages would result in an increase in the number of men employed. It is further advanced that, assessments being no longer paid with the old-time promptness, old-time standards should give way, and that in the present condition of things on the Comstock, unless new bonanzas are discovered, the present expenditure cannot be maintained. It is also stated that, if further economy is rendered necessary, the place to exercise it is not in the reduction of miners' wages, but in the consolidation of office expenses and a reduction of office salaries. So much has been said on this subject that nothing new can be added. It is a matter that is full of complications, from the political "pull" of a mine superintendent to the power of the Miners' Union, which is the most potent factor at present. The possible outcome will be a mutual agreement that miners employed in the lower levels worked will continue to be paid $4 and those employed near and on the surface a lesser amount. Time was when it made little difference how much was paid the Comstock miner, and in those times a good many men were on the pay-rolls that did no work in the mines, but those times are gone.

## Concentrates.

ELEVEN smelters are now in operation in Colorado.

PLACERVILLE'S new daily, the *Nugget*, starts off well.

THE babe born to-day must wait eight years for celebration of its birthday anniversary.

THE Kennedy, Nev., Chlorination Works is expected to resume operations next week.

PERRIS DISTRICT, Riverside Co., Cal., calculates that its gold yield for '95 aggregated $196,000.

THE *Mail* says that at Cripple Creek, Colo., a 4-room, unplastered log-house brings $40 per month rent.

THE Nevada Co. Miners' Association was reorganized at a meeting held in Nevada City last Thursday evening.

THE Senate Committee on Public Lands will consider the Johnson mineral classification bill on Monday, March 2.

THE *Enterprise* notes the advent of the woman prospector in Sierra Co., Cal., and notes the presence of two near Downieville.

UNDISMAYED by the current quotations of 68¾, two nervy men of Silverton, Col., have started a paper called the *Silver Industry*.

THERE is a bill pending in the Utah legislature to make the filing fee for incorporations 50 cents for each $1000 of the capital stock.

THE recent exhibit of the State Mining Bureau at Atlanta, Georgia, has been presented to the Girls' Normal and Industrial College at that city.

THE Gold Mining Exchange, Mills Building, this city, has completed its organization and expects to have a formal business opening about the 9th prox.

ONE of the new rules for prospecting in India is that the owner of an exploring license is not allowed to turn up the ground beyond the depth of two feet.

THE Argentine smelter at Kansas City, Kas., shipped 1795 carloads of lead during '95; its aggregate business for the year amounted to more than $8,000,000.

CONGRESSMAN BELL OF COLORADO has introduced a bill in the House to authorize the exploration and purchase of mines within the boundaries of private land claims.

AT the last weekly executive session of the San Francisco Stock Exchange an extension of two weeks' time was allowed mining companies in which to pay up their annual dues.

SO far the snowfall in the Sierras has been unusually light and the January rainfall has not supplied the usual amount. More snow and rain are needed for a profitable mining season.

IT is claimed that whisky saved the lives of three miners at New Castle, Colorado, who got drunk and failed to go to work in the Vulcan mine the night before the recent terrible explosion.

AT Leadville, Colorado, in December, the Arkansas Valley smelter, owned by the Consolidated Kansas City Smelting & Refining Company, broke the local record, running through 27,000 tons of ore.

THE next session of the Western Federation of Miners will be held in Denver, Colorado, May 11, '96, when all the Miners' Unions of the West will send delegates to represent their respective interests.

THE Northwestern Miners' Association met at Spokane, Wash., last Saturday and perfected its organization. Several addresses were delivered and harmonious action taken to develop and protect mining interests.

THE newly appointed members of the U. S. Debris Commission will begin the transaction of business as soon as the Senate formally confirms their appointment. Meanwhile Capt. C. E. Gillette is attending to the routine duties of the office.

IN the Transvaal, South Africa, there are 100,000 Uitlanders, of whom 75,000 are men, and 60,000 Boers, of whom 15,000 are men. There were less than 15,000 votes cast at the last election for President. The Uitlander population is increasing rapidly—it is estimated at the rate of 4000 a month.

SIXTEEN YEARS AGO yesterday—Feb. 28, 1880—Aspen, Colorado, was founded by B. C. Wheeler. When he drove the first stake there was six feet of snow on the level. During the last sixteen years the Aspen mines have produced $50,000,000 of silver, the output of 1895 being estimated at $4,000,000.

PRESIDENT CLEVELAND has signed the bill extending the operation of the mineral land laws to the north half of the Colville Indian reservation, in Washington, and that country is filled with eager locators. There will be considerable complication, legal and otherwise, the conflicting claims being already numerous.

FROM Meadow Lake comes the annual story that the district is to be revived. This time it is a New York company which "in the spring" will put up a plant that will work the ore to 92 per cent of its assay value. The rich but refractory ore has long been a metallurgical problem, and its fortunate solver will win fame and fortune.

A BILL is before the British Columbia parliament which, if it becomes a law, will levy a tax of two per cent on the gross output of the mines in that province, on the basis of the ore shipped. There is an annual deficit of $600,000 in the British Columbia provinces, and as in Nevada twenty years ago, taxation of the mine yield is proposed.

TWENTY YEARS AGO the famous Tillery seam of coal in South Wales suddenly came to an end and against a great fault, or dislocation of the strata. All efforts of miners and experts failed to follow it farther until a few days ago, when the lost end of the seam—consisting of 4½ feet of coal in three layers—was discovered, and the mine will again be lucrative.

TO-DAY, says last Sunday's Virginia, Nev., *Enterprise*, is probably the last Sunday on which the Comstock mines will be worked. Yesterday the miners working in the Comstock mines and at the Brunswick lode were notified that, commencing with next Sunday, the first Sunday in March, the mines would be closed down Saturday night and would not resume operations until Monday morning. This is a new departure here on the Comstock, and doubtless is inaugurated for the sake of economy. It is generally well received by the miners, the majority of whom will welcome one day out of seven as a day of rest and recreation. The Comstock mines have never closed down on Sunday, but the mines of all other big camps close one day out of the seven.

THE United States Mint in this city is coining standard silver dollars at the rate of $100,000 a month. The resumption of coining standard silver dollars commenced on the 1st inst. For January double eagles to the value of $1,820,000 were coined, and half eagles to the amount of $224,500, making a total gold coinage of $2,044,500.

JOHANNESBURG, South Africa, and the surrounding country seems to be sorely afflicted at present. The recent political complications were embarassing; then ensued a scarcity of labor; last week there was a dreadful explosion of eight trucks of dynamite, killing over a hundred unfortunates, and now comes news of a $375,000 fire, the last being evidently a gross exaggeration.

THE *Telegraph* says a letter has been received in Grass Valley, Cal., from England stating that miners are arriving in that country from the Transvaal in great numbers, as many as 150 having arrived on one ship. The letter also states that they arrived in their digging clothes, not taking time to change or secure any of their belongings.

THE January gold output at the Witwatersrand, South Africa, is announced to be 148,178 ounces—a decrease of 30,250 ounces in comparison with December, which showed a decrease of 16,790 from the November output, the figures for the last two months of 1895 being 178,428 and 195,218 ounces respectively. The decrease is ascribed to political and labor troubles.

AT the Candelaria water works, Esmeralda Co., Nevada, over 30,000 feet of old iron pipe is being replaced by new steel pipes. When finished, operations on the company's mines, which have been suspended for over three years, will be resumed. This pipe line supplies the town, the mill and mines of the Candelaria Water Works & Manufacturing Co., limited, the Holmes mine and the Mt. Diablo mine with water.

NOT to be behind other localities in strange tales of treasure, Olympia, Wash., reports the discovery of gold in the bark of fir trees. The *Olympian* says the gold "is in fine flakes, scattered all through the bark," and advances the neat theory that "the flour of gold was taken up by the roots and conveyed in the sap up through the body of the tree, finally being filtered out and retained by the bark," which is interesting, if not conclusive.

THE executive committee of the Oregon Miners' Association met in Grant's Pass last Monday. R. M. Hickey was appointed to solicit members for the association throughout Josephine, Jackson, Douglas, Coos and Curry counties. A committee was appointed to investigate the mining laws of this State and to correspond with representatives in Washington for favorable legislation on mining. The next meeting of the committee will be held on April 1st.

UNDER date of the 18th an Oregon man writes: "Our party of six will sail this P. M. at 6 o'clock on the steamer City of Topeka for Juneau, where we expect to arrive on Saturday, the 22nd inst. The entire passenger list will amount to 250, most all for the Yukon. The steamers report 10 to 15 feet of snow in Juneau and 400 miners to go over the pass, including the present list. Citizens there report the most severe winter ever experienced by white settlers in Alaska."

THE *African Review* publishes a table of South African dividends for '95. The Rand record for the year was £2,058,418, against £1,466,694 paid to shareholders for 1894. The total of South African dividends stands at £6,616,236, an increase of £3,061,660. The Rand dividends represented 25% of the value of the year's output—a higher proportion than in any previous year. Some of the total of £6,616,236 was return of capital in cases where dividends had been declared on sales of property.

FROM Vladivostock, a Pacific port of Siberia, comes the report that the agents of the Anglo-American Company have arrived with a capital of £5,000,000 to work the alluvial gold deposits of Eastern Siberia. They intend to purchase abandoned claims and expect there to extract the gold by improved machinery and processes. The amount of capital, if all subscribed, would indicate ample backing. Probably, however, two or three extra ciphers have been appended in transit.

THE O. & C. R. R. Co. has made application at the Roseburg, Or., land office for patents to another long list of lands in the Southern Oregon mineral belt. Some of these lands are in the best mining regions in Jackson county, and those interested there should send direct to the register of the land office at Roseburg for a copy of the list and instructions as to the proper action to take in entering a protest against the patenting of any parcel of this land to the Railroad Company. Any action in the matter must be before April 4th, '96.

SECRETARY OF THE INTERIOR SMITH has granted J. H. P. Voorhees, a relative of Senator Voorhees, a concession to prospect and mine for gold in the Navajo, Arizona, Indian Reservation. This is a privilege which has been sought for by miners for years, the belief being general that rich deposits of gold are to be found in the Carrizo mountains, which lie almost entirely within the Navajo Reservation. Mr. Voorhees secures a lease of a certain square mile of territory in the Carrizo mountains south of the Colorado river, in the extreme northeast corner of Arizona, which is to run for ten years.

W. H. MEDARIS, a miner at Newcastle, Colorado, was an eye-witness of the terrible explosion there last week, by which over sixty miners were killed. He says the explosion was caused in the same manner as the one at the same mine eight or nine years ago. Gas, combined with coal dust, forms an excellent medium for an explosion, especially when there is a "blowout" shot behind it. In this case, he says, a shot was probably not well tamped, the tamper blown out, and the flame set off the gas and dust. Great precautions were taken in the mine to avoid an explosion. The men were all required to carry safety lamps, and were not allowed to have any tobacco or matches. The Italians, however, were careless, Mr. Medaris says, and violated the regulations imposed upon them for their own protection whenever they got a chance.

THE United States District Attorney has commenced suit against the Central Pacific Railroad Company to recover 9366 acres of land in Butte, Sutter, Tehama, Yuba and Shasta counties, valued at about $1,000,000. The claim of the Government to a portion of the land it seeks to recover is based on the allegation that it was erroneously patented to the Oregon and California Railway Company, a predecessor of the Central Pacific, by reason of the fact that at the time the railroad company filed maps of survey, under the act of July 25, 1866, and when withdrawals of land were made by the Secretary of the Interior, the land was of mineral character, and was exempt from the operation of the patents afterward issued. It is alleged that the Government had no right to issue patents to mineral land, and did so unwittingly, so that it is now entitled to recover possession of the land.

LAST Tuesday the San Francisco Chamber of Commerce passed and sent copies of the following to the California delegation in Congress and to the Executive Committee of the California Miners' Association: WHEREAS, Legislation is now pending in Congress for the protection and encouragement of the mining interests of the Pacific coast; be it *Resolved*, That the Chamber of Commerce of San Francisco, by its Board of Trustees, cordially endorse the proposed legislation. The Government of the United States, having sold its citizens public lands for the purpose of hydraulic mining, is bound in good faith to protect them in its legal use, and to provide such accessories as will obviate any damage to the lands of other citizens. We endorse the mineral land bill which has passed the House of Representatives, as a measure which is just and equitable to all whose interests are affected thereby.

THE wily promoter is ubiquitous. The following is reproduced from a paper published in Constantinople, Turkey. "A prospectus having been issued by a syndicate registered in London under the name of the 'Kuluk Mining Syndicate, Limited,' purporting to acquire and work certain emery mines at Kosagatch, near Kuluk, in the province of Menteshe (Asia Minor), I, the undersigned, Mimico Cotaris, hereby declare that the only emery mines hitherto granted by Imperial Firman in that locality, and known by the name of Kuluk emery mines, are my property, the concession of said mines being in my name and in that of Emmanuel Economides, whose share in said concession I purchased and paid for many years ago. I have since worked the said mines for upwards of seventeen years as sole owner thereof, and recently the said Economides having, in violation of our agreement, sold over again his share in said mines to Mr. Edward Whittall, I am in litigation with the above-named parties regarding this matter, and our suit is actually pending before the competent Turkish tribunals. I further declare that it is against my will and consent that my said mines are being disposed of by the above-mentioned syndicate, and formally protest against this act of spoliation, rendering the directors of said syndicate liable for all damages which may accrue to me therefrom.—MIMICOS COTARIS."

SAYS the current *Mining World* to hand: "Some funny details of the Jameson campaign are coming to hand. The battle was fought over the Randt Gold Mining Co.'s ground, and as the manager and his wife could not get through the lines of the contending parties, they simply lowered themselves down the Violet shaft, and, with many others in a like case, spent the night in the third level. More bold than either the manager and his wife was one of the white employees, who got through and visited Krugersdorp, where, to his surprise, he found the machinery and everything else absolutely uninjured. His reflections as he came away probably were that neither the Boers on the one side nor the Jamesonites on the other had done very much execution either to themselves or to property in their vicinity, and that their skill as marksmen had been overrated. On the subject of Violet Consolidated, when the Boers arrived there on January 1st they sent all the colonials off the property, to the number of 47, and occupied the outhouses. When the battle took place the Queen buildings were somewhat damaged. The Kaffirs became very frightened and declared they would do anything but show themselves. The manager was doing all he could o keep the mine free of water. The principal point held by the Boers was the Queen block, which has a 10-stamp mill. This is about one mile from the Violet on a different series of reef."

THERE is only one bill now before Congress, says the Marysville *Democrat*, providing for an appropriation of money from the general treasury for the betterment of the Sacramento and Feather rivers that is based upon the report of Government engineers. That bill was first introduced by Congressman Caminetti and provided for $300,000 as recommended in the report of December 3rd, 1893. Because of the condition of the treasury it was agreed later that the amount should be reduced, and finally the bill was passed in the Senate carrying an appropriation of $100,000. For lack of time, and because of opposition by a few men who claim to represent the valley counties, the bill failed in the House. The bill was introduced by Congressman Johnson, one of the first sent to a committee of the present Congress, and it provides for an appropriation of $250,000. This bill is our only hope for successful legislation during the present session, in the interest of these streams, and this can be secured only by united action. The bill introduced by Congressman Johnson, January 11th, at the request of Robert T. Devlin, providing for the Sacramento River Commission, is simply a new proposition which cannot be put in operation in several years at best. We already have a commission of Government engineers who are by law instructed to disburse at once money appropriated by Congress for the betterment of the Sacramento and Feather rivers.

THE Rainy Lake, Minnesota, *Journal* of late date prints the following: "The Colorado millionaire who has discovered a vein of sylvanite 'running $149,000 to the ton' is indeed to be congratulated. Sylvanite of highest grade is 85 per cent silver, with a possibility of carrying some gold. A ton of pure silver, at present market quotations, is worth a little less than $20,000. It is this fact that makes the discovery of a vein chuck full of $140,000 ore a remarkable circumstance in the world of science, as well as of mining, contributing also, it may be, to the world of fiction." As this paragraph is likely to be more or less extensively copied, thereby conveying a good deal of misinformation, the Denver *Review* good-naturedly tries to forestall it as far as possible by giving the real facts in regard to sylvanite. Dana's Mineralogy, after stating that sylvanite is "a telluride of gold," gives its composition as follows: "Tellurium, 55.8 per cent; gold, 28.5 per cent; silver, 15.7 per cent." By this it will be seen that sylvanite, as Mr. Dana finds it, is more than one-fourth of it gold. Now, there are 29,166 ounces, Troy weight, in a ton avoidupois. If the reader will multiply $20.67, which is approximately the value of an ounce of gold, by 28½ per cent of 29,166, he will find that a ton of pure sylvanite would be worth more than $150,000. The values of the Cripple Creek sylvanite are almost entirely in the gold. Another name for sylvanite is "graphic tellurium," or "graphic gold," so called because the crystals are frequently arranged on the face of the rock so as to resemble written or printed characters.

## Comstock Ore Sampling.

Written by JOHN D. McGILLIVRAY.

The rehearing before Judge Hebbard of part of the Hale & Norcross case furnishes, in the evidence offered, some valuable lessons to miners, not only on the Comstock, but everywhere. Judge Hebbard had found in the first trial of the case that the Hale & Norcross sustained damage by the imperfect milling of the ores in the amount of $789,618. He held that the amount returned by the mills in bullion was 52.11 per cent, and that it should have been at least 75 per cent, of the car sample assays.

The Supreme Court was not satisfied with the evidence upon which he had based his conclusions, and sent this part back for rehearing. In the rehearing the subject of ore sampling and of the methods of milling on the Comstock—as to the evils and the causes of them—was gone over by the best of practical miners and experts, and many points of interest were brought out.

Louis Janin, the well-known mining engineer, was called as an expert witness in the case. Mr. Janin has had many years' experience in mining and milling on the Comstock and is thoroughly familiar with all the methods of mining in vogue there. So, on the stand, he went over practically the whole ground in dispute. Aside from its bearing on the case, much that he said is worth the attention of miners. What follows in this article is made up from his evidence as given on the trial, from data furnished by him to the writer, and from authorities he used for reference while on the stand.

As to the sampling itself, upon which the case mainly hinges, it was shown that a very careless system has been in vogue on the Comstock ever since the beginning of mining there. Correct assaying of ores is the main check by which millions are guarded wherever mining is done, and if assaying is to be of any value at all, careful and correct sampling must be done. Professor Christy of the College of Mines of the State University, in a paper published by the American Institute of Mining Engineers, says of this:

"Haphazard and occasional sampling and assaying are worse than useless. They lead to great losses of valuable capital, frequently to the total abandonment of good properties, and, worse than all, to a false sense of self-satisfaction that discourages improvement by denying its necessity."

By sampling is understood the final delivery to the assayer of a comparatively small proportion of ore which accurately represents a very much larger volume of the same material. That is to say, in proportion to its quantity, it will contain precisely as much or as little of the gold and silver as a ton will of the rock sampled. The greater the proportion that is taken of the ore body, the more likely it is that it will represent an average value. Ordinarily, metallurgical works which treat ore from many sources, or buy ore from many different people, pay for the ore on the assay value. The proportion that is taken for a sample of the total amount is one-tenth or one-twentieth of the lot; or, if the lot itself is small, say ten tons or under, the whole amount. This proportion that they thus select is crushed fine and thoroughly intermixed.

On the Comstock a grab sample is taken from the carload of ore, which is not thoroughly mixed, and the pieces of which are very far from being uniform in size, and instead of one-tenth or one-twentieth of the lot, the amount grabbed is probably not over half a pound from the carload which weighs nearly a ton. In one case one part in ten, at least, is taken, and in the other one part in 4000. Moreover, in the former case the whole lot is crushed to permit of uniform mixture, but on the Comstock only about eight pounds of the day's samples, of say 100 pounds are taken from the sample box, and that, too, without crushing or quartering down, for the assayer; in other words, the assayer takes his assay from one part in 48,000.

The manner in which the carman takes the sample from the carload of ore weighing about a ton, is necessarily incorrect, for the carload itself is not an intimate mixture, which is required in good sampling, and the quantity that he takes, as stated, is but one part in 4000. If, during the twenty-four hours, he has thus taken say from 100 cars or 200, or whatever the number may be, the final result is the same small proportion of the total amount which he is supposed to be sampling. Nothing can be properly sampled which is not homogeneous, unless one gets a proper proportion of each component part.

In these ore cars the ore is generally in a finely divided state, but the waste rock is coarse. No man being asked to sample ore will take one or two pieces of the coarse as representing the mass, for he knows that it is not ore; he cannot help knowing it, and it is not in human nature for him to grab up masses of waste rock when he is told to sample ore; he only does it in cases where it is intimately intermixed so that he does not know one from the other.

The manner in which the sample for the assayer is prepared is also incorrect, also supposing that there are considerably more than eight pounds in the box. A correct sample of the whole quantity which is in the box can only be obtained when the whole amount is reduced to powder, or, at least, in small pieces which will permit intimate intermixture. But eight pounds out of, say, 100 pounds would be sufficient if the ore was in a proper mechanical condition, as stated. But in the manner in which this sample of eight pounds is taken from the box, the same errors may creep in as in taking the sample from the carloads, possibly even greater. It is true that a man, having 100 pounds properly spread out, might sort out a closer proportion of poor and rich ore than the car sampler did, but, as stated, it is a vicious sampling of a vicious sample, and no subsequent result obtained from an assay, no matter how made or how correct, can be depended on as showing the value of the ore body which it is attempted to sample.

It may be said here that most of the milling on the Comstock is done by custom mills, and this makes it necessary for the mine owners to take samples before the ore reaches the mill. The millman for his guidance takes samples from the pulp as it comes from the batteries. In most cases throughout California and Nevada, where the mill and mine are under one ownership, assays are made only from the battery pulp. That the mill sample on the Comstock is far better than the haphazard car sample may be easily seen. The ore is broken down in the mine, thrown down an ore chute, put in the cars, goes to the ore bin at the mine, then to the ore cars of the railroad and finally is dumped into the ore bins at the mill, where it is broken up by the rock breakers before it goes to the batteries. In all this handling the ore necessarily becomes thoroughly mixed.

An analysis of the assay value by railroad and battery samples compared with the bullion returns on the lot of 338.72 tons of Hale & Norcross ore worked at the Brunswick mill in October, 1895, furnished an illustration of the unreliability of samples, even of battery samples, if improperly taken. While there was extracted of the silver in the ore 66.01 per cent by railroad sample and 73 per cent by battery sample, there was obtained in the bullion of gold 140 per cent by railroad sample and 153.45 per cent by battery sample. The impossible per cent of yield of gold, even from the railroad sample, will bar one from claiming that the battery sample was too low in gold on account of the gold remaining in the mortar until the final cleanup.

The excessive percentage is due, possibly, to incorrect assay returns. The foreman of the mine testified that the ore was of a different character from what is found elsewhere in the mine and probably contained a larger proportion of gold to silver than ordinary ore. It is well known that when ore contains free gold, large discrepancies may occur in duplicate assays from the same finely powdered pulp.

One of the main discussions before Judge Hebbard was as to the different percentage of bullion obtained from the ore of different mines and even of different ore bodies in the same mine on the basis of the car sample and battery sample assays. An erroneous impression was given to many that this was due to the milling, while in fact it was due mainly to the difference in the relative proportion of gold to silver in the ores and to the difference in the minerals comprised in the ores.

It is more difficult to obtain a high percentage from silver ores than from gold ores, the latter being free and uniting quickly with quicksilver, whereas silver is combined with sulphur and other substances and must be first reduced by chemicals before it will unite with quicksilver, and the gangue of the ore often acts upon the chemicals used, destroying their efficacy. In some of the mines the bullion consists of one-third gold and two-thirds silver, whereas in others the proportion is reversed; in some cases even 80 per cent being gold. Therefore the per cent of extraction of gold and silver may be equal, but the total percentage will vary. From 80 to 90 per cent should be obtained of the gold and about 45 per cent of the silver in ordinary work on the Comstock.

To illustrate this, take one-ton samples of $40 rock from two Comstock mines, one with 80 per cent of gold and 20 per cent of silver, and the other 30 per of gold and 70 per cent of silver. Suppose that in working them there is obtained in each case 80 per cent of the gold and 45 per cent of the silver. From the first lot, containing $32 in gold and $8 in silver, we would obtain $25.60 in gold and $3.60 in silver, or a total of $29.20, which is 72 per cent of the $40. From the second lot we would obtain $9.60 in gold and $12.60 in silver, or a total of $22.20, which would only be 54 per cent of the $40 in that ore. This accounts for the different percentages obtained in the yield from different mills from working ore from different bonanzas.

In the Comstock there were different bonanzas, or ore bodies, which differed as to the gangue as well as to the minerals composing the ore. The presence of rebellious metals and the difference in the mechanical condition of the ore bodies make it almost impossible to fortell closely what the yield in per cent will be from any given ore body in comparison with any other ore body or even sometimes of different portions of the same ore body.

This may be illustrated by the results obtained by Mr. Janin from two lots of slime worked by him on the Comstock and referred to by Raymond in his "Mineral Resources for 1872." From one lot the percentage of gold extracted was 23.30 and of silver 35.68. From the other lot he obtained 76.28 per cent of the gold and 87.06 per cent of the silver.

It may be interesting to note here some of the points in Judge Hebbard's decision upon which the case was sent back for rehearing.

There were delivered to mill by the Hale & Norcross 88,887 tons gross weight. Based on this weight the gross value of the ore was $3,505,361, or an average assay value of $39.43 per ton by car sample. Allowing for 6 per cent moisture, there was only 83,553.78 tons dry weight, which, at $39.43 per ton, gives a gross value of $3,294,525. The yield in bullion, based on wet weight, was 52.11 per cent of the gross value by car sample; based on dry weight, it was 55.45 per cent of the assay value. The estimated value of the dry ore by car sample being $3,294,525, and allowing that 5 per cent of the value went off in slimes (the per cent of weight going off in slimes would have been greater, but the slimes are usually poorer, especially in gold, than the original ore), there went into the pans ore containing $3,129,798.

Judge Hebbard decides that there should have been returned in bullion $2,616,491. To obtain this would have required an extraction in the pans of 83.6 per cent of the car sample assay, which he admits the testimony showed to be always too high.

Supposing the car sample assay of the Hale & Norcross ore to have been $5 too high, and Judge Beatty also says that the testimony shows that they are always too high (referring to Mackay's testimony that they unually run $8 to $10 per ton above the real value), and consequently that the real value per ton was $34.43; then the gross value of dry ore would have been 83,553 tons at $34.43, or $2,876,729. Allowing that 5 per cent of this value ran off in slimes, there would have gone into the pans ore assaying $2,732,892, and the $2,616,491 which Hebbard says should have been returned in bullion, would have required an extraction of 95 per cent in the pans. Judge Beatty assumes that Judge Hebbard has roughly included the yield of the slimes and concentrates, etc., in what should have been the bullion yield. This, however, would still make necessary an extraction of over 90 per cent in the pans, or there would have to be credited to the mill the cost of reworking the slimes, tailings, etc., which would not be covered by the charge of $4.50 per ton allowed as the actual cost of working the ore.

It is necessary for the Comstock millman to extract in bullion at least 75 per cent of the battery assay to make good his guarantee of 65 per cent on wet ore and allow for loss of slimes. Ore is now worked to a higher percentage on the Comstock than was formerly the case, and it is the custom to grind much longer.

The improvement of the working of Comstock ores lies in the direction of working directly the whole amount of ore as it comes from the battery without separating the slimes, and on accomplishing to a great extent by chemical means what is now less perfectly effected by prolonged grinding of the ore at an unnecessary expense for fuel, castings and quicksilver, the consumption of the latter being increased by the continuous grinding in the pan.

A better system of sampling is now especially desirable on the Comstock, on account of the working of lower grades of ore, where a slight error may entail a loss by causing the milling of ores that will not pay. It is said that Mr. Keating proposes to put up mills to handle large quantities of this class of ores down on the Carson river as soon as the Hale & Norcross suit is settled. When working low-grade ores the mine owners must necessarily be very careful, for fear of sending to the mill any that will not pay, for the margin between profit and loss is small.

A charge made in the Hale & Norcross case, and one that has too often been made before, is that of causing a great deal of ore that would not yield a profit to the mines to go through the mills simply for the sake of the milling profits.

When thorough, reliable sampling is done, the mill owners will be satisfied, the mining stockholders will be satisfied, and a blot will be removed from the escutcheon of the mill barons of the Comstock.

The remedy is simple and at hand, and only awaits adoption by those in power on the Comstock. Mechanical samplers have been so perfected that their use has given entire satisfaction in other districts, both to the mine owners and the mill owners where custom work is done. The rapidity with which ore is extracted on the Comstock precludes the idea of hand sampling. There need be no objection, however, to mechanical samplers, which can handle any number of tons. These could be conveniently placed at the mine under crushers above separate ore bins, and a given proportion of the ore delivered in cars might be run to the crushers. Falling thence the ore might pass through the samplers, which can be arranged to deliver any percentage required of all the mass passing through them. For instance, ten carloads out of every hundred might be delivered to the crusher, and all of this would pass through the mechanical ore sampler, which would deliver as small a lot as desired—say half a ton—the other nine and one-half tons going on to the mill. From the smaller lot quartered down the assayer would take his sample.

## Notes on Gold Milling in California.

NUMBER XV.

By E. B. PRESTON, M. E. Field Assistant State Mining Bureau.*

SPECIFICATIONS FOR A FORTY-STAMP GOLD MILL (WATER POWER).—MACHINERY.

*Water Wheels and Pulleys.*—One water wheel six inches in diameter, to drive the battery, the wheel to be supplied with a shaft, boxes, collars, gate and nozzle, automatic governor, and a pulley 36 inches in diameter grooved for 1¼-inch manilla ropes.

One driving pulley, 12 inches in diameter.

One idler pulley, 48 inches in diameter, grooved for 1¼-inch rope, and fitted with shaft and boxes.

One slack-tightener pulley, 48 inches in diameter, grooved for 1¼-inch rope, and fitted with shaft, boxes, carriage, track, and counterbalance weight.

The rope for transmission is to be put on in one piece, passing around the idler and slack-tightener (which are to be set on an angle in such a way that they will take the rope from one side of the main pulleys and pass it on to the opposite side of the other pulley), thereby making but one splice in the whole rope, which will be kept in constant tension by the slack-tightener.

One wheel, 4 feet in diameter, to drive the rock-breakers; the wheel to be supplied with a shaft, boxes, collars, gate, and nozzle, and a pulley 34 inches in diameter, grooved for 1½-inch manilla rope.

One driving pulley, 60 inches in diameter.

One idler pulley, 30 inches in diameter, grooved for one 1½-inch rope, and fitted with shaft and boxes.

One slack-tightener pulley, 30 inches in diameter, grooved for one 1½-inch rope, and fitted with shaft, boxes, carriage, track, and counterbalance weight; rope to be put on similar to that for the battery.

One wheel, 36 inches in diameter, to drive the concentrators; the wheel to be supplied with shaft, boxes, collars, gate, and nozzle, automatic governor, and a pulley 16 inches in diameter, grooved for one 1-inch manilla rope.

One driving pulley, 48 inches in diameter.

Forty-stamp battery, stamps to weigh 850 to 900 pounds each, arranged to run in eight batteries of five stamps each, by belts and friction clutch pulleys from battery line shaft.

Eight high cast-iron mortars, single discharge, each to weigh about 5000 pounds; to be planed all over the bottom, and faced where the apron joins on; eight holes to be accurately cored in the base for 1½-inch anchor bolts. Each mortar to have five cast-iron linings. The aggregate weight of these linings is about 500 pounds per mortar.

Eight cast-iron aprons, to be faced where they join on to the mortars, and fastened in place with ¾-inch bolts.

Eight sugar pine screen frames, to have iron facings put on the ends where the keys bear against them; the edges to be fitted with dowel-pins to join them to the inside plate-block.

Sixteen inside plate-blocks, two sets, one to be 6 inches high and the other to be 4 inches high; to be well fitted into the mortars and to have plates fitted and fastened on with brass screws; blocks to be bolted together to keep them from splitting, and to be fitted with iron facings where the keys bear against them, and well fitted to the screw frames.

Eight brass wire screens, No. 30 mesh, to be fastened on to the screw frames with copper tacks.

Sixteen gilt-headed end keys, for screen frames, to be well fitted in place.

Sixteen bottom keys, for screen frames, to be well fitted in place.

Sixty-four foundation bolts, for mortars, to be 1½ inches in diameter by 30 inches long, with hexagon nuts on the top ends and steel keys in the bottom ends.

Sixty-four wrought-iron washers, 4x4x¾ inch, for bottom ends of foundation bolts.

Eight sheets of rubber, ¼ inch thick by 30x60 inches, for mortar foundation. Mill blankets tarred may be used in place of rubber.

Forty chrome steel or cast-iron dies, 9 inches in diameter by 7 inches high, with square base well fitted into the mortars, 10 inches from center to center.

Forty chrome steel shoes, 9 inches in diameter by 8 inches high, with tapered shank 3½ inches in diameter at top end, 4; inches in diameter at bottom end, by 5 inches long, to fit into the stamp-heads by being covered with dry, hard pine ¼ inch thick, this being driven in by being allowed to drop a few times on the bare die.

Forty chrome steel stamp-heads, 9 inches in diameter by 17 inches long, with a conical socket cored into the lower end, 4 inches in diameter at inner end, and 5¼ inches in diameter at the outer end, and 5½ inches deep, and a conical socket cored and actually bored out to fit the tapered end of the stamp stem, 2⅞ inches in diameter at inner end, and 3¼ inches gauge at the outer end, by 6 inches deep. Transverse rectangular keyways are to be cored through the stem-head, 1x2½ inches, for loosening the shoes and stems.

Two steel loosening keys, ⅞ inch thick by 1 inch at the point (2 inches at the head) by 18 inches long, for loosening the shoes and stems.

Forty best refined iron or mild steel stems, turned perfectly true, full length, 3¼-inch gauge by 14 feet long, to be tapered on both ends to accurately fit the stamp-heads. Each stem weighs about 360 pounds.

Forty chrome steel, double-faced tappets, 9 inches in diameter by 11 inches long, with a steel gib and two steel keys accurately fitted in place; both faces to be turned true; tappets to be bored with the gibs in place to accurately fit the stems, and to be counter-bored opposite the gibs by moving the center ¼ inch away and, with diameter ⅛ inch less than the bore, taking a cut ⅛ inch deep. Each tappet weighs 112 pounds.

Eight upper and eight lower guides, with cast-iron frames; guide-blocks to be made of good, dry maple timber and well fitted in place; the guides may also be made entirely of wood.

Four extra quality, mild steel cam-shafts, turned true full length, 5¼ inches gauge diameter by 14 feet long, key-seated for cams and pulley; key-seats must not run through the bearings.

Ten heavy corner boxes, 5¼ inches gauge bore, eight of them to be 12 inches long, and two to be 20 inches long, all of them to be planed all over the bottoms and backs, and furnished with bolts 1 inch in diameter, to fasten them to the battery frame.

Forty double-armed, chrome steel cams—twenty right and twenty left hand—to be made 29 inches long over all, the hub to be 11 inches in diameter and 5¼ inches through the bore; the lifting faces to be 2½ inches wide, and ground smooth, the hubs to be bored to fit the shaft accurately, and properly key-seated and fitted with steel keys, and each marked to their respective places, giving them a combination as follows: Counting from the left-hand side, when facing the battery, throughout the full ten stamps of each cam-shaft, No. 1 cam will drop its stamp first; then Nos. 8, 4, 10, 2, 7, 5, 9, 3 and 6 consecutively. This is the order; 1, 4, 2, 5, 3. Each cam weighs about 158 lbs. The curve of the face of the cam is the involute of a circle, usually slightly modified.

Four pairs of cast-iron double sleeve flanges, for wood pulleys; flanges to be 36 inches in diameter, and 14 inches through the bore; to be turned all over the inside, where they fit on the wood; the outside flange is to be bored and fitted to the sleeve and fastened with a gib-headed steel key; the hub to be bored and fitted to the cam-shaft and fastened with a steel key.

Four wood pulleys, 72 inches in diameter by 17 inches face; to be made of best kiln-dried sugar pine, and all joints to be filled with white lead in oil; the cast-iron flanges to be well fitted on and bolted with twelve ⅝-inch bolts.

Eight wrought-iron collars, for cam-shaft, 5¼-inch bore, fitted with two steel set-screws in each.

Eight wrought-iron jack-shafts, 3 inches in diameter by 60 inches long; black finish.

Sixteen cast-iron jack-shaft side brackets, with four lag-screws, ⅝ inch by 6 inches, for each, to fasten them in place.

Forty open latch sockets, lined with leather.

Forty wood finger-bars, to be fitted and bolted to the above sockets, and furnished with wrought-iron caps and handles.

A complete set of water-pipes for a battery of forty stamps, with all fittings, cocks, and connections.

*Bolts and Washers for Battery Frame.*—Six brace rods, 1¼ inches by 25 feet, 7 inches between two nuts; 6 brace rods, 1¼ inches by 12 feet, 6 inches between two nuts; 26 bolts for mudsills, 1x30 inches; 24 bolts for yokes, 1x28 inches; 24 bolts for yokes, 1x52 inches; 48 bolts for guide girts, 1x32 inches; 4 bolts for knee beam, 1x28 inches; 36 splice bolts for mudsills, ⅞ inch, 16 inches between head and nut; 12 splice bolts for tail girt, ⅞ inch, 9½ inches between head and nut; 32 bolts for mortar-blocks, 1 inch, 59 inches from point to point; 64 bolts for mortar-blocks, 1 inch, 65 inches from point to point; 24 joint bolts for posts, 1 inch, 35 inches between two nuts; 6 joint bolts for knee posts, 1 inch, 45 inches between two nuts; 6 joint bolts for knee posts, 1 inch, 35 inches between two nuts; 24 joint bolts for knee beams, 1 inch, 43 inches between two nuts; 10 joint bolts for tail girts, 1 inch, 21 inches between two nuts; 24 cast-iron washers for 1¼-inch rods; 514 cast-iron washers for 1-inch bolts; 72 cast-iron washers for ⅞-inch bolts; 24 cast-iron washers for ⅝-inch bolts; 40 sheet-iron washers, 3½ inches square by ⅛ inch thick, for 1-inch joint bolts.

*Battery Line Shafting and Pulleys.*—One shaft, 5½-inch gauge by 18 feet long, properly key-seated; one shaft, 5-inch gauge by 15 feet 6 inches long, properly key-seated; one shaft 5-inch gauge by 17 feet long, properly key-seated; one shaft, 4-inch gauge by 17 feet long, properly key seated; two shafts 3-inch gauge by 10 feet 6 inches long, properly key-seated; two face couplings, 5-inch gauge, properly fitted and keyed in place; one face coupling, 4-inch gauge,



FIG. 4. CORRAL HOLLOW



FIG. 5.—CORRAL HOLLOW AND SURROUNDING COUNTRY.

(See page 161.)

* Bulletin[No. 6, California State Mining Bureau.

properly fitted and keyed in place; two face couplings, 3-inch gauge, properly fitted and keyed in place; two babbitted boxes, 5½-inch gauge; three babbitted boxes, 5-inch gauge; two babbitted boxes, 4-inch gauge; two babbitted boxes, 3-inch gauge, all of the above boxes to be made of the same height, planed all over the bottoms, with drip cups cast on to the sides, and furnished with suitable bolts to fasten them to the 16-inch battery knee beams; two collars for 5½-inch shafting, with two steel set-screws in each; four friction clutch pulleys, 48 inches in diameter and 16½-inch face, complete, with levers and connections; pulleys to be fitted to line shaft in their proper places, with phosphor-bronze bushings, the drivers to be properly keyed on with steel keys; one pulley, 6 feet in diameter, grooved for three 1¼-inch manilla ropes, pulley to be well balanced and keyed to the shaft with a steel key.

*Water-Pipes.*—Sufficient 3-inch pipes and fittings to connect battery pipes with feed-water tanks.

*Traveling Hoist.*—One traveling crab, with track-iron and rails, to extend full length of battery.

One 2-ton Weston's differential chain-block.

*Ore-Feeders.*—Eight Challenge self-feeders, complete, for batteries, with all connections.

*Ore-Bin Gates.*—Eight ore-bin gates, 18x24 inches, for fine ore, with guides, racks, pinions, shafts, boxes, hand-wheels and bolts.

Three ore-bin gates, 24x36 inches, for coarse ore, with guides, racks, pinions, shafts, boxes, hand-wheels, and bolts.

*Sluices and Aprons.*—Eight cast-iron aprons, 54 inches wide by 56 inches long, to be fitted under the lip of the mortar apron.

Eight silver-plated copper plates, 54x56x⅛ inches, to be made of best Lake Superior copper, and to have one ounce of silver per square foot; plates to be fitted into the cast-iron aprons, and fastened by strips of wood on the sides, which are bolted to the sides of the apron.

Eight cast-iron sluices, 54 inches wide by 12 feet long, to be made into two sections and bolted together by flanges, the lower section to have a quicksilver trap or trough cast on to the end, extending the full width of the sluice, and to have a connection made for a 2-inch pipe to conduct the pulp to the dividing tanks, and thence to the concentrators.

Twenty-four silver-plated copper plates, 54x48x⅛ inches, to be made of best Lake Superior copper, and to have one ounce of silver per square foot; plates to be fitted into the sluices, overlapping at the joints, and to be fastened in place in the same manner as those in the apron.

There are to be eight silver-plated copper shaking-tables, one for each battery, placed below the apron-plates. These tables consist of a light iron framework suspended upon movable springs. This table is given a longitudinal oscillation by means of eccentrics.

*Dividing Tanks and Pulp Pipes.*—Eight cast-iron dividing tanks, 10 inches long by 8 inches wide by 6 inches deep, with 2-inch pipe connection in one end and two 1½-inch pipe connections in the other end, each to have a wooden swinging tongue put in so as to direct the pulp to either of the 1½-inch pipes, or a part to the one and a part to the other. The tanks are to be connected with the sluices by 2-inch pipes, and with the concentrators by 1½-inch pipes.

*Inside Plates and Blocks.*—Three wooden blocks for each mortar, to be 3 inches, 4⅛ inches and 6 inches high, respectively, to be fitted into the mortars under the screw frames; each block to have iron facings, fitted in flush and screwed on where the keys come, and to have a silver-plated copper plate bent to the proper shape and screwed on with silver-plated brass screws; the copper plates to be made of best Lake Superior copper, 6x50x$\frac{3}{16}$inch, and to have one ounce of silver per square foot.

*Concentrators and Shafting.*—Sixteen endless belt concentrators, complete, with water-pipes and fittings to connect with supply tanks. All sulphuret tanks, complete, to be made of good redwood lumber.

One piece of shafting, 2½ inches by 16 feet; six pieces of shafting, 2 inches by 16 feet; three pieces of shafting, 2 inches by 10 feet; eight face couplings, 2 inches, four babbitted boxes, 2½ inches, with bolts for 8-foot timber; eighteen babbitted boxes, 2 inches, with bolts for 8-inch timber; two collars, 2½ inches, with steel set-screws; two collars, 2 inches, with steel set-screws; one pulley, 48 inches in diameter, grooved for one 1-inch rope, and properly fitted and keyed with a steel key to 2½-inch shaft; two pulleys, 6-inch face by 36 inches in diameter, properly fitted and keyed with steel keys to the 2-inch shaft, sixteen pulleys, 4-inch face and 10 inches in diameter, properly fitted and keyed with steel keys to the 2-inch shaft; sixteen loose pulleys, 4-inch face by 10 inches in diameter, properly fitted to the 2-inch shaft, sixteen collars, with steel set-screws for same.

*Rock-Breakers and Shafting.*—Two rock-breakers, 9x15 inches; one piece shafting, 4 inches by 16 feet; one piece shafting, 3½ inches by 16 feet; one piece shafting, 3 inches by 16 feet; one face coupling, 3½ inches; one face coupling, 3 inches; three babbitted boxes, 4 inches, with bolts for 10-inch timber; two babbitted boxes, 3½ inches, with bolts for 10-inch timber; two babbitted boxes, 3 inches, with bolts for 10-inch timber; two collars, 4 inches, with steel set screws; one pulley, 48 inches in diameter, grooved for 1-inch and 1¼ inch manilla rope, and properly fitted and keyed to the 4-inch shaft, with a steel key; three pulleys, 20-inch straight face by 20 inches in diameter, properly fitted and keyed to the shafting.

*Cleanup Barrel.*—One cleanup barrel, 24 inches inside diameter by 48 inches inside length, to be made of cast iron 1½ inches thick, with two discharge openings, 5½ inches in diameter, in the sides diametrically opposite each other, the heads and discharge doors to be accurately fitted; journals to be 4-inch gauge, cast on to the heads; one tight and one loose pulley, 7-inch face by 30 inches in diameter; two babbitted boxes, 4-inch gauge; and driving pulley, 6 inches in diameter by 14-inch face.

*Batea.*—One batea, 48 inches in diameter, with gears and hangers complete, and tight and loose pulleys, 4½-inch face by 16 inches in diameter, one driving pulley, 9-inch face by 21 inches in diameter.

*Machinery for Cleanup Room.*—One clean-up pan, 24 inches inside diameter, with tight and loose pulleys.

One driving pulley, 8-inch face by 16 inches in diameter.

One cast-iron washing-tank, 24x30x24 inches deep, with three pipe connections for drawing off water.

One cast-iron washing-tank, 30x36x24 inches deep, with three pipe connections for drawing off water.

One cast-iron washing-tank, 30x54x30 inches deep, with three pipe connections for drawing off water.

One marble top, complete, for washing-tanks.

One side washstand, with pipes and fittings.

All pipes and fittings necessary to bring water to the clean-up pan and washing-tanks.

*Retort and Melting Furnace.*—One retort, 10x36 inches, inside dimensions, with amalgam trays, condenser, catch tank, furnace front, bearers, bars, smokestack, and base plate, guy rods, dampers, binders, and all pipes and fitting to bring water to the condenser.

One cast-iron melting furnace, complete, with doors, grate-bars, bearers, cast-iron shell, and damper.

Two bullion molds for 500 and 750 ounces.

Four black-lead crucibles, No 16, with covers.

One crucible tongs for No. 16 crucible.

One skimmer for bullion.

*(To be Continued.)*

## Some Notes on "Crossings."

Written for the MINING AND SCIENTIFIC PRESS by HERBERT C. HOOVER.

There occur in a number of mines in the Grass Valley and Nevada City districts certain local variations in the country rock known to the miners as "crossings." The term "crossing" is very unsatisfactory, because it is used to indicate almost any interruption in the course of the vein, whether it be a fault, dyke or cross vein. But there is a peculiar form of crossing which affords many points of interest, whose origin seems to lie in none of the above causes. They are lenticular masses or streaks in the country rock, crossing the vein at irregular angles, are usually softer than the inclosing rock, schistose in structure, vary from a few inches to several feet in thickness, and extend along the dip of the vein from a few feet to the entire depth of the workings. They present many features of importance to the miner, for not only do they afford an easy channel for cross-cuts, but they may control the extent of the pay chute, or even the entire vein filling.

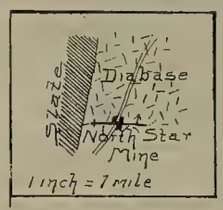
The most typical of this variety of crossing are those of the North Star mine at Grass Valley, called to my attention by Mr. Louis Janin.

In the North Star mine there are a number of these crossings, there being as many as four in one level. Some of them extend only a short distance below and above a level, while others extend through several levels, and one, the west crossing, extends throughout the workings, about 2800 feet, and forms the western limit of the ore body.

On approaching the crossing the quartz usually shows one of two phenomena, either splitting into a network of stringers or ending abruptly, but in either case continuous on the opposite side. The crossings thus form either a breccia of country rock or a "horse" in the vein. The network of stringers sometimes extend into the crossing so as to make it profitable to remove the crossing itself for a few feet on either side of the vein, and giving rise to the suspicion that a cross-vein has been encountered.

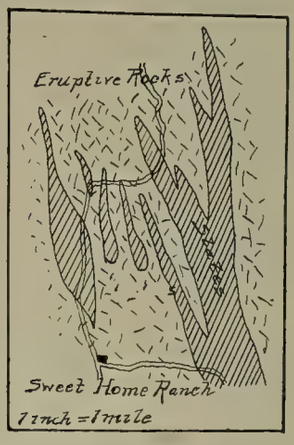
There are many current opinions as to the origin of these crossings, some contending them to be streaks of decomposition, or that they are the result of shearing by faulting. But neither is tenable in the North Star case, because either theory would necessitate that the crossing extend from the surface to considerable depth; and, moreover, the vein shows no indication of displacement. Therefore, it is necessary to seek some other explanation, bearing in mind that the crossings are older than the fissure, for they are brecciated by the quartz; that they are mere lenses in the country rock, and not due to either shearing or decomposition.

The North Star vein is a true fissure vein, having an east-west strike, a dip to the north of about 20°, and for the most part in diabase porphyrite.* The vein has been worked for 2800 feet along its dip.




From Smartsville Folio U. S. G. S.

From the cut herewith presented it will be seen that the rocks in the vicinity of the North Star mine are of two formations, slate and diabase porphyrite. The contact between them runs almost north and south, and passes near the west end line of the North Star ground. The diabase porphyrite is of igneous origin, and has been intruded up through the slates,† shattering them, forcing long dykes and tongues into their fissures and sometimes completely enveloping large or small masses. Splendid examples of such formation on a large scale occur at Sweet Home Ranch, ten miles south of Grass Valley. And Mr. Lindgren has noted the occurrence of such inclosures of slate in the Ophir district, near Auburn.‡




AFTER SMARTSVILLE FOLIO, UNITED STATES GEOLOGICAL SURVEY.

I have microscopically examined slides from some of the North Star crossings and find them to be schists, metamorphosed from slates, which, in connection with their close proximity to the area on the west, and their general parallelism with its strike, make it quite positive that they are merely included masses of these slates.

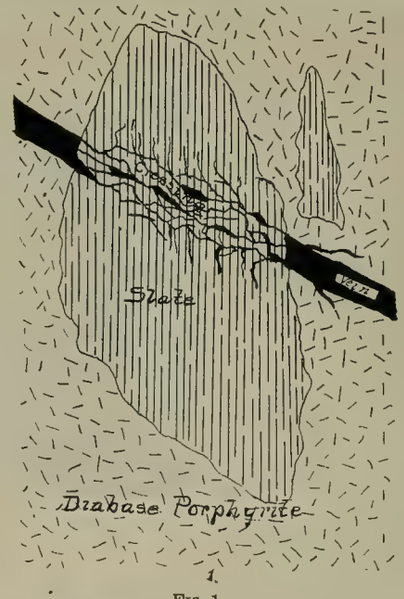



FIG. 1.




FIG. 2.

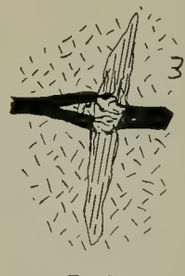



FIG. 3.

Fig. 1.—Section along dip of vein perpendicular to its strike.
Fig. 2.—Section along plane of vein.
Fig. 3.—Section along strike of vein perpendicular to its dip.

IDEAL SECTIONS TO SHOW OCCURRENCE OF SLATE CROSSINGS.

The character of the fissure varies in passing from

*W. Lindgren, Smartsville Folio. Text U. S. Geological Survey.
†Turner, 14th Am. Rep., U. S. Geological Survey, p. 472; Lindgren, 14th Am. Rep., U. S. Geological Survey, p. 253.
‡ 14th Am. Rep. U. S. Geological Survey, p. 253.]

the hard, massive diabase to the softer, more blocky slates, much the same as fissures in different country rocks. Mr. Lindgren,[7] in discussing the character of Sierra fissures, says: "Different rocks influence the character of the fissures to some extent. In massive rocks they are apt to be straight, clear cut and well defined, in slates and serpentines there is often a tendency to splinter into a network of cracks and fissures extremely small, but often rich." When the North Star fissure passed through the hard, massive diabase it was clean cut and afforded an open channel for circulation of vein-filling solutions, but where it cut the more blocky slate inclusions the fissure became a network of small veins, thus impeding circulation or checking it altogether, as at the west crossing. Much the same phenomena might be produced by dykes into a slate country rock, the fissure forming after the dykes.

Movement along the fissure probably faulted the lenses so that the hanging wall portion does not hang directly opposite its foot wall end. In such extensive masses as the west crossing the small exposure along the vein does not show any development, and information is hardly available in the smaller ones. At any rate, the movement has not been extensive, and its greatest effect, probably, was to scatter the crossing debris, some to each side of the crossing itself, thus accounting for the fact that the vein often splits or "raises" around a "horse" before reaching the crossing proper. (See Fig. 3.)

Where the crossings have a limited length along the dip of the vein their effect was much that of a "horse," and the solutions had no difficulty in passing around the ends of this streak of debris in the fissure, but when they are of such general extent as the west crossing they become of utmost importance.

The importance of such a crossing to vein formation lies in its bearing on the distribution and extent of ore bodies in the vein, or even of vein matter in the fissure. That this is of no little consequence is seen from the fact that the plaintiff in the case of Carson City Mining Co. vs. The North Star Mining Co. contended that inasmuch as the west crossing represented the extent of quartz in the vein, it marked the west limit of the vein, and seeks to have the end lines of the North Star readjusted on that basis.

The importance of this particular variety of crossing to the miner lies in the fact that they are often mistaken for faults when they are of considerable thickness and show no well defined walls, and useless crosscuts are run, under the impression that the vein is "thrown." In reality in such cases, not uncommon, the vein is to be found by drifting on the strike of the vein until the crossing is passed, as if it were a dyke. To distinguish between a slate lens and a real fault requires a close study of the country rocks around the mine, and their relations to each other.

In conclusion, then, I think it is evident that some of the crossings are slate inclusions in the prevalent country rocks, and perhaps dykes into slates might produce much the same phenomena; and that it is important that the crossings of every mine be thoroughly understood in order to more fully determine the extent of any ore body; and that they may be distinguished from faults and the expense of crosscutting avoided.

[7] Bul. Geological Society of America, Vol. 6, p. 229.

## His Conscience Troubled Him.

G. W. Richardson, secretary of the Nelson Hydraulic Mining Co., received the following letter recently. It bore the postmark of one of the large cities in the United States and was registered. The contents referred to were nine small pieces of gold of the value of possibly $5. The writer evidently is an honest man, for this is the only case on record where gold dust, washed probably merely to see if there was anything in the gravel, or out of curiosity, has ever been returned to the owners of the ground. Mr. Richardson is seriously thinking of having the gold made into a signet ring and presenting it as a token of the company's appreciation to the man who returned the dust:

*Nelson Hydraulic Mining Company*—DEAR SIRS: I wish to return you the contents of this letter, which I feel it is my duty to do. I did not stop to think, at the time I took it, that I was doing wrong. I beg you to forgive me. I took eleven pieces, and I lost two. When you receive this please drop me an answer.

January 21st, 1896. —Nelson, B. C., Tribune.

THE MINING AND SCIENTIFIC PRESS, published in San Francisco, California, presented to its readers in its issue of the 8th inst. a fine half-tone engraving of the Homestake Company's mill, Lead. This is the oldest, and probably has the largest circulation of any mining journal in America, and in commenting on this great corporation's mine in South Dakota, it speaks with a sense of pride while saying: "It is interesting mainly as the mill of the old reliable Homestake, owned largely in this city [San Francisco], and which last week paid its 120th dividend, making a total of dividends paid of $5,748,000." Black Hills Mining Review.

## Mines, Miners and Monopolies.

Written by J. A. EDMAN

NUMBER VI.—*Concluded*

While loudly proclaiming their indifference to mineral lands, as such, and professing to claim only the agricultural land covered by their grants, the Southern Pacific, in common with other land-grant companies, has for years been actively at work with the specific purpose of absorbing as much as possible of the mineral lands of California, of which every step in their programme bears abundant testimony. The prospective value of the mineral land already patented or likely to be patented to the Southern Pacific Company, under the present rulings of the Interior Department, can be estimated by an analysis of the land grants controlled by the company in California. According to the statement of the Commissioner of the General Land Office, made July 1st, 1894, they are as follows:

| | *Acres granted.* | *Acres Patented.* |
|---|---|---|
| To Central Pacific Company..... | 1,638,000 | 491,000 |
| To Cal. & Oregon R. R. Company | 3,724,000 | 1,730,000 |
| To Western Pac. R. R Company | 1,100,000 | 450,237 |
| To Southern Pacific Company | 11,964,000 | 2,596,089 |
| Totals. | 18,426,000 | 5,328,216 |

The above shows eighteen and a half million acres granted and over five million acres patented to the company in California.

The extraordinary activity of the General Land Office during the fiscal year ending June 30, 1895, is shown by the following statistics of land certified to and patented to the Southern Pacific Company during that year:

| | *Acres.* |
|---|---|
| In the Central Pacific grant | 100,293 |
| In the Cal. & Oregon grant | 306,692 |
| In the Southern Pacific grant (main line) | 616,728 |
| In the Southern Pacific grant (branch line) | 72,548 |
| Total | 1,105,261 |

The amount of mineral land already patented to the company can only be surmised from the investigations of the Miners' Association. The mineral lands in the odd sections within the limits of the above land grants appear from an unofficial, but very conservative, estimate as follows:

| | *Acres.* |
|---|---|
| In Central Pacific grant | 704,000 |
| In Cal. Pacific and Western Pacific grant | 1,600,000 |
| In Southern Pacific grant | 1,344,000 |
| Total | 3,648,000 |

Assuming that 20 per cent of this land, being 729,000 acres, is now occupied and can be protected by the miners, and deducting this from the above would leave nearly three million acres of the best mineral land of the United States to be absorbed by one railroad company. Granting to the Southern Pacific Company a funding bill, extending their lease of power virtually for one hundred years, the well-known ability of that corporation to originate bold financial schemes would warrant the belief that in the hands of a gigantic mining trust these lands would attain within twenty years a fabulous value, exceeding even the well-watered stock of the parent company and representing more tangible assets than their present bonds. With the added possession of fifteen million acres of agricultural land, who can foresee the future of such a corporation and its influence on our institutions? And knowing the grasp it now holds, what menace will it then convey to our liberties as a people?

The action of the Miners' Association has formed the only serious check to the schemes of the railroad power. Indifferent to the efforts of the hydraulic miner to protect their industry, and fortified in their land policy by the control of the Interior Department, it found itself struck in a vulnerable spot by the efforts of the mineral lands committee of the association to prevent the wholesale absorption of the mineral lands. Consequently, when, as before stated, active steps were taken to oppose the approval by the General Land Office of the so-called free lists filed by the Southern Pacific Company during the spring of 1895, the organs of the company began their attacks upon hydraulic mining, in line with their old policy of disrupting by sectional prejudices, and in the hope of sowing dissentions in the association, among which many influential members were hydraulic miners.

Under the Caminetti bill many small hydraulic mines had gone into successful operation, and the Debris Commission had by its just but firm administration proven its title to existence and the practicability of pursuing this branch of mining without danger to the general well-being of the State. It had also demonstrated that the great majority of California miners, as law-abiding citizens, had accepted the situation in good faith, and were ready and generally able to provide for restraining the debris from their mines. A few of the larger companies possessing mines near the main streams, and especially on the Yuba river, where the expense of restraining the debris was almost prohibitive, and where millions of tons of tailings already in the river beds should be held back so as not to affect seriously the navigation of the rivers below, considered that the equities of the situation demanded action by the State and General Government. To meet this condition a bill, previously referred to, had been framed by the association to be submitted to the Fifty-fourth Congress, providing for continuing the Debris Commission and for erecting dams under its supervision. This measure and the classification and segregation of mineral lands under the modified Idaho-Montana bill, were among the most important matters acted upon by the Miners' Association in convention in San Francisco on October 14th, 1895.

We have at least three able and conscientious men in the House, and our Senators are men of experience, judgment and high reputation; they should all be impressed with a full sense of their duty to their State, as well as to the Union, in the impending conflict. Any bill prepared and introduced in the present Congress by the friends of the railroad power may justly be suspected as impracticable, or containing a hidden clause intended to operate in favor of the monopoly, or simply to tide over the fight of the railroads to pass a funding bill.

In a contest with a corporation as thoroughly organized for aggression as the Southern Pacific, and fortified by system, experience, wealth and political connections, the miners of California and the Pacific coast in general should not underestimate the strength of their adversary, who can be met and defeated only by the most perfect organization, persistence and activity, wherein the old rule of fighting the devil with his own weapons should not be entirely forgotten.

By the methods usual among fraternal organizations, miners' associations should be created in all the Western States and Territories, as in Oregon, Washington, Nevada, Arizona, Utah, Colorado, Wyoming, Idaho and Montana.

As soon as the Pacific coast States and Territories were thoroughly organized the mining industry could make itself heard and respected in Congress.

The contest of the California miner with the Southern Pacific is not, as has often been flippantly stated by the Eastern press, a sectional quarrel between a few miners and a progressive railroad company. It is one of the first waves of the storm of popular indignation and resistance to organized monopoly and political tyranny, and California's miners may well be proud to be the pioneers in offering the first serious obstruction to the iniquitous land monopolies created and fostered by venal and unwise federal legislation. In this impending conflict all citizens alike are interested, and especially the farmers of our State, who should never forget the Mussel Slough massacre and other crimes of the Southern Pacific against the bone and sinew of the State. Only in reconciling old differences and working side by side for the common good can a path to victory be found by the people, and only by obtaining political power can its latent force be speedily exerted.

It is to the judicial department alone that under present conditions the Western (and especially the California) miner must look for protection against unjust, oppressive and unconstitutional laws and rules of departments. This branch of our Government has remained the most unsullied during our downward progress from the ideal republic of Lincoln to the present Government "of the dollar, by the dollar, and for the dollar," under which so many nations have perished from the earth. It is yet to hoped that even here in California, where the corporations so far have recruited most of their devoted and able servants from the ranks of the legal profession, high-minded, able and patriotic men will arise to espouse and defend the people's cause, which cheering hope the current history of the Miners' Association affirms.

It may be fitting in closing this review of one of the most vital questions in the history of California to quote the words of one of England's greatest poets:

Ill fares the land, to hastening ills a prey,
Where wealth accumulates, and men decay.

J. A. EDMAN.

Meadow Valley, Cal., Feb. 15th, 1896.

## A Human Salamander.

In Phœnixville, Chester county, Pa., is a man, Jacob H. Boyer by name, who may be appropriately termed a human salamander. He is a mason, and his duty is to repair the firebrick lining to furnaces before they are permitted to cool. According to a correspondent of the Philadelphia *Press* he can step into a furnace where the temperature is more than 200 degrees Fahrenheit; he can work there with little discomfort, though the heat singes his whiskers and burns the soles of his shoes. And yet he wilts under the first strong rays of the sun. The capacity of a single furnace is estimated at forty tons of best Phœnix steel every twenty-four hours. The ingots to be heated vary in size, the largest being a foot in diameter and eight feet long. These ingots are heated for the rolls, and it occasionally happens that an accident occurs to the furnace while heated. To take the heat out and cool the furnace would be a great loss of time and a big inconvenience to the company. Right here is where Boyer's wonderful ability to stand the heat comes in handy. He can repair the breakdown without the loss of a moment.

Boyer's shoes have frequently been scorched, and his whiskers and hair have often been burned off to the roots. Once he repaired a smelting furnace while it was so hot that the tools he was using were bent double. Several of the firebrick had fallen out of place and Boyer used a long-handled instrument to put the bricks in place. The job was accomplished only after the greatest difficulty.

# Scientific Progress.

## On a New Kind of Rays.*

BY W. C. ROENTGEN.

(1) On passing the discharge from a large induction coil through a highly-exhausted Crookes, Hittorf, or Lenard tube inclosed in a light-tight covering of black card, it may be observed, in a darkened room, that a paper screen, impregnated with barium platino-cyanide, and approximated to the tube, becomes lit up with brilliant fluorescence—and this equally well, no matter which side of the paper screen may be turned towards the apparatus. Fluorescence is still discoverable at a distance of two metres from the excited tube. It is easy to infer that the discharge tube is the cause of the fluorescence.

(2) There is thus produced some emanation capable of traversing black cardboard, which is impervious to the ultra-violet rays of either the sun or electric arc. It is readily shown by experiment that all bodies are pervious to this influence, although in very different degrees. Thus paper is very transparent. The fluorescent screen lights up brightly behind a printed book of 1000 pp. Fuorescence also occurs behind two packs of cards. A single sheet of tinfoil casts a hardly perceptible shadow. Thick blocks of wood (2 to 3 cm. thick) are but slightly opaque. A plate of aluminum, 15 mm. thick, even allows some of these rays, which I term "X rays" to pass through it, and determine feeble fluorescence. Glass is opaque in proportion to the amount of lead which it contains. Ebonite, of the thickness of several centimeters is traversed by the rays. When the hand is held before the fluorescent screen, the bones exhibit themselves by shadow, surrounded with only a faint shadow of the flesh. Water, bisulphide of carbon, and other liquids are transparent. Thin plates of gold, silver, platinum, copper, and lead, are somewhat transparent. Platinum .2mm. thick is somewhat transparent; silver and copper are more transparent. Lead 1.5mm. thick is nearly opaque. White (lead) paint is relatively opaque. The salts of the various metals, whether solid or in solution, behave much as do the metals themselves.

(3) These results suggest the conclusion that opacity for the rays is proportioned to density. However, experiments with equal thickness of calcspar, glass, aluminum and quartz showed that density is not alone of importance. The densities of these four substances are about the same; but the calcspar is distinctly least transparent.

(4) Opacity increases with the thickness of the screen. To determine the law, photometrically, a photographic print has been taken from a series of tinfoil slips, partially superposed, so that they are graduated in thickness.

(5) Sheets of platinum, lead, zinc and aluminum were rolled until of about equal translucency. Their relative thicknesses were, thus, 1 : 3 : 6 : 200. It is to be remarked that the transparency increases more rapidly than the product of density and thickness decreases.

(6) Besides barium, platino-cyanide, uranium glass and other bodies exhibit noticeable fluorescence. Of special interest is the fact that photographic dry plates respond to the influence of the rays. It is thus possible to exclude the risks of imperfect ocular observation.

Owing to the penetrancy of the rays through thin sheets of paper, wood, or tinfoil, we may photograph upon a plate inclosed in its dark slide. Undeveloped plates, wrapped up in the usual way, must not be laid for any length of time in the vicinity of the discharge tubes.

It is questionable whether the photographic action of the rays is a direct effect, or is a secondary effect due to the fluorescence of the material of the plate. Films, however, receive the photographic impression readily.

I have not yet experimentally proved that the X rays are capable of producing thermal effects, although it seems probable. The retina of the eye is insensitive to these rays, although experiment has shown that the ocular media are fairly transparent.

(7) After these experiments on relative transparency I investigated the question of the refraction of the X rays. With prisms of 30° of water and bisulphide of carbon, used at such a distance as that a pencil of light was refracted by respectively 10 mm. and 20 mm., there was no apparent refraction of the X rays.

With prisms of ebonite and aluminum there was possibly a slight deviation, indicating a refractive index not exceeding 1.05.

In view of the importance of this question it was subjected to another test. Finely powdered substances only allow a little incident *light* to traverse them, owing to refraction and reflection. But powders are sensibly as transparent to X rays as are the solid substances to which they correspond in equal mass. Powdered rock salt, zinc and silver were used in these experiments, which indicated the absence of regular reflection or refraction.

In accordance with this, large ebonite and glass lenses are without action. The shadow photograph of a homogeneous round rod is darker in the middle than at the edge. And the shadow photograph of a cylinder, having relatively transparent matter toward its axis, shows the edges darker than the middle.

(8) An observation must be noted which, prima facie, contradicts the foregoing statement. A photographic plate was "exposed" behind a black screen, the glass side being turned towards the discharge tube. Applied to the sensitive layer were several blanks of platinum, lead, zinc and aluminum. On development, the blackening was relatively strong againt the platinum and lead, and especially the zinc. There was hardly any blackening against the aluminum. It would appear, therefore, that the three first mentioned metals had reflected the rays. Placing a screen of aluminum between the metal blanks and the plate scarcely modifies these results. However, as the state of the surface of the metals does not affect the results of this experiment, we may infer that the reflection is dispersive and not regular.

As I could discover no refraction, it would appear that the X rays traverse all substances at the same speed.

(9) The orientation of calspar and quartz is without effect on X rays traversing these bodies.

I have not succeeded in observing any deflection of the X rays even in strong magnetic fields.

That point on the wall of the discharge apparatus at which the cathode rays impinge, producing the brightest fluorescence, is the point of origin of X rays. By magnetic deflection of the cathode rays, this point of origin can be moved.

The X rays are also generated by a tube closed with an aluminum plate of 2 mm. thickness. The justification of my use of the term "rays" is afforded by the regularly defined shadow images which can be produced. A pin-hole photograph of the discharge tube, covered with black card, has been made — serving to prove rectilineal propagation.

Interference effects have not yet been recognized. The action of electrostatic force is now under investigation.

It is known that there may exist in the ether longitudinal vibrations. May not these new radiations be of such a character?

* Translated from the *Sitzungsberichte der Wurzburger. Physikmedic Gesellschaft.*

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PROF. F. KLEINPETER directs attention to a new mining explosive which is coming into use in Austria. It is known as Dahmenite A, and is said to be thirty-three per cent stronger than the best gelatine dynamite, and in consequence of the large volume of gas which it produces (being approximately double that yielded by dynamite) it has a wedging rather than a pulverizing action, resulting in a materially increased fall of lump coal. It can be compressed without losing any of its explosive force, and in this state is claimed to exceed dynamite. A weaker detonator is required to bring it to explosion than is required for any other known safety explosive, and it is better able to withstand the effects of storage. If properly packed no decomposition can take place. The last illustration of the safety with which Dahmenite A can be handled is the fact that the German Board of the State Railways allow it to be carried on any trains.

# Mechanical Progress.

## Look Around a Corner.

Mankind once had an extra eye in the back of his head. It would be a very bold thing to question the wisdom of nature in depriving us of this rear eye, but it does seem as if it would have been just as well to let it remain. There are thousands of ways in which it could be made useful. For example, ladies on the street would not be obliged to turn around in order to study the dress of another lady who had just passed.

A foreign firm of opticians have very considerately endeavored to supply, as far as may be done by mechanical means, the loss of this rear-view eye. They have constructed a telescope which enables the user to look around a corner.

Two tubes that extend horizontally carry an object glass in either end. The eye pieces are placed on an axis at right angles to that of the objective or long tubes. When the observer looks through the small peepholes he sees a different field with each eye. The rays of light from the objects that lie in the field of vision are reflected by means of prisms so that they turn the corner of the right angle. When the tubes are thus extended the observer may stand behind a tree or a wall and reconnoitre from his concealed position. The field of vision is enormously extended. You may study objects at opposite points of the compass with no more trouble than the winking of your eye. The stereo-telescope may be folded up, in which position, being held with the tubes upwards, it enables the observer to look above an object obstructing his view, such as a hedge, wall or crowd of people, or a big hat at the theater.

The stereo-telescope should be a useful instrument in the hands of a spy or a sharpshooter. Detectives would also find it valuable. If the police could be provided with them they could keep an eye on both the front door and the side door of a saloon at one time. And as for women, with one of these implements in her hand, she would never have to turn her head to see the cut of that other woman's gown or the trim of her bonnet.

## A One-Man Power Crosscut Saw.

When a crosscut saw is operated by hand it is customary to put a man at each end, and they pull on it alternately. But when one man tries to manage it alone he has trouble. The farther end sways inconveniently. There isn't quite enough downward pressure to make a good cut. And when the blade is pushed away from the operator it is liable to bend, or "buckle." But E. Bliss of Sorrento, Fla., claims that he has found a way of overcoming these difficulties. On the farther side of the log which is to be cut, he says, he drives a stake into the ground, and attaches thereto a stout cord and a coil spring. This takes the place of the other man and pulls the saw back every time. Mr. Bliss does not say how long a spring is necessary to give a play of four or five feet, but he says that he allows for a "tension of about five pounds, and an elongation equal to the length of the stroke." As the cord which holds the spring is fastened to the stake close to the ground, there is a slight downward strain on that end of the saw.

## The Fiddle Drill.

The elaborate carving on the new building of the New York Clearing House Association necessitated considerable use of the "fiddle drill." This drill is of peculiar interest, inasmuch as it is one of the oldest stone cutting tools in existence. It is said to antedate Greek sculpture, and is in use to-day in about the same form as it was 2,000 years ago. As its name implies its action resembles a fiddle. The drill is of two pieces. In one hand a carver holds the drill stock, which is like a carpenter's brace, except that it is straight instead of having a crank. In the other hand he holds the "bow," which is strung with a brass wire and which is given a turn around the drill stock.

To use the drill the carver places the drill stock against his breast, holding it with his left hand, and with his right he draws the bow back and forth, fiddle fashion. This imparts a rotary motion to the drill stock, and the drill is ground to cut in either way it turns. The fiddle is used in the finest work, in crevices where the sculptor could not reach with his chisels and hammer without endangering the carving. About the first thing an ingenious Yankee would say on seeing the "fiddle drill" work would be: Why couldn't a power drill of some sort be used for that kind of work, something like the dentist's drill? But carvers say that pneumatic drills and various types of stonecutting tools have been tried, but none found able to supersede the "fiddle."

## Fog Horns.

Before a great while steam fog-signaling machinery will probably have become obsolete in the United States, and compressed air apparatus, with which satisfactory experimental results have latterly been achieved, will take its place. Trials were made a few months ago at the Staten Island lighthouse station, near New York, and also on board one of the lightships off the New Jersey coast, with oil engines driving air-compressing machinery for working the fog horns there, and it would seem, from all accounts, that these installations have proved themselves all that was expected. The greatest advantage, perhaps, which a compressed air fog horn outfit offers is the quickness with which the sound can be made. Under the old method it took from forty-five to sixty minutes to light the fires under the boilers for the generation of the steam to blow the horns. The lighthouse keeper, as soon as he saw the fog coming, lighted his fire and prepared to get a full head of steam on. This he was obliged to do several minutes before the fog closed down. Sometimes it came rapidly and surrounded him long before he could get the signals working. Now, in five minutes, air can be compressed in the tank, and a blast of maximum force can be given immediately. The tank is left full of compressed air after it is used, and contains enough to keep the horn going for ten minutes. The horns can be started before the fog rolls down upon the keeper and kept blowing steadily until the fog lifts. The power can readily be shut off during any temporary lifting of the fog, while formerly it was necessary to keep the fires up for a long time so as to be sure of being in readiness should the fog roll down again.—Cassier's Magazine.

## Glue Joints in Belts.

In regard to joining leather belts, a correspondent writes to the *Woodworker* and says: I have always had the best results by using common carpenter's glue, such as we use in the shop. I mended an old belt that drives a pony planer. The driver is thirty-two inches, the driven ten inches, centers about eleven feet, and the belt has to be crossed. There are eight splices

in this belt, all glued, and not a rivet in any one, as I consider rivets in a belt a perfect nuisance, and of no use whatever, except to weaken the belt wherever the rivets are put through. I also used a glued belt on the under head of a moulding machine and on the side spindles.

I have used glued belts on matcher-head spindles and always with the best results. The reason so many fail in their efforts to produce the best results is because they do not give enough attention to the details. My modus operandi is. Scarf the ends with a plane and make a good length of splice. Have all nice and equal, so it will be same thickness as the rest of the belt when glued. Here is where the secret lies to make it hold: Before gluing give all the ends a sizing of thin glue, in order to thoroughly fill up the pores in the leather. Let this get perfectly dry, then glue in the ordinary way, and let the glue get good and dry before using. I always give such a joint a good dose of neat's-foot oil to limber it up. The belt referred to has been in use now two years, and only repaired once with a new lace. Experience has taught me it is money in pocket to make all repairs as thoroughly as possible.

# Electrical Progress.

## Range of Speed in an Electric Motor.

In an electric pumping plant which was put in operation during the past year, the requirements of the situation seemed to call for a considerable variation in the speed of the pumps. A shunt motor of 40-horse power, wound for 500 volts, was used to drive a duplex pump of 500,000 gallons capacity. A speed reduction of 30 per cent was required.

Evidently the speed reduction might be obtained by inserting a resistance in series with the armature of the motor. By this method, however, the total power required at the reduced speed would be substantially the same as at full speed, the portion not required to drive the motor being wasted in the resistance box. For some purposes this would not be objectionable, but for continuous pumping the loss of efficiency involved is not admissible.

Another method of varying the speed is by changing the strength of the field magnets. If this can be done by strengthening the magnets, there is no objection; but in many machines the field cores are so nearly saturated that this will avail only to a slight extent. By weakening the field magnets an increase of speed is produced, so that if the gearing be altered in the proper manner the required variation may be obtained. The difficulty which presents itself in this case is the increased liability to sparking at the commutator when the field strength is diminished.

In order to determine whether in this particular motor the speed variations could be produced by weakening the fields, tests were made which gave the following results:

| Number of Tests. | Electrical Horse Power Supplied | Net Horse Power | Efficiency of Motor and Pump Combined | Total Pressure Pumped Against | Revolutions of Pump | E. M. F. at Field Terminals |
|---|---|---|---|---|---|---|
| 1. | 15.42 | 9.45 | 61.3 | 48.0 | 33.5 | 500 |
| 2. | 16.75 | 11.02 | 65.8 | 50.0 | 37 5 | 400 |
| 3. | 20.77 | 13.73 | 66.1 | 52.5 | 44 5 | 300 |
| 4. | 30.15 | 21 86 | 72 5 | 111.0 | 33.5 | 500 |
| 5. | 38 86 | 28.05 | 72.2 | 106.0 | 45.0 | 325 |

The net horse power is the power consumed in forcing the water and was calculated from the gauge reading and suction lift, together with the dimensions and revolutions of the pump. During the tests the sparking was not at all excessive.

Another series of tests was undertaken to determine what could be done in the way of strengthening the fields. For this purpose the field coils were connected in parallel and an adjustable resistance was placed in series. The following were the results obtained

| Number of Tests | Volts Armature Fields | Volts Armature Fields | Current in Field | Current in Field | Normal Current in Each Field | Reduction of Pump Revolution Per Cent. | Per Cent Increase | Per Cent Decrease |
|---|---|---|---|---|---|---|---|---|
| 6 | 275 | 3 45 | 1 72 | 1 48 | 16 | 2 32 | 0 | 5 0 |
| 7 | 300 | 3 65 | 1 82 | 1 48 | 23 | 0 30 | 0 | 11 7 |
| 8 | 350 | 1 15 | 2 07 | 1 48 | 40 | 0 28 | 5 | 16 2 |

## The Action of Electric Currents on Mine-Surveying Instruments.

By W. LENZ.

In view of the rapid increase in the number of electric railways in the Westphalian coal field, and in the use of electric power under ground, the question of the action of electric currents on magnetic mine-surveying instruments is of such great interest that the author has been induced to conduct a series of experiments. A point underground was selected at a horizontal distance of some 100 yards from the rails of the Bochum-Herne electric railway and 434 m. (1420 feet) below it. There, by means of a Fennel's magnetometer with quartz fiber suspension, a series of observations of variation were made based on a fixed line. The magnetometer was previously compared for a long period with the apparatus in the Bochum Town Park, and the two instruments were found to coincide almost exactly. The first observation, in September, 1895, was made by day, the second by night, when the line was free from current, and the last again by day. While the curve of the day results exhibited great irregularities, that of the night results was perfectly regular and in accord with the magnetic records. The irregularities in quite small intervals of time amounted from 2.7 minutes to 5.4 minutes. As at first it was thought that the deviations might be ascribed to the iron-free safety lamps employed, a third observation was made in the morning, the lighting being effected by a stearine candle. The results were exactly the same as on the first day. As the observations were made at a comparatively large distance from other workings, and as the shaft was 200 yards away, it is evident that magnetic observations can, under such conditions, be only satisfactorily conducted during the night in the absence of the magnetic current. Another source of error is the safety lamp. Composed of various metals, the lamp in a hot condition sets up thermo-electric currents which act on the magnetic needle. In order to obtain information on this point, the author placed six mine surveyors' safety lamps free from iron, one at a time, first in a cold condition, then heated, at the pole of a sensitive magnetometer. Of the six lamps examined, two, when cold, had no action on the needle, while all acted on it when hot. The deviations observed amounted to from 30 to 160 seconds. A new benzine lamp, that had not previously been used, caused a deviation of as much as five minutes. The deviation increased with the temperature of the lamp. A quite new aluminum safety lamp caused the same deviation when cold as when hot. From these results it follows that the mine surveyor, before making magnetic observations with delicate instruments, should carefully test his lamp. The influence of slight magnetic properties may be lessened by holding the light in the prolongation of the magnetic axis. With side lighting great care is necessary.

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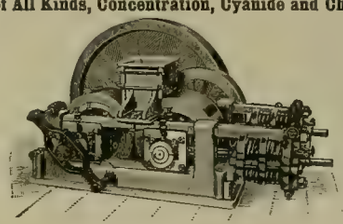
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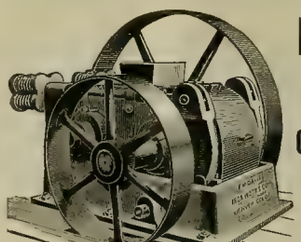
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# Mining Summary.

## CALIFORNIA.

### Amador.

*Record:* The Cosmopolitan quartz mill, a thirty-stamp mill located between Amador and Plymouth, has been purchased by D. Guttman and will be brought to the Gate mine, where it will have ten more stamps added.

MINING ITEMS.—*Republican:* Negotiations have almost been completed, for the purchase of the Wheeler and Chandler gravel mines, near Pine Grove, to Chas. Haskins, lately from the East, who is also largely interested in the Original Amador and Mayflower quartz mines near Amador City. The price of the combined claims is $25,000.

The Newton copper mine, about 4¼ miles this side of Ione, is once more in operation, after an idleness of about fifteen years. The shaft is free from water and some miners are at work underground.

### Butte.

BANNER GOLD MINE.—A circular to the shareholders states: The directors have secured the services of Mr. J. B. Low as consulting engineer to the company. Mr. Low visited the mine on January 3rd, and reports: "The work of sinking the main shaft is progressing in a satisfactory manner. The rock encountered at the present depth (820 feet) shows a less disturbed condition, and fully justifies our prediction in the report of July 3rd, 1895." Mr. Low again visited the mine on January 29th, and the general manager, Mr. G. H. Evans, cables that he (Mr. Low) is very much pleased with the bottom of the shaft. His opinion is the indications are most favorable. The shaft is now down to about 890 feet.

### Calaveras.

The Gold Hill mine in Spring gulch, north of San Andreas, has been bonded by L. A. Irvine to an English company.

AT COPPEROPOLIS.—*Prospect:* The Empire mine and mill is running steadily.

The shaft in the Kuhn mine in Salt Spring valley is down eighty feet.

The Gold Hunter mine is being reopened and rich ore has been found.

The Angels *Voice* says the Oro Plata gravel mine has put in their new machinery and everything is running smoothly. Eighteen men are at work.

The Roanoke Mining Company will erect an electric plant two miles from the mine, for power at the mine and for lighting the town of Mokelumne Hill. The old Cook ditch has been purchased, it is thirteen miles long, taking water from the Calaveras and Esperanza rivers. This ditch was dug some thirteen years ago at an expense of $30,000 and was used by the Cook brothers to carry on their hydraulic works on the Calaveras river.

The shaft in the Gwin mine is now down 1069 feet. The work of drilling a six-inch hole to tap the old works and relieve them of their water is now in progress. This hole has been sunk to a depth of 150 feet below the bottom of the shaft.

The Esperanza Mining Company has contracted for ten additional stamps, making thirty in all. The chlorination plant will be finished about the first of March. Its roasting capacity will be six tons of sulphurets per day. This will be the second largest plant in the State, the Utica being the largest. The mine is paying well and everything points to an era of prosperity.

At the Hexter mine contracts are being advertised for to cut a tunnel 2000 feet, in sections of 100 feet, with privilege of 100 more. The tunnel is to be 5x7 feet, 6 feet, 4 inches in the clear, and timbered with 8x10-inch sawed timbers.

M. B. Kerr, superintendent of the South Paloma, south extension of the Gwin expects to put on a steam hoist within the next month after which it is his intention to sink 600 feet without crosscutting.

### El Dorado.

(Special Correspondence).—A. J. & R. S. Wilton have bought twenty-two acres, both placer and ledge property, one-quarter mile north of Georgetown. The claim has a two-foot ledge. Work has been started sinking shaft and running longer tunnel.

Dr. I. M. Proctor has bond from Frank Miller for a 4000-foot ledge. Tunnels and five shafts worked years ago will be re-opened at once. The ledge is from eighteen inches to three feet in width.

At the Larkin they are drifting south on the 100; the ore is holding out. This is three miles south, in the Diamond Springs district.

Frank Goyen has bonded to D. H. Jackson the old mine known as the Marguerite, adjoining the Lookin on the north. Active work at reconstruction is already under way.

The Lady Emma, six miles north, in the Kelsy district, has gone below the 300 depth. The new ten-stamp mill is rapidly approaching completion. The ore body at 300 feet is six feet wide and good grade.

Considerable activity in seeking property in the neighborhood of Shingle Springs is developing itself within the past week.

J. J. Antwerp has come from Cripple Creek and bonded a claim on Weber Creek. He is operating a two stamp prospect mill and working a body of fair grade ore.

St. Louis people have begun prospect operations near Greenwood. The shaft is progressing satisfactorily and the prospects are encouraging.

### Mariposa.

*Gazette:* The Dorse or Brooks mine, two miles from Hornitos, is operated by C. E. Stuart of Piqua, O. A large sum of money has been, and much more will be, spent on prospecting the property, which Mr. Stuart holds under a bond. So far the indications are most favorable. The new chlorination works that were constructed some months ago, and have since been standing idle, are less than a mile below the Dorse mine. If the mine prospects all right, the actual work will be taken up on a large scale and will conduce greatly to the prosperity of Hornitos. There are three eight-hour shifts now working in the shaft.

The present pay roll at the Tendron mine is understood to be about $4500 a month.

### Mono.

NEWS FROM BODIE.—In the Bodie the regular prospecting work was done during the week ending February 23d in the 200 and 300 foot levels.

The upraise north drift from the east crosscut on the 200-foot level shows three feet of low-grade quartz in the top.

In the Mono mine the east crosscut from the south drift, 400 level, is still in hard porphyry.

The yield of the Bulwer Consolidated mine for the week ending February 23d was eight tons of ore, assaying $20 per ton.

### Nevada.

Twenty-nine men were laid off at the Manzanita mine at Sweetland last Saturday on account of a scarcity of water.

The Old Home mine at Blue Tent has been sold to the Oro Grande Co. by T. T. Kirkham. The property adjoins the Oro Grande and will be worked through the latter claim. A five-stamp mill will be erected soon.

THE COMMODORE FOOTE MINE.—*Transcript:* Samples of ore taken from the mother lode that crops out from under the lava and gold gravel beds in the vicinity of the Central House, nine miles from Nevada City, are a recent discovery that promises to be an important find. The lode runs northeast and southwest, with an east dip at an angle of 45°. The ledge from wall to wall is over 200 feet wide, and is a contact vein between granite and slate. The footwall shows porphyry and diorite. A working assay by simple amalgamation, of half a pound of the ore, shows that it will safely average between $4 and $5 per ton in free gold and as much more in sulphurets. The mine can be worked by tunnel, and water power can be easily obtained of 1000 feet pressure, if needed.

NEWTON COPPER MINE.—*Ledger:* Work has been commenced at the Newton copper mine, located between the Mountain Spring House and Miller's Station. This mine has been idle for several years. Supt. H. D. Ranlett has been busy hoisting water for over a week, with the intention of having the mine ready for active operation by March 1st.

GARNIER CONSOLIDATED.—A sale has been consummated of the Garnier Con. group of mines, which are situated in Amador and Calaveras counties. This group consists of six claims, three of which are well developed mines. A well equipped ten-stamp mill, run by water power, is also included in the sale. A group of mines located on the mother lode in El Dorado county was also purchased by the same parties, which consists of a syndicate embracing capitalists from New York, New Haven, Conn., Iowa and California. The syndicate has invested $250,000, and it is their intention to commence active operations within thirty days. S. H. Lucas will represent the syndicate on this coast.

*Transcript:* A mammoth quartz ledge has been discovered on the ridge between Nevada City and Washington. The ledge is said to be 200 feet in width, and will yield $4 to $5 per ton in free gold besides sulphurets. It is thought to be a fine low-grade proposition. John Cornwall and A. Isoard, of Nevada City, are the principal owners.

*Herald:* Supt. Murchie of the Old Home Con. Co.'s mines at Blue Tent has ordered a stamp mill of Watson & Nivens, at the Nevada foundry. It is to be five stamps, of 1000 pounds each, and it is expected that it will be ready inside of thirty days. The company has been working the Oro Grande ground through a tunnel, but now they intend to erect a hoisting works and sink 300 or 400 feet at least.

THE COUNTY MINERS' ORGANIZATION.—At the meeting of the Nevada County Mining Association last Thursday afternoon the annual reports of the officers were submitted. They showed the total receipts since organization to be $2030, with $20 still in the treasury. The secretary's report contained the following statement: "The fact remains that the County Association has not done what it should in backing up the State Association, and justice to the latter demands that in future Nevada county should make a showing consistent with the fact that it is the principal gold-mining county in the State, having yielded to date $205,000,000."

The old association then disbanded, for the reason that its constitution failed to conform with the State association's, and its provisions for collecting funds had proved practically inoperative. The new association's constitution provides, among other things, for a complete and effective system of obtaining contributions. Prominent and active citizens in every part of the county have been selected for this work, and it is now certain that Nevada county will be among the most liberal contributors to the miners' defense fund.

Secretary Sonntag was elected an honorary member of the association and addressed the meeting. His remarks were received with unbounded enthusiasm. He reviewed the history of the State Anti-Debris Association, charging that it had never affiliated with the miners. It had been and was still under the control of a coterie of men who were keeping up agitation for the sake of emoluments they derived as paid officials. When the miners wanted aid, anti-miners used their best endeavors to impede their securing favorable legislation. He spoke in glowing terms of the Sacramento Chamber of Commerce and of the San Francisco Board of Trade and Chamber of Commerce for their valuable aid in endeavoring to secure for the miners beneficial legislation. He assured the convention that the whole California delegation were faithfully working for the passage of bills now before Congress.

### Placer.

Last week the superintendent's office at the Red Point mine was destroyed by fire. Maps, papers and valuables about the office to the amount of $4000 were destroyed. Acting Superintendent George Hoffman was out on the pipe line at the time of the fire.

The Colfax *Sentinel* describes the Eureka Consolidated drift mine, a property that it is proposed to develop on the Forest Hill Divide. Felix Chappellett, of the Mayflower mine is the principal owner in the company. The main tunnel to tap the channel is being driven in a canyon about two and a half miles east of the Red Point, 3,914 feet above sea level, and 800 feet below the level of the main divide. The tunnel is equipped with an air compressor which furnishes the power to drive the drills. Work is prosecuted continually, and the tunnel has reached a distance of 400 feet in the blue slate rock. The claim is one of the largest on the coast, embracing over 3,600 acres of land covering six and a half miles of ancient river beds, containing valuable deposits of gold. Though these old river beds are covered with a lava cap from 400 to 800 feet deep, the existence of the deepest channel has been established by the mining done on both ends of the channel near the lines of the Eureka, and by tunnels that have been run into the gravel at different points on the company's property.

### San Bernardino.

J. B. Osborne has opened up a new ledge in the Ord mining district, near Daggett. It is ten feet across, and averages $18 per ton.

### San Diego.

ON THE COLORADO RIVER.—(Special correspondence)—Eight shafts are now being sunk on the two bodies of free-milling ore at Picacho, one of which was discovered on the Mina Rica mine a few months ago and crosses that vein, also the Mars, Venus, West Goshen and Del Mar mines. It is 400 feet wide on the Mina Rica and averages $15. The other body of ore was found a few days ago. It crosses the Helen Mar, Apache, Eastern California, and runs into the San George, and averages about the same. It is from 40 to 100 feet wide. These new bodies of ore are, in addition to the veins, already known to exist in the above mines and add new interest to this camp, now being opened and developed. The work on the eight shafts is being pushed, with flattering results. The shafts are now down from 40 to 100 feet each. The veins are crosscut at every fifty feet. Gold Basin Mining Co., headed by C. B. Richards, vice-president First National Bank, and A. J. O'Conner, receiver of the Consolidated National Bank, San Diego, has secured seven good mines in the White Gold basin, one mile east of Picacho, where it will at once put down three shafts, each 100 feet deep. The company will also put up a forty-stamp mill. With the present developments going on at Picacho, and the good results obtained, the camp is fast coming to the front as one of the most promising mining sections on the coast.

Yuma, Ariz., Feb. 20, 1896.

A deed was filed in San Diego this week transferring the Champion, Golden Bell, Mina de Ore, Fortune, Painted Rock, Mount Pedro, Silver King and Horseshoe mines in Old Picacho district, to the Gold Basin Mining and Milling Company for $1,000,000. The signers of the deed are C. L. Josselyn, A. J. O'Conor, M. O'Conor and C. B. Richards, of San Diego. The deal has been on foot for some time and is believed to mean the beginning of development of the ledges at Picacho.

The Owens mine force at Julian has reached the botton of the shaft and discovered the Cornish pump and the tank that was lost at a former attempt to bail the mine out. Workmen are now engaged at the 250-foot level crosscutting to the Owens ledge and a large force will be put on as soon as the conditions justify.

### Shasta.

*Free Press:* The Tendron Mining Company has incorporated at Redding; principal place of business San Francisco, term of incorporation fifty years; capital stock 100,000 shares of a par value of $5 per share. Stock subscribed, W. Johns 200 shares; S. J. Johns, Alameda, 10 shares; J. R. Johns, Los Gatos, 10 shares; J. M. Haven, Oakland, 10 shares; T. E. Haven, San Francisco, 10 shares.

### Sierra.

C. J. York will soon resume running the lower tunnel—200 feet in—to reach the ledge in his mine a mile and a quarter up Slug canyon.

There are five men working at the Wide Awake drift claim. The old tunnel is in 1200 feet. Being too high, another has been started much lower, which is already 400 feet long.

Twenty-two men are working the Gold Valley mine with good paying rock in sight.

*Enterprise:* The cleanup at the Bald Mountain Extension drift mine for last week's output of gravel was eighty-five ounces, aggregating about $5200 for the past twenty-four days.

### Siskiyou.

Glinn & Co. of Portland, Or., have leased the lower part of the American Bar mine, on Klamath river, and will operate by excavation, the process being similar to that of making deep cuts for railroads. About 150 men will be employed and work will begin immediately. Several carloads of machinery are at Hornbrook, all ready for shipment to the mine and several head of horses were purchased for use in the work. Steam power will be used for hoisting. Over 75,000 feet of lumber will be used for the buildings and the erection of a wing-dam. A ditch has been put in which conducts water to an overshot wheel, and furnishes power to run an elevator, the water afterwards being used to wash gravel.

*Journal:* The mines on Humbug have all been in full blast since the recent rains, as plenty of water has been available. The supply will last for some time yet, but unless we have some heavy spring rains, the season for the miners will be short, as the snow in the mountains is scarce this year.

*Journal:* A new postoffice has been established on Thompson creek—Nolton, in honor of T. J. Nolton, who was instrumental in disposing of the Shinar mine to the Seattle Placer Mining Co., which has given steady employment to about seventy-five men during the past fall and winter. John Wood has been appointed postmaster.

The Red Hill hydraulic mine at Salmon river is now being worked with excellent success, two cleanups made since New Year's yielding about $6000, the second shipment of bullion having been made last week. This mine has a good supply of water, and will continue to yield handsomely during the coming spring and summer months.

The Summerville hydraulic mine in the same vicinity is also yielding rich pay, and will produce considerable gold dust during the spring and summer months.

R. H. Campbell was over at his Quartz valley mine last week, and intends to work the same on a more extensive scale than ever before, having got rid of the English syndicate who failed to carry on the work as agreed upon when bonding it.

Lamb's quartz mill in this place is busy crushing quartz from the Bailey & Carrick mine at Greenhorn. They have about twelve or fifteen tons at the mill.

### Trinity.

*Journal:* One thousand feet of wire cable for the Cis Fse mine, Junction City, was received at the Redding depot this week.

Operations at the Strode mine, near Trinity Center, which has been shut down during the winter, will be resumed March 1st.

Lowden, Van Matre and Garvin, of this county, together with Coffin, Woods, Wellendorf and Herzenger have formed a partnership and located 160 acres of mining land on the Trinity river, near tne mouth of Buckeye creek, in the Minersville mining district.

AT CINNABAR.—At the Altoona in a few weeks the furnace, shut down for repairs, will start up and seventy-two men will be constantly employed. The ore is getting richer and richer as depth is attained, and another shaft 100 feet deep will soon be under way. The furnace is capable of turning out 600 flasks of quicksilver per month.

### Tuolumne.

*Independent:* The Marlee gravel mine, located on the north fork of the Tuolumne river, has been bonded, in the sum of $16,000, to the Mining Development Company, incorporated, with business office at Sacramento. It is bonded by the owners, Messrs. Burns, Longeway and Carter. The ground is covered by a U. S. patent. The corporation has contracted for 3½ miles of ditch from Turnback creek; also, for 5500 feet of 24-inch steel pipe, to carry water to the mine. Thirty-five years ago, 100 men worked there, at one time, the bed of gravel being 200 feet in depth. It is an ancient river channel, and is supposed to be a branch of the main river whose bed is now covered with the lava flow of centuries ago, under what is now known as Table Mountain, extending through Tuolumne, from north to south, and cut from its continuation through Calaveras county by the present Stanislaus river. This channel was tunneled into in numerous places from Shaw's Flat to below Jamestown, and millions have been extracted from the ancient river bed by those fortunate enough to strike it. The Australias, Fraser river, Powder river, Nevada, Montana, and other visionary excitements of "better diggins far away" almost depopulated the richer mining fields of Tuolumne. Add to this, the primitive means of mining, water flooding of tunnels and shafts—going into a bottle in some cases, going above or below the ancient bed, through the adamite lava, thousands of feet—all this by poor men, who had to get a bag of flour on credit or starve. How much was taken out of the New York, near Jamestown, and other places will never be known. Years of litigation in many cases ruined many, and added still more to the list of deserted mines—which, to-day, contain hundreds of millions not yet revealed, and which has added to our abiding faith of many years ago, that Tuolumne's mines have not even been scratched over, much less developed. But, to return to the Marlee. The reason for its abandonment was solid, they could only get water from the Street ditch, which gave up and died years ago. The only supply obtainable then, was Turnback creek. This was barred for many years by the large number of surface mines below, who used and claimed all the water.

The Wallrough quartz mine, a few miles above Sonora, on the mountain road, is also bonded and about to be developed by a Chicago company.

The Parole quartz mine, located near the village of Calders, above Sonora, will be started up again soon, with new improvements.

COLUMBIA MINES.—A partial list of the number of quartz and stamps in that locality: Quartz mines.—Keltz, 15 stamps; Ham & Birney, 10; Star, 10; Graham, (Custom rock) 4; Armstrong, Five Mile Creek, 3; Nervy, 5; Slingerland, 3. Total, 50 stamps. Pocket and gravel mines.—Fox (pocket), Saw Mill Flat; Dorsey mine, Eagle Creek; U. S. Grant; Black Bear; Midnight; Tiger; St. Elizabeth and Exactly mines, in the Star mine locality; the Sublett mine on the main river; the Hyapoo (pocket); and the Admiral Von Tromp.

### Yuba.

The Nevada City and San Francisco men that have the old Flagg mine in charge have several thousand dollars worth of machinery and buildings on the ground and are down to a depth of 250 feet taking out good ore rock. They have leased the four-stamp mill on the Hibbert & Burris mine, crushing about eight tons daily. The old Danebroge has also been

bonded, and is being opened up under the direction of J. C. Campbell. This company is down 500 feet in the old works. The Jefferson and the Pennsylvania, on the northwest, have also been bonded by the same parties, and if the flattering prospects continue, they will work the three mines on one large scale. The Rattlesnake, Dexter and Jupiter locations are also under consideration for bonding by the old-time owners.

ONLY ONE ISSUE.—The following is from the Marysville *Democrat*: "A bill is now before Congress providing for an appropriation of $250,000 to carry on the work of betterment of the Yuba and Feather rivers as recommended by the Government engineers. The work includes the construction of a wall of rock to span the Yuba river channel, between two high points on either side, known as De Guerre Point, at the entrance of the foothills ten miles east of this city.

This wall, as planned by the engineers, will be 100 feet in width on the bottom and will have a slope on either side which will leave the wall on the top 50 feet in width. This wall is to be constructed entirely of stone and to be sufficiently solid when finished to withstand the pressure of any force of water and detritus that will ever accumulate in the stream. The engineers in their report say the wall or barrier is not for the purpose of permitting hydraulic mining to be conducted, but is for retention in the foothills above that point a mass of sand and gravel, the accumulation of years when hydraulic mining was conducted without restraint.

And these Government Engineers in their last report say that no substantial betterment of these rivers can be expected while this flow of heavy material continues without restraint in the foothills. Their plan of betterment to follow the completion of the restraining wall they explain in part as follows:

Commencing at the wall and working down stream a channel is to be opened in as nearly a direct line to the mouth of the new cut-off as possible, then to deepen the channel of the cut-off and thus continue the work down the Feather river. Along the stream between the dam and this city where there is the greatest width they will construct brush jetties at different points, by which to force all of the water into one channel. The figures of cost and the general plans of betterment are well known by Surveyor Meek of this county, who is heartily in accord with the engineers in these projected improvements.

This is the only issue and it appeals to every man, woman and child who have interests here. Let us work for it and send to Washington approval of the efforts to obtain such appropriation.

The Supervisors, the City Council and citizens should meet and adopt resolutions in favor of the appropriation, as the matter is of great importance to the people of this city and country.

## NEVADA.

### ESMERALDA COUNTY.

THE SILVER PEAK MINES.—Walker *Bulletin*: James Hickey, for several years foreman of the Bodie and Standard mines, and now foreman of a group of mines at Silver Peak, says an English syndicate has just arranged to take those properties, put in extensive machinery and build chlorination works.

### STOREY COUNTY.

ON THE COMSTOCK.—The yield of the Overman mine for the week was 7 tons and 1075 pounds of ore, which was extracted from the north drift on the 900-foot level. The assay value of the ore per car samples was $53.92 per ton. On the 1900-foot level the Caledonia southwest drift has been extended ten feet; total length, twenty-five feet, past east crosscut No. 1. Formation porphyry, with seams of quartz.

In the Confidence mine west crosscut No. 1 from the surface tunnel is being repaired. Prospecting in the crosscuts from the end of the north drift, sixty feet about the surface tunnel, is still going on. There were extracted during the week ending February 24 twenty carloads of ore, the average top car sample assay of which shows an assay value of $21 per ton.

Seg. Belcher.—On the 300-foot level the joint Belcher and Seg. Belcher west crosscut from the south lateral drift is out 304 feet; the face shows porphyry. This crosscut has been stopped for the present. There have been hoisted during the week and stored in the ore-house at the mine twenty-five mining carloads of ore, the averrge top car sample of which shows an assay value of $28.49 per ton.

Challenge.—The joint Challenge and Imperial west crosscut No. 1 from the surface tunnel has been stopped for the present. Some necessary repairs were made during the week to the surface tunnel. The Imperial and Challenge will join with the Confidence in running one west crosscut, which will lessen the expense of these mines.

Belcher.—There have been hoisted during the week and stored in the ore house at the mine 34 mining carloads of ore, the average top car sample of which shows an assay value of $27.10 per ton.

Savage.—On the 950 level at the face of the north prospecting drift from the west crosscut, eighth floor of the north upraise, they are stoping ore above and below the sill floor of this drift. From the eighth floor of the east crosscut they have upraised and connected with the north drift from the twelfth floor. This connection affords good ventilation; the upraise is in good ore from top to bottom.

In the east crosscut at a point 35 feet south of the north upraise they have started a south prospecting drift and advanced the same 12 feet; face is in low grade quartz. During the week they have extracted and hoisted 81 cars of ore from this level; car samples average $25.81 per ton.

ROCK-PICKERS ORDERED OFF.—*Enterprise:* The management of the Gold Hill mines ordered all the ore pickers off the waste dumps of the Gold Hill mines. This will work quite a privation in Gold Hill, as many boys and men have earned enough to buy bread by scratching over the Gold Hill waste piles, making probably an average of 75 cents a day. It is thought probable that the Gold Hill mines may be thinking of working over the Gold Hill dumps by means of the Kinkead machinery.

### LANDER COUNTY.

The Austin Mining Co. says the *Reveille*, ran the big tunnel 250 feet ahead in the month of January, and the work is being pushed as rapidly this month. An air blower is to be put in the tunnel soon.

## OREGON.

### BAKER COUNTY.

The sale of the property of the Elkhorn Mining Company under execution took place last week at Baker City. The only bid was that of the First National Bank for $10,279.33 with interest and costs, the amount being the judgment held by the bank against the property.

### JACKSON COUNTY.

THE GOLDEN FLEECE.—M. A. Graham, manufacturer of the Oriental gas engine, of this city is at Ashland, with his machinery for working the gravel mine recently bonded to him by Z. A. Moody and others. The property is owned by E. K. Anderson and is known as the Anderson mine, situated three miles below Ashland. The machinery weighs twenty-five or thirty tons. The cemented gravel is broken up by blasting, then hydrauliced into 500 feet of flume, which will carry it to the mill. The machine consists of a cylinder 20 feet long and 60 inches in diameter. Inside are 113 chilled steel balls weighing seventeen pounds each, revolving at the rate of twenty revolutions per minute. It is expected that 150 to 200 tons per day will be handled.

### GRANT COUNTY.

Al Hoskins has completed an extension of one and one eighth miles on the Humboldt ditch for the Humboldt Mining Company near Canyon City.

## WASHINGTON.

WHATCOM'S GOLD MINES.—M. Muir Picken, one of the vice-presidents of the Northwest Mining Association, has prepared a report for the United States Mint at San Francisco, showing the production of gold and silver in the mines of Whatcom county for the year 1895. The report has been compiled with great care and the collection of data is from the most reliable sources. The gross production of Whatcom county mines was: Gold, $40,000; silver, $12,000. The producing mines operated in 1895 were: The Whistler, John D. Leedy, proprietor; Eureka, Baron, manager; Excelsior, O. A. Benson, manager; Snowdrop, Williamson, owner; the Mammoth, unknown ownership. All of these are in the Slate Creek district, on the western slope of the Cascade range of mountains.

Mr. Picken adds the following: "Gold was discovered in Slate Creek district in this county in 1894, and last year's work was chiefly development and placer mining. I have no doubt this year's production will show a large increase over last year. No bullion was shipped through here from outside of the county, but a large quantity of gold and silver-bearing ore passed through in transit to the Everett and Tacoma smelters. If you wish the quantities of this, I shall be pleased to give them to you. About 1,200 miners, including prospectors, were in the Slate Creek district last year. Miners were receiving from $3 50 to $4 per day."

## BRITISH COLUMBIA.

CARIBOO.—In Cariboo all the mining news is preparation for next year. The Horsefly company is getting up pipes, gates, pumps and monitors for the hydraulic elevator. A new company is the Elk Mining Company, with $10,000 capital, and H. Helgeson as manager, to work a lease on Goose creek, emptying into Cariboo lake opposite Keithley creek. A whole creek will be taken by a flume, 700 feet long, 3x6 feet, through a canyon, to dry the ground to be worked. The Quesnelle River Hydraulic Gold Mining company is preparing for work, with James Deacon as manager. A four-mile ditch will be dug and water brought from Big lake, which will be dammed. The company has 320 acres, with 160 acres further up the stream.

## IDAHO.

AT WOOD RIVER.—The Camas Gold Reef Mining and Milling Company of Hailey, has incorporated, capital stock $250,000; to operate the Alaska mine on the Camas gold reef, near Hailey. The Camas gold reef extends as far as known, from a point six miles south of Hailey to Atlanta.

A FLOATING GOLD MILL.—A Lewiston dispatch says Dean & Caples are building a new steamboat here for use on the rivers in a big mining scheme. The proposition represents the investment of $30,000. The craft will be 18x68 feet, with cabins and comfortable quarters. It will be fitted with a sixty-horse power engine for motive power and a forty-horse power engine for operation of the mining machinery. It will have steam appliances for throwing a large stream of water with such a force that it will tear down a mountain. It will be fitted with appliances for crushing quartz, assaying ore and separating flake gold from black sand.

## MONTANA.

BUTTE & BOSTON WINS.—This week the Butte & Boston Mining Company got a verdict against the Lexington Mining Company for $125,000, the value of the ore taken by the latter from beneath the surface of ground belonging to the plaintiff, by means of underground workings. The case was on trial ten days. The suit was for $400,000. Both companies own portions of the Wappello claim, having bought from the original patentee. The Lexington Company's portion is north of Butte & Boston's and its vein dips to the south. In following it, it was found that 300 feet down the vein separated as by fracture. The Lexington crosscut to the lower part of the fractured vein and continued on down, taking out ore from what it claimed was some vein that had its apex on Lexington ground. The Butte & Boston demonstrated by an appraise that the vein the Lexington had worked on below the 300-foot level was not a portion of the vein apexing on the Lexington ground, but was an almost vertical vein having its apex on the Butte & Boston property and clearly traced from the point where the ore was extracted to the surface inside the Butte & Boston part of the Wappello claim. It was also demonstrated that the Butte & Boston vein was intersected by the Lexington vein, but without breaking the continuity of the former.

One of the most important instructions of the court was in regard to the separation of the two parts of the Lexington vein at 300-foot level. The Judge said that if it becomes necessary in order to convert two separate and distinct portions of a vein to pass for any considerable distance through country rock, having none of the elements of a vein and through which intervening space there is neither mineral nor walls nor seams to be followed, then it may be concluded that the veins are permanently separated, and one cannot be followed from the other through the intervening space into the ground of another. The case will be appealed.

COPPER AND SILVER IN HELENA.—U. S. Marshal McDermott has bonded a copper mine recently discovered in the city limits of Helena. The former owners have been working it for several weeks, and smelted several tons of ore which assayed 21% copper and 14 ounces of silver to the ton. The Rothschilds mines at Anaconda and the Boston at Butte average less than 10%. The vein is six feet wide, has been exposed for some distance, and does not lose its richness. The claim is within less than half a mile of the City Hall and one corner stake is 200 feet from the back fences of some residences.

ARGENTA MINES.—Regular shipments of copper ore are being made from W. A. Clark's mines at Argenta to the Butte smelter. Three ore teams are constantly on the road between Argenta and Dillon. The ore comes out of the Goldsmith, where a force of fifteen or twenty miners is employed, and carries a very high percentage of copper, says the Dillon *Examiner*.

## UTAH.

TINTIC.—*Tribune:* Of the constantly increasing productiveness of the mines of Tintic a report which has just been compiled by the Union Pacific affords perhaps the best evidence on record. The report discloses that in 1895 there was drawn out of the district 3,762,000 tons of ore and concentrates. In 1894 the amount of freight hauled over the Tintic division reached 151,661,000 pounds, while the report for 1895 shows it to have been 422,872,000 pounds, a gain over the previous year of 265,211,000 pounds, and yet in 1893, said a gentleman who is prominently identified with the district, the company was seriously considering the advisability of reducing its service to tri-weekly trains. In the statement it is revealed that the increase in the business of the division has been due more largely to the hauling of mining supplies and mining machinery than to anything else, outside an increased output from the mines, and with all of them operating at full capacity there is no doubt but the road will find it necessary to put on additional crews and increased rolling stock.

## WYOMING.

The first gold mining machinery in Johnson county, the stamp mill of the Burlington Mining Company has reached the company's property on Jelly Creek, near Buffalo, where it will be set up and started immediately.

## COLORADO.

*Mail:* A thousand men are employed at the rate of $3 per day within a circumference of three miles of Gillett.

*Record:* The recent discoveries of gold in the foothills of the front range, near Denver, coming so shortly after the Cripple Creek discoveries, serve to emphasize the lesson often taught by experience in this State, that the real merits of a district cannot be determined by a few prospectors running over it in feverish haste, digging a few shallow holes here and there and submitting only a few of the most promising portions of the vein matter to analysis. A good prospector should be a man of intelligence, and he should have sufficient financial backing to enable him to fully exploit any find that he makes. Thorough work is no less important in prospecting than in the practical work of mining, and the mine investor who is really wise makes it a point to cultivate and liberally grubstake the experienced and capable pioneer prospector.

## NEW MEXICO.

A mining company, capital $150,000, has incorporated in Las Vegas. Incorporators: W. E. Crites, T. and B. M. Blauvelt, G. Beaty, J. Miller, W. S. Standish, I. H. Hunsaker and J. Haefner; to buy, sell, develop and operate mines in Mexico, Arizona, Colorado and New Mexico.

## AUSTRALIA.

*Mining Standard*:—Queensland departmental returns of the gold output for 1895 figures relating to the quartz mining industry show a falling off in the production of nearly 50,000 ounces. With the exception of Rockhampton, the Queensland gold fields were all less productive in 1895 than in the previous year. Croydon and Gympie, for reasons which we have already reviewed, between them account for no less than 40,854 ounces of the general decline; or particularly the difference between the yields for the two years. Rockhampton added over 7,000 ounces to her 1894 total, while the results of the cyanide process at Croydon on old tailings, were 24,000 ounces better than in 1894; otherwise the decrease in 1895 would have represented 80,000. Alluvial mining was also less successful last year than in the preceding twelve months, the decrease amounting to about 4,000 ounces. The total gold yield of the colony is officially announced at 626,200 as compared with 679,511 in 1894. We notice, however, that the comparative statement does not contain returns from some of the smaller fields, nor is any provision made for the gold from "other sources." These two items in 1894 represented 5,500 ounces, an insignificant amount compared with the grand total, but still sufficient to materially reduce the loss as at present shown by the figures for the year just closed.

## ARIZONA.

Following is the amount of copper and copper matte shipped by the Arizona and Detroit Copper Company for the year ending Dec. 31, 1895:

| | Pounds. |
|---|---|
| From Clifton, copper | 5,142,555 |
| " matte | 2,655,318 |
| From Morenci, copper | 4,315,850 |
| " matte | 1,567,850 |
| Total, copper | 13,738,695 |
| Total, matte | 4,661,168 |

They also shipped to El Paso 1,590 pounds of silver ore, which netted $539. During the month of January, this year, the amount of copper shipped was far in advance of any single month since the present company have owned the mines and plant.

## SOUTH AFRICA.

"ECONOMIES OF GOLD MINING."—At a meeting on the 8th inst. in London, England, of the North of England Institute of Mining and Mechanical Engineers, Prof. Louis read a paper on "The Economies of Gold Mining." Prof. Louis in his paper dealt with gold mining in its most recent developments, the subject of gold mining being of universal interest, owing to its object, "gold," being the universal standard of value. Before the discovery of America the amount of gold in the world was very small. It has been estimated at less than 30,000,000 ounces. After the end of the fifteenth century better statistics are available, and it is estimated that from the fifteenth to the sixteenth century the output of gold in the world was nearly 250,000 ounces per annum, while at the present time the gold output would be from 9,500,000 to 10,000,000 ounces, or a total output since the year 1500 of about 425,000,000 ounces of gold. After entering minutely into the fluctuations in the output of gold from 1500 up to the present time, Prof. Louis then dealt with the modes of working employed in obtaining the precious metal, both from the matrix and from the alluvial deposits. He pointed out that the origin of gold as it exists was a subject still involved in much obscurity. His opinion was that the gold was dissolved in the form of an alkaline aurate, although there was much to be said for the view that it might have been a soluble silicate; in either case the solutions were certainly alkaline, and carried with them a very large amount of dissolved siliceous matter. Accordingly all deposits of gold were characterized by the existence of quartz in very large proportions, quartz being, in fact, an invariable concomitant of gold. In all countries in which gold was found the conditions of its occurrence seemed to be practically identical as far as the mode of origin of gold is concerned. It was interesting to learn that seven-eighths of the gold production of the world was produced in but four districts—America, Russia, Australia and the Witwatersrand. Each one of these districts had its own peculiarities. Prof. Louis then dealt with their distinguishing characteristics, and stated that at the present day the South African practice was the best, the reason being that South Africa was the youngest gold field, and was thus able to benefit greatly by American experience, which had hitherto been the best. Prof. Louis dealt more particularly with the Witwatersrand deposits, as the conditions in which gold occurred there—viz., in true beds—rendered their underground workings comparable to that of many coal mining districts.

Many diagrams and views were shown by means of an optical lantern to the gentlemen present at the meeting, and were fully described by Professor Louis. The modes of mining, the sinking of shafts and levels, the bringing of the ore to bank, etc., were matters also fully entered into and explained. The costs of mining were given in detail, and the different machinery for the crushing, etc., of the ore was described. The proportion of gold collected by the various processes in one of the best managed mines of the Witwatersrand was given as follows:

| *Obtained by*— | *Per Cent.* |
|---|---|
| Amalgamation | 69 |
| Concentration and chlorination | 9 |
| Cyanide process | 16 |
| | 94 |
| Left in the tailings | 6 |
| Total available gold | 100 |

The cost of the above methods of treatment may be set down as follows, bearing in mind that in South Africa all calculations are made upon the very convenient short ton of 2000 pounds:

| *Cost of*— | *Per Ton.* |
|---|---|
| Milling | 4s 6d |
| Concentrating and chlorinating | 3s 3d |
| Cyanide process | 7s 9d |
| Total | 15s 6d |

The above were fair average figures, but the items were subject to a good deal of variation in individual cases. Taking the value of the ore at £3, some 16s must be subtracted for gold extraction, and this, with taxes, would run up to 25s, so that the value of the ore at the pithead would be about 35s per ton. After deducting other charges and expenses, the profit might be put at 15s, or 25 per cent, and the methods of mining employed varied with the circumstances of the various mines. The magnitude of the mining operations might be best appreciated from the fact that in 1894 there were nearly 2,830,000 tons mined in a strip of land only twenty-five miles long and about a mile wide.

## Coast Industrial Notes.

—Prest. J. J. Hill of the Great Northern Railroad will shortly begin the construction of a $100,000 depot at Seattle, Wash.

—San Francisco merchants now send goods to Arizona by way of steamer to Guaymas, thence to their destination via Santa Fe Railroad.

—A tug boat for towing along the Central American coast is being built for La Libertad owners by the Fulton Engineering and Shipbuilding Co.

—The Pacific Rolling Mills are temporarily closed, during which cessation of work considerable will be done in the way of additions and improvements.

—The Everett, Wash., pulp and paper mill has advertised for 20,000 cords of fir, 5000 cords of cottonwood and 1500 cords of spruce for the coming year.

—The Alameda, Cal. City Trustees have given the contract for dynamos for the municipal electric plant to John Martin of this city. The price is $7,463.

—The new Santa Rosa, Cal., water works, built at a cost of $165,000, were put in successful operation this week. They were built by Paul B. Perkins of this city.

—At a special election held at Suisun, Solano county, last week, to vote $42,000 bonds for a public waterworks, only six votes were cast against the proposition.

—Seattle, Wash., has discovered that Buffalo and other New York cities are shipping their paupers westward, something that San Francisco long since found out.

—The Southern Pacific has reduced the rates of $15 first class and $7.50 second class between this city and Portland, Or., to $10 and $5, respectively. The reduction takes effect to-day.

—At last the Union Iron Works has received the delayed armor plate from the Government for the battleship Oregon. The vessel can now be ready for final inspection and test by May 15th, 1896.

—Nearly 200 men are now at work on the new electric road which will extend from Marin valley to the summit of Mount Tamalpais. The Risdon Iron Works will furnish the engines and boilers, and the General Electric Co. the electrical appliances.

—Congressman Johnson this week introduced a bill in the House of Representatives directing the Committee on Ways and Means to investigate Japanese manufactures and the effect their future development will have upon commerce and manufacturing industries.

—It is wired from Washington as an important news item that Speaker Reed, of the House of Representatives, is in receipt of a twenty-three pound salmon from the Columbia river. It would be possible without special effort, later in the season, to send a sixty-pound salmo quinnat from that river.

—The S. F. *Chronicle* last December announced that it would send a silver cup to every baby born on this coast December 25th, 1895, and did so. The *Ledger*, published at Mexico, Missouri, now announces that it will give a similar silver cup to every baby born in the county in which that paper is published during the week ending December 31st, 1896.

—Marsden Manson, of the Bureau of Highways, has returned from an inspection of the roads in Inyo and Mono counties. He states that from the Sonora Pass, near the southern end of Alpine county, to Walkers' Pass, in Kern county, a distance of 200 miles, there are no open wagon roads crossing the Sierras. The Bureau will at once proceed to remedy this state of affairs.

—The Oakland and Livermore Valley Railroad Company has incorporated in Oakland, Cal., to construct a railroad between that city and the Corral Hollow coal mines. It is capitalized at $3,000,000; $45,000 has been subscribed. The line of the proposed railway is to begin near the eastern limits of Oakland, thence to a point near Livermore. The total length of the proposed road is 45 miles.

—There are the usual unauthenticated reports regarding the extension of the Burlington road from its present terminus at Billings, Montana. Rumor No. 1 extends the line to Great Falls; rumor No. 2 extends it to Spokane and the coast; rumor No. 3 extends it to the coal fields on the other side of the line and Canadian Pacific connections, and rumor No. 4 gives it a terminus in Alaska.

—The San Joaquin Valley Railroad directors have given Cotton Bros. a contract to build a bridge across the Merced river for $45,000. It will be 2600 feet long and forty feet above the water. Most of it will be trestle work. There will be three spans over the river proper, each 125 feet long. The spans will be composed of wooden trusses bound with iron, and will rest upon piers of piling.

—Easton, Eldridge & Co., of San Francisco, have an option on 40,000 acres of the Chino ranch, which if they negotiate, is to go for $1,600,000. The contract expires March 26th, 1896. The property included is the entire Chino ranch except 320 acres of townsite, and 1000 acres to be selected. It also covers the Chino Valley Railroad, all water rights and everything appertaining to the property. The terms of sale, if made, is one-fourth of the purchase price in cash, the balance in three equal annual installments, at 7 per cent interest.

—Tacoma, Washington, reports that $3,000,000 has been subscribed in New York to buy the Tacoma Eastern Railway and extend it to the Pacific Forest Railway Reserve and the Cispus Pass. The Tacoma Eastern consists now of seven miles of standard guage track, extending from tidewater seven miles southeastward. The Puget Sound, Mount Tacoma and Eastern Railroad Company proposes to carry out the project. Officers: President and General Manager, G. L. Holmes of Tacoma; Vice-President and Treasurer, Thomas Morch of New York; Secretary and Assistant Treasurer, P. V. Cæsar of Tacoma.

—The annual report of the Southern Pacific Co., for the year ending June 30, '95, shows that the capital stock is 1,500,000 shares, par value $100 each. The total amount issued and outstanding is $120,934,170, of which $1,000,000 is represented by shares issued for cash, the balance having been given for stock of railway companies. The income account for the Atlantic and Pacific systems of the Southern Pacific shows gross earning from operation, $35,847,810.36; operating expenses, $23,797,596.24. The total gross earnings from operation are stated at $31,245,143.89, made up as follows: Total freight earnings, $19,187,454.08; total passenger earnings, $11,021,129.62; total other earnings, $1,036,560.19.

—Santa Fe officials have recently been turning their attention to the efficiency and earning power of their locomotives. A report was recently called for by the Board showing what one additional loaded car on each freight train on the system would mean in earnings during the year. The answer was that if each freight train carried one more loaded freight car there would be additional earnings amounting to $1200 per locomotive for the year. The importance of this is in the fact that the Santa Fe has something like 1000 locomotives, and with the additional loaded freight car on each train there would be $1,200,000 in all earned. Moreover, this would be net, because it would cost no more to haul that extra car than it costs to haul the present load.

—K. B. Anderson, who recently bought in the Nevada Southern Railroad, has filed in the San Bernardino county recorder's office a deed transferring the road to the California Eastern Railway Co. At the same time a copy of the articles of incorporation of the California Eastern Railway Co. was filed in the county clerk's office, having been mailed there by Judge Dillon of Los Angeles. The company was organized by Denver capitalists, is capitalized for $1,500,000, and includes among its directors H. C. Dillon and I. B. Newton of Los Angeles. The main office of the company is in Denver and branch offices are located in New York, Los Angeles and Manvel. The road will be extended beyond Manvel about forty miles, making the entire road seventy-five miles in length. It will run from Blake on the Atlantic and Pacific to Goode Springs, Lincoln county, Nev.

—An agricultural paper interested in California colonization is advertising a $55 rate from Chicago to California. This is $7.50 less than the authorized rate. The name of the road over which the rate is applicable is not stated. Nevertheless, the advertisement caused something of a sensation and aroused no end of suspicion that some of the roads are not living up to their obligations. Western roads will not allow their Eastern connections to sell tickets to Colorado points via the Missouri river gateways at short time rates after March 1. Their reasons are that these circuitous road tickets are used to scalp rates locally from the Missouri river to Colorado common points. After the date named rates from Texas to Colorado common points must be made up of the sum of locals from Texas points to the Missouri river gateways, and from the river gateways to destination.

—The sixteenth annual report of the U. S. Geological Survey shows that the increase in the production of petroleum in California in 1895 over the previous year was 50 per cent. The report on 1895 will show an increase also, probably to an aggregate of 1,000,000 barrels. The Appalachian fields show exhaustion. California oils will yet be refined. There are no limits to the powers of science, and nothing hid from the genius of invention. Coal oil was first extracted and refined from shale and cannel coal. Some manufacturing chemist will yet bring kerosene from Los Angeles petroleum. The consumption of fuel oil in California is increasing slowly. The output of oil can be more easily increased than the consumption can. Every producer in the Los Angeles oil field whose wells are "shut down" knows how he can open them up and increase his flow of oil, but he does not know where he can find customers. There is no inducement for capital to go into the district either to produce or to buy oil. Neither consumption nor tankage is commensurate with the production. The magnitude of the trade here is disappointing to Los Angeles. It does not amount to 500 barrels per day, about one-half of which only goes from the Los Angeles field. The coal men are united, vigilant and wealthy, and do not propose to yield up their business without a battle. They have possession and hold all the vantage grounds. There are other troubles and difficulties here for the Los Angeles oil men in the two veteran, powerful oil companies that have long furnished the fuel oil trade of San Francisco and have in tanks three-fourths of all the petroleum on the Pacific coast. An oil producer writes to the Los Angeles *Times*: "If there was ever a time that the oil producers should all stand in together, it is now. Wells in general have fallen off in their production one-half in the last sixty days. Consumers and those who have got large contracts in the future are now alarmed and trying to secure contracts from the well-owners at the present low prices. Do not promise one barrel ahead for at least less than 50 cents at the well. Oil should be 75 cents within thirty days, and could be if a few that now have full tanks were only willing to hold on. Had you not rather have 75 cents for the balance of the year after thirty days than sell now at 40, and so on afterward? You have your choice of the two propositions. Money is now here to secure future oil. There are a few of our own people also helping to keep oil down at a death price. They have secured contracts beyond the capacity of their own wells, and are now running around over the field to those who are not posted, and, with the promise to relieve their tanks right away, secure a contract ahead at a low price. Now, they are really cutting their own throats. Many have lost their all in this business, and many more will if prices do not go up. Nine-tenths of the people in the field to-day would not put down another well if prices of 50 cents only were guaranteed. So you can plainly see that, with the production running rapidly down, and no new wells drilling (comparatively), oil must go up to at least $1 per barrel, which is very cheap for it." A number of the leading producers say their wells are only paying running expenses, to say nothing about getting their money back originally put in the business. Twenty carloads of oil were shipped from Los Angeles to San Pedro last Wednesday—part of the cargo of the tank steamer Enoch Talbot, now loading at that port for this city. The shipment is consigned to the Arctic Oil Works and will consist, complete, of 7,000 barrels.

## Recent Mining Dividends.

The Gold Coin Mining Company of Cripple Creek, Colo., has declared a dividend of 1½c per share, payable March 16.

The Montana Ore Purchasing Company paid a dividend of $1 per share, or $40,000, on the 20th.

The Ontario Silver Mining Company has declared a dividend of 10c per share, payable February 29.

The Etna quicksilver mine in Napa county will pay a dividend of 10c per share on March 2.

The Highland mine of South Dakota paid a dividend of 25c per share on the 20th.

The Quincy copper mine of Michigan paid a dividend of $4 per share on the 17th.

The Calumet & Hecla copper mine of Michigan will pay a dividend of $5 per share on March 3.

The Homestake Mining Company of South Dakota paid a monthly dividend of 25 cents per share on the 25th.

The Arizona Copper Mining Company, headquarters Edinburgh, Scotland, has paid a dividend of 1s. 6d. per share, making a total of £3 per share for the year.

## Recent Mining Incorporations.

The Ruby Queen Milling and Mining Company, San Jose, Cal.; capital stock, $100,000; directors, T. E. Johnson, K. E. Johnson, H. Postlethwaite, R. R. McLeod of San Jose and H. W. Postlethwaite of Saratoga, Cal.

The Boulder Mining Company, this city; capital stock, $1,000,000, of which $5000 has been subscribed; directors, F. W. Williams, H. A. Brown, J. H. Mangels, J. M. Wilmans, James O'Connell.

## Personal.

R. C. Campbell-Johnston of Vancouver has been elected president of the Society of Mining Engineers of British Co-lumbia.

R. I. Thomas left Grass Valley last Friday for Washington, D. C., in the personal interests of pending mining legislation.

J. E. Buckley of Spokane, Wash., goes to Iquiqui, Chile, on a salary of $36,000 per annum, as auditor of a railroad at that place.

Thos. J. Barbour of the Risdon Iron Works has returned from Butte, Mont., where he secured a contract for a hoisting engine of a capacity of fifteen tons load from a depth of 3500 feet at a speed of 2500 feet per minute.

Colonel G. H. Mendell, having retired from active service in the Corps of Engineers, U. S. Army, is now at liberty to offer his services to parties desiring professional reports or advice on engineering projects or constructions. His long service in charge of public works distributed between the Mexican and Dominion boundaries has given him acquaintance with local conditions appertaining to the intervening territory on and near the Pacific coast, which acquaintance he hopes to make useful to those who may consult him. The high character of such service is known and appreciated. His office is at 530 California St., this city.

## Commercial Paragraphs.

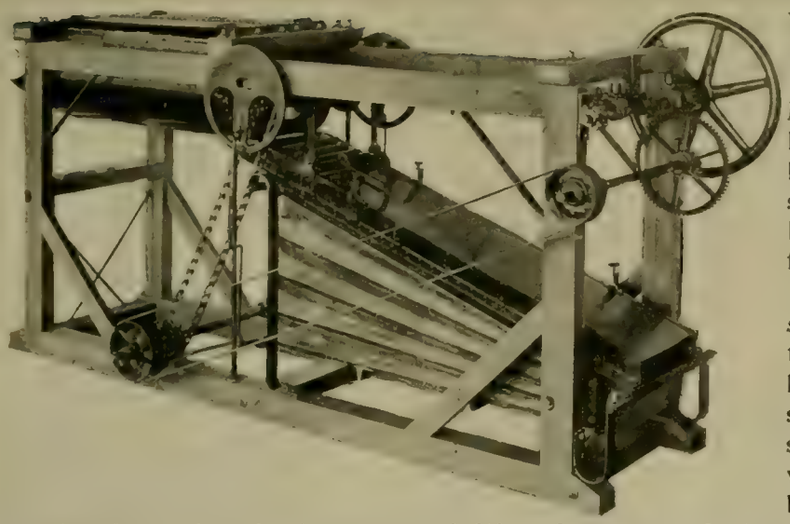
The Pelton Water Wheel Co. of San Francisco has recently shipped a 400 H. P. wheel to run the new 120-stamp mill of the Alaska-Mexican Co. on Douglas island, Alaska. The Alaska-Treadwell mine, adjoining, is using eleven Pelton wheels in its various operations of milling, pumping, hoisting, air compressors, dynamos, etc. The company states "A single wheel seven feet in diameter is running the entire mill, consisting of 240 stamps and ninety-six concentrators, requiring upwards of 600 H. P. A notable instance of the advantages of water power in mining operations is afforded in this plant—not only as regards initial cost, but in operating expenses. The wheel above referred to weighs less than 1000 pounds and the entire equipment, embracing shafts, boxes, driving pulleys, etc., only about 4000 pounds. A steam power plant to give the same capacity would not weigh less than 200 tons, and the expense of operating such a plant would be well into the thousands every month, while the cost of running the Pelton wheel is merely the oil used for the journal bearings. The operation of this extensive plant affords also an excellent illustration of the advantages of the modern economical methods of mining, and of how low-grade ore can be made to pay large dividends."

This doesn't happen every day. You can't expect it more than a few times in a lifetime. No one is going to agree and guarantee positively to save you 30 per cent or else no pay unless they know what they are about You can't expect people to say, "You need not pay for this until you have proved our guarantee," unless they intend to do all that they claim. As a matter of fact, we do more than we claim. We guarantee to save 30 per cent, but actually we save a good deal more.

Have you ever heard of a Double Pipe Air Compressor? It has one disadvantage. It needs twice as much piping as is needed with the ordinary makes of Air Compressors. On the other hand, it has more real, genuine advantages than you can shake a stick at. It will do the same work as the ordinary Air Compressors, such as are in general use throughout the mines on this coast, on 30 per cent less power. We will guarantee this and prove it to your satisfaction, else you need not pay for the Compressor. It weighs less than half as much as the ordinary Air Compressor. It costs less for freights and is more easily carried up into the hills. It shows the same high efficiency at all altitudes, high or low. It takes no more fuel to do the work if located on the highest peak of the Sierras than it would take if located at the sea level. It enables you to buy a smaller boiler than you can use with any other Air Compressor to do your work. It does not overheat the air at the Compressor and freeze it at the rock drill. In short, it is the ideal Air Compressor. It has been tried in practice, and we can show you the highest recommendations and endorsements. We sell it on a strict, positive, iron-clad guarantee If your power costs you anything, you want the Double Pipe Air Compressor, because you can buy it on a guarantee that it will run on 30 per cent less power than any other make of Compressor. If you have to take a Compressor to your mine over bad roads, you want the Double Pipe Air Compressor, because it weighs less than half as much as any other Compressor. It is cheapest to buy, cheapest to run, cheapest to transport, cheapest to carry anywheres. For pumping it beats the world. You can run it with steam or water.

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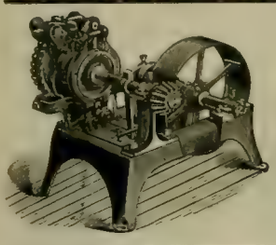
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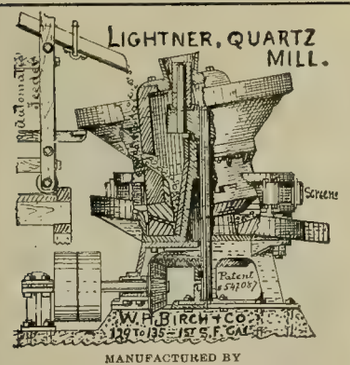
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**FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.**

**SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.**

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We refer by permission to Mr. N. A. McMillan, Haines, Oregon, manager of the Blue Mountain Mining Co., at Rock Creek, Or., where ten of our stamp mills are in operation; also to Mr. John S. Miller, Helena, Montana, manager of the Diamond Hill Mining Co., operating one of our forty-stamp mills at their mines at Townsend, Montana.

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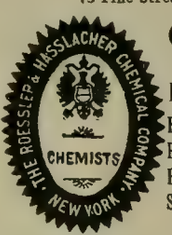
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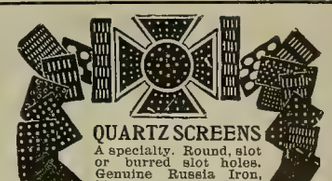
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# Practical Information.

### Nuts on Wagon Axles.

Every now and then one hears of a wagon wheel coming off through the loss of a nut, and an accident of this sort is apt to be attended with further injury to the vehicle or its load. If the latter is heavy, the end of the axle is liable to strike the ground abruptly enough to break off a portion, or at least to spoil the screw thread. This thread, by the way, is right-handed at one end of the axle and left-handed at the other, so that the nut, in going on, turns in the same direction that the wheel does when the wagon is moving forward. If the wheel exerts any influence on the nut through friction, therefore, its tendency usually would be to tighten the nut. It would only be in backing, apparently, that the nut could be loosened from that cause. It is surprising, perhaps, that such a thing should happen at all, but it does, and a good many people, farmers and blacksmiths, have wondered how it could best be prevented.

A generation or two ago, some carriage makers put a pin through the nut and the axle-top. This, of course, would serve well enough for a while, but after the nut had been removed several times, in order to allow the axle to be greased, the thread would be worn a trifle. Hence, if the nut was tightened up properly with a wrench, the hole would not be in the right place for the pin. A scheme which has been tried with great success for many years is to have two nuts, one going on after the other, and each screwing in a different direction. A pin ties the two together, and the double nut is thus perfectly locked. The patent on this idea ran out long ago, and there are several makers of this style of axle. But one must pay an extra price for it. This is the most efficient plan in use, probably; but it has been suggested that nuts, not only on axles, but also on the bolts through the ends of the springs, might be kept in place by using spring washers, such as are now employed in certain parts of a trolley-car gear, and as nut locks for railway track bolts. Again, a wonderful grip is secured in one of the track bolts lately introduced by cutting the thread in a peculiar way. The same scheme ought to work in a wagon axle.

However, there are plenty of country wagons and city trucks, some of which are used in hauling enormous loads over rough highways, which are provided with no special means of securing the nuts, and which never lose one. The secret of this, probably, is that the nuts are well fitted, and are closely watched. If the nut pinches tightly enough, and if the screw thread is kept free from grease when the wheel is off, no accident of this sort ought to happen. But when the nut is worn by long service, and goes on too easily, there is always a certain amount of risk, especially if a man is careless in greasing the wheels. And such a man, too, will probably neglect to examine the nuts occasionally and try to tighten them with a wrench.

PAPER PULP is one of the most useful articles within reach of mankind. Mixed with glue and plaster of paris or Portland cement, it is the best thing to stop cracks and breaks in wood. Pulp paper and plaster alone should be kept within the reach of every housekeeper. The pulp must be kept in a close-stoppered bottle, in order that the moisture may not evaporate. When required for use, make it of the consistency of thin gruel with hot water, add plaster of paris to make it slightly pasty, and use it at once. For leakage around pipes, to stop the overflow of water in stationary washstands where the bowl and the upper slab join, it is invaluable. Used with care it will stop small leaks in iron pipes, providing the water can be shut off long enough to allow it to set. Around the empty pipe wrap a single thickness or two of cheese-cloth just wide enough to cover the break, then apply the compound, pressing it in place and making an oval of it, somewhat after the fashion of lead-pipe joining, only longer. The strength of this paste, when once it is thoroughly hardened, is almost beyond belief. The piece of cheese-cloth prevents any clogging of the pipe by working through the cracks. Paper pulp and fine sawdust, boiled together for hours and mixed with glue and linseed oil, make a perfect filling of cracks in floors. It may be put on and left until partly dry, then covered with paraffine and smoothed with a hot iron. The surface, if properly managed, is equal to the polished wax floor.

### Handling Material in Shops.

A recent issue of the *Iron Age* gives an account of a reform which was effected in a large manufacturing establishment by the use of a simple diagram made by a young engineer in its employ. The account follows:

Convinced that the large economies had been well looked after, and that his greatest usefulness lay in the discovery of opportunities for small savings, the young man made a diagram showing a ground plan of the works. On this diagram he traced, in colored lines, the course of the various materials employed in the industry. The results were surprising. The path of each material entering into the finished production of the works suggested nothing so much as an admiralty chart tracing the course of a derelict at sea. Instead of moving steadily forward from stock pile to shipping room it was found that the material zigzagged around the works, twisting, turning and doubling on itself until its path was twelve or fifteen times the greatest length of the plant. Obviously this meant unnecessary handling. Looking more closely, the investigator discovered that instead of being a continuous process the business consisted of half a dozen or more separate processes, each in the hands of a little group of workmen whose special skill had for years been overvalued, but who had taken good care to see that no one of their number set a pace which the others found inconvenient. Over each of these groups was a foreman whose ambition it was to erect his branch of the industry into a distinct department. To this end he had got it as much as possible by itself, and was not satisfied until he had a closed door between his room and the one adjoining it. No one realized the evils of this system until the diagram of which we have spoken made it evident at a glance. To effect the reform needed, recourse was again had to the graphical method, and it was found that with very little expense the amount of moving and handling of material in process of manufacture could be reduced one-half. One or two new doors were cut, and the machinery was rearranged with a view to bringing the several processes as nearly as possible into line. As a result it was found that a good deal of the unskilled labor formerly employed about the works could be dispensed with. It was further found that the problems of the management were materially simplified, and that the unequal working of the several departments was early and permanently corrected. What has been half a dozen processes became one continuous process. By a discreet shifting of labor the special skill of each little group of mechanics became common property, and the cliques which had been a break on the wheels of the industry were effectively broken up. The weekly payrolls were materially reduced, the output was increased in quantity and improved in quality, and a very pronounced tendency to "dry rot" was checked and corrected.

CRYOSTASE is the name of the new substance discovered by a German chemist, which has the remarkable property of solidifying under the influence of heat and again becoming liquid at temperatures below freezing point. It is obtained by mixing equal parts of phenol, camphor and saponine, to which is added a rather smaller quantity of turpentine. This is the only substance at present known which possesses the property of liquefying when cold and becoming solidified when hot, for, if some substances, like albumen, harden at a slightly high temperature, they cannot be brought back again to the liquid state, even under the influence of a very low temperature.

BATH METAL is made from tin and copper. Bell metal results from zinc and copper. Bronze is the product of copper and tin. Britannia ware is made from copper, bismuth and antimony. Cannon metal is formed of copper and tin. Dutch gold is made from copper and zinc. German silver is composed of zinc, nickel, copper and a small portion of iron. Standard gold is made from gold and copper. Copper and tin form gun metal. Mosaic gold is a combination of copper and zinc. Pewter is made from lead and zinc. Sheet metal is composed of lead and a small quantity of arsenic. Standard silver is made from silver and copper. Solder from tin and lead. Type metal the combination of antimony and lead. White copper is made of copper and arsenic.

IT is remarkable what slight variation there is in the temperature of the healthy human body. The normal temperature is 96.6. The great peculiarity about the temperature in men is its evenness under all conditions. Heat or cold causes but slight variation, and in man less than in any other animal. In extremes that would be fatal to many animals man can endure and enjoy good health. We read of Arctic voyagers enduring a temperature ranging from 80° to 90° and even 102° below zero, while, on the other hand, in the tropics, during the greater part of the year, the temperature ranges from 106° to 110° above, and yet men enjoy good health in such varying temperature, and the heat of their blood varies very little.


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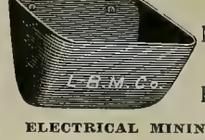
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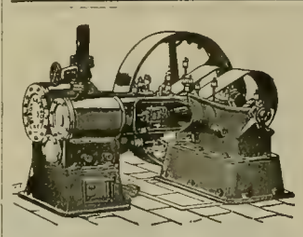
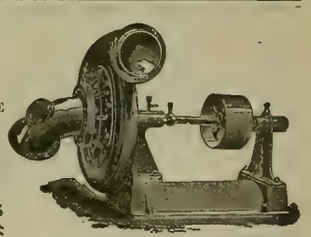
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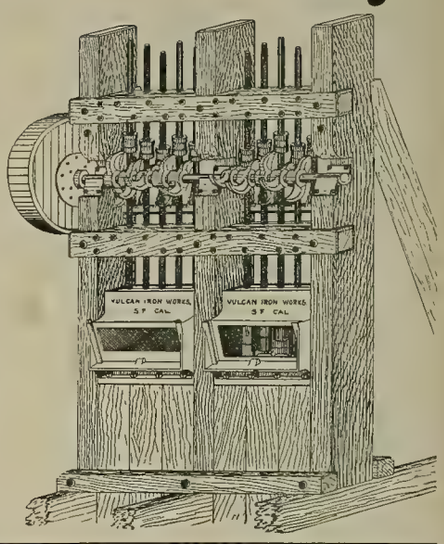
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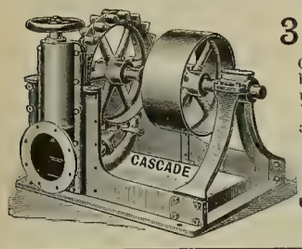
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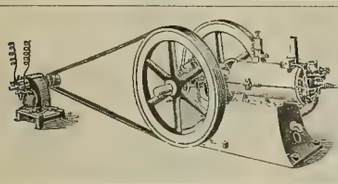
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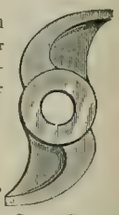


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Stamp Cam.

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LIGHT STEEL RAIL.

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The Largest and Most Completely Equipped Electrical Manufacturing Establishment in the World.

POWER, INCANDESCENT AND ARC LIGHTING, FROM THE SAME CIRCUITS.

We have purchased and are the SOLE OWNERS of the patents issued to Nikola Tesla for the POLYPHASE ALTERNATING SYSTEM, now recognized to be the most successful system for lighting and power purposes.

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STANDARD SYSTEMS

for distribution of light and power in LARGE MANUFACTURING ESTABLISHMENTS, MILLS and MINES.

WESTINGHOUSE ELECTRIC RAILWAY SYSTEM,

the Most Durable, Economical and Efficient on the Market.

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NEW YORK, 120 Broadway ✦ PITTSBURG, Westinghouse Building. ✦ CHARLOTTE, N. C., 36-38 College St.
BOSTON, Exchange Building ✦ BUFFALO, Erie County Bank Building. ✦ SYRACUSE, N. Y., Bastable Building.
CHICAGO, New York Life Building. ✦ PHILADELPHIA, Girard Building. ✦ WASHINGTON, D. C., 1333 F. St. N.

# RISDON IRON WORKS,

SAN FRANCISCO, CAL.

READ WHAT MINERS THINK OF THE BRYAN IMPROVED ROLLER QUARTZ MILL AND JOHNSTON CONCENTRATOR.

OFFICE OF LA CANDELARIA CONSOLIDATED MEXICAN MINING CO. / SAN DIMAS, DURANGO, MEXICO, October 25, 1888. \

RISDON IRON WORKS, San Francisco: Gentlemen: Our company has been operating a three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard. We crush through a No. 90 mesh screen. Our mills run 24 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours, through 70-mesh, 14 tons, and through 80-mesh, 16 tons. This proportion has been continuous. One set of dies will crush from 1500 to 1600 tons.

One set of tires will crush 1500 tons.

One ring plate will crush from 2200 to 2500 tons.

The mills require very little attention. At our mill an ordinary peon, costing one dollar per day, has complete charge.

In regard to slimes, in comparison with stamps, by reason of the absence of surface and the continuous agitation by the scrapers, a much less amount of slime is created. A three years' experience teaches us that in every respect the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours, and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule backs over as difficult a road as any in Mexico. As a gold amalgamator it is surpassed by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY. / EUREKA, UTAH, August 24, 1895. \

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco: Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz. capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec'y. \

BULLION-BECK AND CHAMPION MINING COMPANY. / EUREKA, UTAH, Aug. 24, 1895. \

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco: Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY. / S. BAMBERGER, President and Manager. / SALT LAKE CITY, UTAH, October 10, 1895. \

R. R. TAWNDRAW, Esq., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,

[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO. / C. C. McIVER, President; D. CUSHMAN, Secretary. / MISSION SAN JOSE, CAL., Oct. 17th, 1895. \

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. McIVER, President.

# UNION IRON WORKS,

NO. 222 MARKET STREET, - - - - - - - SAN FRANCISCO, CAL.

—MANUFACTURERS OF—

# MINING AND MILLING MACHINERY,

Automatic Cut-Off Engines, High-Speed Engines, Hoisting Engines, Quartz Mills,
Manty Chili Mills, Rolls and Concentrating Machinery, Dodd Sigmoidal Water Wheel,
PUMPS—Cornish and Other, Copper and Lead Furnaces, All Classes of Marine Work.

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NEW YORK OFFICE: 145 BROADWAY. CABLE ADDRESS: "UNION."

# The McGlew Ore Concentrator Company.

PATENTED SEPTEMBER 19, 1893. CHEAPEST, SIMPLEST, MOST DURABLE AND CLOSEST SAVING CONCENTRATOR IN USE. FRANK BARRERE, Secretary and Manager.

Can be seen in operation at the Company's works, 132 Main Street, San Francisco.

Office, 116 Davis Street.

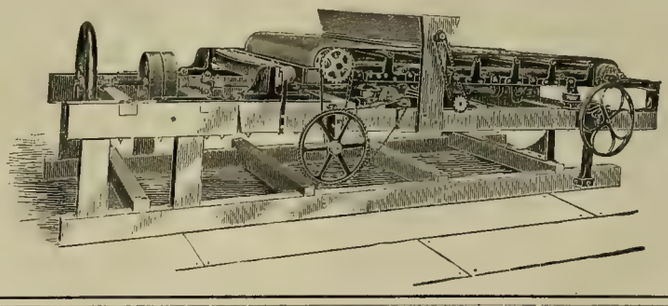
NINETY-FOUR AND ONE-HALF PER CENT
—SAVED—
ON ORES DIFFICULT TO CONCENTRATE.

A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.

SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION.

CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
including prepared canvas belt 4 ft. 6 ins. wide.



FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.

THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94⅝ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,

E. L. BALLOU, Propr. Ballou Reduction Works.

NOTICE TO GOLD MINERS!



# SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

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Incorporated.

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# Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH.

—AGENT FOR—

Hoskins' Hydro-Carbon Assay Furnaces.

# Market Reports.

## The Markets.

SAN FRANCISCO, Feb. 27, 1896.

The advance noted last week continues. Prices have bettered and, though sales are still slow, it is evident that the hold-off policy cannot much longer continue. An official of the Illinois Steel Company states an interesting fact bearing on the business situation. A year ago this company had orders on its books for between 15,000 and 20,000 tons of steel rails. To-day it has orders booked for about 100,000 tons. The inference to be drawn from this fact is that without regard to present earnings or future prospects the railroads find themselves in a position where they must increase their expenditures for renewals, a natural result of the policy of retrenchment which they have been pursuing since the panic of 1893.

In metals, silver has made the most noticeable advance, being quoted to-day at 68¼, the highest since the slump of July, '93. Big dealers differ as to the reason for the advance. It is to be hoped the better quotations will show a permanent increase. Seventy-five-cent silver would mean much to the silver mining industry of this coast.

### New York Metal Market.

NEW YORK, Feb. 27.—PIG IRON—Southern, 12@13.00; Northern, 13@13.50.

COPPER — Brokers', 10.75c; exchange, 11.00c.

LEAD—Brokers', $3.00; exchange, $3.20.

TIN—Straits, 13½c@14c.

SPELTER—Domestic, $3.90.

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.86¾ |
| London Merchants | $4.84½ |
| London Sight Bankers | $4.88 |
| Refined Silver, per oz., 1000 fine | 68¾c |
| Mexican Dollars | 55c |

### New York Silver Prices.

NEW YORK, Feb. 27.— Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 31 | 67½ | 10 50 | ..... |
| Saturday | 31⅞ | 68¼ | 10 75 | 3 10 |
| Monday | 31⅞ | 67⅞ | ..... | 3 20 |
| Tuesday | 31¾ | 68⅛ | 10 75 | ..... |
| Wednesday | 31½ | 68⅛ | . | 3 20 |
| Thursday | 31½ | 68¼ | 11 | ..... |

### San Francisco Metal Market.

| | | | |
|---|---|---|---|
| **COPPER.** | | | |
| Bolt, ¼ & 5-16, 21c; ⅜ and larger, | | | 18c |
| Lake Superior Sheathing | | 23 @ | — |
| Ingot, jobbing | | — @ | 19 |
| Ingot, wholesale | | 18 @ | — |
| Sheet copper | | — @ | 18 |
| **LEAD.** | | | |
| Pig | | — @ | 3 90 |
| Bar | | — @ | 4 15 |
| Sheet | | — @ | 5 50 |
| Pipe | | — @ | 4 75 |
| **SHOT.** | | | |
| Drop, sizes *smaller* than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and *larger* sizes, " | | " | 1 65 |
| Buck, Balls and Chilled, do, " | | " | 1 65 |
| **IRON.** | | | |
| American Soft | 22 00 | @ | 26 00 |
| Pig, per ton | 18 00 | @ | 20 00 |
| **STEEL.** | | | |
| English, lb | | 16 @ | 19 |
| **TIN PLATE.** | | | |
| Per bx | | 4 75 @ | 5 00 |
| **PIG TIN.** | | | |
| Per lb | | 15 @ | 16 00 |
| **ANTIMONY.** | | | |
| Per lb | | — @ | 10 |
| **QUICKSILVER.** | | | |
| Home trade, per flask | 39 00 | @ | 40 — |
| **BORAX.** | | | |
| Refined, in car lots | | — @ | 5⅛ |
| Refined, in sacks and barrels | | — @ | 5⅜ |
| Powdered, in car lots | | — @ | 5⅜ |
| Concentrated, " | | — @ | 4⅞ |
| **LUMBER.** SAN FRANCISCO—WHOLESALE. | | | |
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 13 00 | @ | 1 100 |
| Spruce | 25 00 | @ | 30 00 |
| **NAILS.** | | | |
| Wire | | | $3 00 |
| Cut | | | 2 80 |
| **COAL.** SPOT FROM YARD—PER TON. | | | |
| Wellington | | | $ 8 00 |
| Greta | | | 6 50 |
| Nanaimo | | | 7 00 |
| Gilman | | | 6 50 |
| Seattle | | | 6 00 |
| Coos Bay | | | 5 00 |
| Cannel | | | 8 50 |
| Egg, hard | | | 10 00 |
| Wallsend | | | 7 50 |
| Scotch Splint | | | 7 50 |
| Brymbo | | | 7 50 |
| TO ARRIVE—CARGO LOTS. | | | |
| Australian | | | 5 50 |
| Liverpool Steam | | | 6 00 |
| Scotch Splint | | | 6 50 |
| Cardiff | | | 6 25 |
| Lehigh Lump | | | 9 00 |
| Cumberland | | | 13 50 |
| Egg, hard | | | 10 00 |
| West Hartley | | | 6 50 |
| **COKE.** | | | |
| Gas Companies' | | | 75c ₩ bbl. |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 13 00 |
| " in sacks | — — | @ | 15 00 |
| Cumberland | 9 00 | @ | — — |

## Mining Share Market.

SAN FRANCISCO, Feb. 27, 1896.

The market has been more or less lifeless the past week, with changes in prices few and far between, and these have been only a few cents up and down. Never in the history of the Comstock mines has the market been kept for so long a time at materially the same prices ruling for shares. Of necessity there have been spasmodic movements, but after each falling back the market was left in a still worse condition. The few chronic traders and the few believers in "big things" to come have their faith most fearfully shaken. It now looks as if there has been played a desperate game of freeze-out. If such has been the case it would seem as if those who have managed it have been quite successful. At this writing every indication points to better prices in the near future, but whether for the purpose of collecting a line of assessments which is to be levied in March, or to promote a fairly respectable sized deal, remains to be seen. In either event it is quite safe to affirm that outsiders will, as usual, be the victims. What the improved prices will be on is, as yet, more or less a disputed point. Some contend that it will be on an improvement reported in two or more mines, while others think it will turn on a contest for election, while others again think it will be done on the presence in this city of Eastern operators. To the average operator and broker it makes but little difference what are the underlying causes for better prices and a more active market so long as they are brought about. It is no longer a secret that ex-Senator Jerry Lynch is in the market to wrest the control of Hale & Norcross from J. L. Flood. If Mr. Lynch is truly desirous of securing control of this mine it is only reasonable to look for better prices for the shares, but it is also equally as reasonable to assert that prices for the shares in other mines will be only sympathetically affected, in which event, that after the election conditions will be still worse. It is stated that the Hale & Norcross mine can be placed on a paying basis, if managed on business principles. Those who believe in better prices on mine improvements assert that in several mines considerable ore can be developed whenever wished by the powers that be. This kind of statement has been made for years past, but it failed, quite as often, of materializing. Parties contending that better prices will rule owing to the presence of Eastern speculators, state that there is now in this city a person connected with two large moneyed operators at New York City, while James R. Keene will be here soon. The New York *Wall Street Journal* of February 20th states that the latter was at El Paso, Texas, on his way to California. It may be that the small pools see in Mr. Keene's arrival an opportunity to promote a bull movement, even if that gentleman cannot be induced to do something.

The Hale & Norcross suit is still in court, while papers are being drawn up looking to taking an appeal to the Supreme Court of the Con. Virginia suit. It looks bad for anything big while these suits are still in court.

News from the Comstock mines is essentially unchanged, although some important work is nearing completion for the more active exploiting of the mines affected. In Alta the work under way is in and around the Keystone ledge. Experienced miners state that when proper work is done on this ledge, good results will follow; but whether it is the purpose to have the work done now, the writer is not in position to state. In Overman they are slowly but surely doing some developing work, and at the same time extracting a few tons of ore each week. The work in Belcher and Seg. Belcher is being slowly pushed ahead. An assessment will be necessary to continue the work. In Crown Point there is more or less active work toward the east and west. After sale day it ought to begin to look better. It is stated that no work is being done in Yellow Jacket. What the work was discontinued for it is hard to say, except to create the impression that there is nothing in the mine. In Challenge and Confidence work on the upper levels is still being done, but it is managed in such a way as not to strike much ore, if the latter is there, as some say. In Con. Imperial and Alpha the west drifts are being run at a snail's pace. Perhaps they may strike the west lode in the course of a year even at the present slow progress. In the middle mines the work seems to be more energetically prosecuted than is that in the Gold Hill group. Some ore is being raised by each mine, but it is not of sufficient quantity or high enough grade to excite attention. There can be no doubt that in two of these mines the work deserves close watching, for it is in the right direction, according to the opinion of experienced miners. While saying this, operators must not forget that the work can be stopped or else turned and plausible excuses be given for doing so. The work in Best & Belcher and Gould & Curry does not attract attention. These two mines are hardly mentioned now. The majority of miners and also operators are watching with great interest the work under way in Con. Virginia. Connection is nearing completion between this mine and Ophir on the 1000-foot level. When this is accomplished, then the former mine will be in better position to prosecute work on that level towards the Ophir. It is freely asserted that ore will be found, but how much and of what grade it is hard to say. Another assessment will be levied and probably collected before this result can be found out. In Ophir and Mexican the work is essentially unchanged. Some ore, but very low grade, has been found in Ophir. In this mine they have also run into some old fillings that will pay now if there is enough to justify raising. The work in Union and Sierra Nevada is about as heretofore reported. These two mines ought to be in good condition for more active work before the summer months pass.

Attention is largely centered on the work being done in Occidental on the Brunswick lode. It seems as if Mr. Zadig, who is credited with the control of this mine, is doing all in his power to find ore and at the same time keep the shares fluctuating. A shaft was started lately which it is hoped will run into good ore before it goes down even two hundred feet, and in the meantime exploiting work is being actively pushed. The work in this lode that is being done by other companies is said to be deserving attention, but the writer must admit of very little personal knowledge regarding the lode, and therefore can not write knowingly on the subject. There are well-informed miners who are quite enthusiastic over the Brunswick lode, and look with confidence to quite a body of ore being found before the end of the current year.

From the Bodie district there is nothing new to report. The same old stereotyped official letters are sent down here. They give distances, etcetera, with an unvarying sameness which must be truly charming to some, but is tiresomely monotonous to outside shareholders.

The following illustrates the changes of the week:

| MINES. | Feb. 20. | Feb. 27. |
|---|---|---|
| Alpha | $ 12 | ..... |
| Alta Consolidated | 14 | ..... |
| Andes | 16 | ..... |
| Belcher | ..... | ..... |
| Best & Belcher | 80 | $ 76 |
| Bodie | ..... | ..... |
| Bullion | 11 | 12 |
| Challenge | 40 | ..... |
| Chollar | 63 | 53 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 2 00 | 1 95 |
| Consolidated New York | ..... | ..... |
| Crown Point | 39 | ..... |
| Exchequer | ..... | ..... |
| Gould & Curry | 42 | 36 |
| Hale & Norcross | ..... | 1 25 |
| Justice | ..... | ..... |
| Mexican | 59 | ..... |
| Ophir | 1 30 | 1 25 |
| Overman | ..... | 15 |
| Potosi | 52 | ..... |
| Savage | 48 | 42 |
| Sierra Nevada | 40 | 35 |
| Union | 54 | 47 |
| Utah | ..... | 10 |
| Yellow Jacket | ..... | 35 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, Feb. 27, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 300 Best & Belcher | 76 | 100 Overman | 15 |
| 500 C. C. & Va | 1 95 | 100 Utah | 10 |
| 250 Occidental | 92 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 400 Ophir | 1 25 | 200 Yellow Jacket | 35 |
| 100 Gould & Curry | 36 | 50 Sierra Nevada | 35 |
| 250 Best & Belcher | 74 | 500 Union | 47 |
| 100 | 75 | 50 Utah | 09 |
| 775 Con Cal & Va | 1 90 | 200 | 10 |
| 200 H. & N | 1 25 | 500 Bullion | 12 |
| 200 Savage | 42 | 500 S Hill | 02 |
| 600 | 41 | 600 Occidental | 87 |
| 400 Chollar | 53 | 500 | 88 |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., February 26, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| CALIFORNIA STATIONS | Total Rainfall for the Week. | Total Seasonal Rainfall to Date. | Total Seasonal Rainfall Last Year to Same Date. | Average Seasonal Rainfall to Date. | Maximum Temperature for the Week | Minimum Temperature for the Week |
|---|---|---|---|---|---|---|
| Eureka | 89 | 24 73 | 32 33 | 28.35 | 66 | 40 |
| Red Bluff | 06 | 13 67 | 25 13 | 17.96 | 74 | 44 |
| Sacramento | T | * | 21.54 | 11.74 | * | 46 |
| San Francisco | ..... | 12.43 | 21.97 | 17.36 | 72 | 46 |
| Fresno | ..... | 4 09 | 11.32 | 6.26 | 80 | 42 |
| S. L. Obispo | ..... | 12.25 | 22 46 | * | 84 | 40 |
| Los Angeles | ..... | 5.91 | 11 68 | 12.83 | 84 | 44 |
| San Diego | ..... | 2 82 | 10 17 | 4 01 | 78 | 46 |
| Yuma | ..... | .46 | 3.01 | 2.63 | 84 | 44 |

* Indicates no record.

## MINING SHAREHOLDERS' DIRECTORY.

### ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | | Secretary. |
|---|---|---|---|---|---|---|
| Alta S M Co, Nev | 51 | 10c | Jan 13 | Feb 17 | Mar 9 | J E Jacobus, 309 Montgomery |
| Andes Silver M Co, Nev | 42 | 15c | Jan 30 | Mar 6 | Mar 28 | J W Twiggs, Nevada Block |
| Bay State M & D Co, Cal | 30 | 2c | Feb 1 | Mar 9 | Mar 28 | F E Luty, 330 Pine |
| Bulwer Con M Co, Cal | 12 | 5c | Feb 5 | Mar 11 | Apr 3 | J E Jacobus, 309 Montgomery |
| Crown Point G & S M Co, Nev | 66 | 25c | Jan 16 | Feb 20 | Mar 12 | Jas Newlands, Mills Building |
| Gray Eagle M Co, Cal | 42 | 5c | Jan 6 | Feb 7 | Mar 3 | W J Gurnett, 308 Pine |
| Gold Bar Con M Co, Cal | 3 | 5c | Feb 10 | Mar 19 | Apr 10 | E C Godfrey, 38 Crocker Building |
| Julia Con Co, Nev | 27 | 5c | Jan 17 | Feb 20 | Mar 11 | J Stadtfeld, Jr, 309 Montgomery |
| Justice M Co, Nev | 60 | 10c | Jan 13 | Feb 17 | Mar 9 | R E Kelly, 309 Montgomery |
| Lady Washington Con Co, Nev | 11 | 5c | Jan 16 | Feb 17 | Mar 10 | J E Jacobus, 309 Montgomery |
| Orleans Mining Co, Cal | 1 | 10c | Jan 21 | Feb 29 | Mar 24 | W Olney, 101 Sansome |
| Osceola Con M Co, Cal | 5 | 1c | Feb 11 | Mar 14 | Apr 8 | H Smith, 307 Montgomery |
| Sierra Nev S M Co, Nev | 110 | 25c | Feb 3 | Mar 7 | Mar 27 | E L Parker, 309 Montgomery |
| Silver King M Co, Arizona | 13 | 25c | Jan 28 | Mar 9 | Apr 6 | J W Pew, 310 Pine |
| Union Con M Co, Nev | 52 | 20c | Jan 14 | Feb 17 | Mar 17 | A P Swain, 309 Montgomery |

### MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Hale & Norcross S M Co | A B Thompson, 309 Montgomery | Mar 11 |
| Potosi M Co, Nev | C E Elliot, 309 Montgomery | Mar 11 |


# HOME STUDY.

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# Assessment Notices.

MARGUERITE GOLD MINING AND MILLING COMPANY. Location of principal place of business, San Francisco, Cal.; location of works, Auburn, Placer county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of February, 1896, an assessment (No. 2) of 10 cents per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 237 Twelfth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of April, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made be before, will be sold on THURSDAY, the 30th day of April, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. WINTERS, Secretary.

Office—237 Twelfth street, San Francisco, California. Office hours from 8 to 10 P. M.

ANDES SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 30th day of January, 1896, an assessment (No. 42), of 15 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, No. 22 Nevada Block, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of March, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 28th day of March, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

JNO. W. TWIGGS, Secretary.

Office No. 22 Nevada Block, San Francisco, California.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 10th day of February, 1896, an assessment (No. 3) of 5 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 38 Crocker Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 19th day of March, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 10th day of April, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR WEEK ENDING FEBRUARY 18 1896

554,854—HARVESTER—J F Appleby, Santa Cruz Cal

554,862—AMALGAMATOR—T G B Massicks, Pres cott A T.

554,610—HOSE—W F Bowers, S F

554,708—FLUME GAGE—C P Brown, Redlands Cal

554,784—CAR COUPLING—S Colman S F

554,912—GOLD SEPARATOR—A Dertenberger, Tacoma Wash

554,782—INDICATOR—C Johnson, Bourne, Or

554,669—VAPORIZER—G C Johnson, Los Angeles Cal

554,887—BURGLAR ALARM—W C Longstreth, Oakland, Cal

555,016—ROOF CLEAT—T H Montgomery, Oakland Cal

554,831—TYPEWRITER—P F Nilson, Phoenix, A T

554,711—PIPE CLEANER—I B Sturges, Portland, Or

554,745—WATER HEATER—Sturm & Froelich, San Jose Cal

554,749—WIRE COILER—W C & E S Wadsworth Sutter Cal

554,762—SAFETY BRAKE—R P Williams, Grants Pass, Or

NOTE—Copies of U S and Foreign patents furnished by Dewey & Co in the shortest time possible by mail or telegraphic order. American and Foreign patents obtained and general patent business for Pacific Coast inventors transacted with perfect security at reasonable rates, and in the shortest possible time

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S and Foreign Patent Agency, the following are worthy of special mention:

WATER HEATER. Joseph N. Sturm and Henry Froelich, San Jose, Cal. No. 554,745. Dated Feb. 18, 1896. This invention relates to a device which is especially designed for heating water for family uses. It consists in the combination of a boiler, a tank or receiver and circulating pipes and closed chamber situated below the boiler and separated from the bottom of the boiler proper, a burner formed in the top of said chamber, a generator passing through the space between the plate and the bottom of the boiler, a connection from one end of the generator having a nozzle, a pipe entering the mechanism chamber and receiving the discharge of the nozzle, a feed pipe connecting with the opposite end of the generator, a pipe in communication with the feed pipe extending below the generator, an intermediate filling of flame-arresting fine wire gauze between the burner and the bottom of the boiler and means for supplying hydro-carbon fluid to the generator, together with a trap which prevents the vapor being forced back into the feed pipe

DETONATING BURGLAR ALARM. Wm. C. Longstreth, Oakland, Cal. No. 554,887. Dated Feb 18, 1896. This invention consists of a stock or body having a shoulder with a projecting holding arm at about right angles and having a striking lug, a spring hammer connected with one end of the stock or body and having its other end freely playing over the arm having the striking lug, and means on the hammer for holding a percussion cap in position to be exploded by the striking lug. The device is a simple, efficient and portable burglar alarm, adapted to be readily applied to either door or window, as may be required.

FENCE WIRE COILER. Wm. C. Wadsworth and Edson Schuyler Wadsworth, Sutter, Cal. No. 554,749. Dated Feb. 18, 1896. This invention is a device for winding up or coiling barbed or other fence wires, upon the occasion of removing the fence, or when it is otherwise necessary to dispose of or to store the wires of the fence. It consists of a wheeled frame carrying a shaft which is driven by power derived from the running mechanism of the frame, a reel mounted loosely upon said shaft and a slip connection between the reel and the shaft whereby the constant speed of the shaft is converted into a variable revolution of the reel, according to the gradually increasing diameter thereof, as the wire is wound upon it, whereby the wire is kept taut throughout the whole course, while the travel of the wheeled frame remains constant.

TYPE-WRITING MACHINE ATTACHMENT. Peter F. Nilson, Phœnix, Ariz., assignor of one-half to Benjamin A. Fickas of same place. No. 554,831. Dated Feb. 18, 1896. The object of this attachment is to enable the machine to write upon the pages of bound books, pamphlets, pads and other folded sheets, as well as upon ordinary sheets of paper. It consists in a novel holder for the book, pamphlet, pad or paper whereby it is presented in proper position to the action of the type, and in the necessary adjustments and means for effecting them, whereby the position of the holder is varied, as required.


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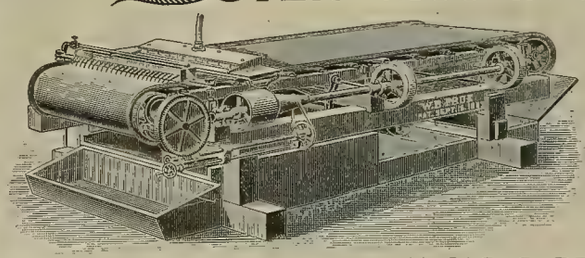
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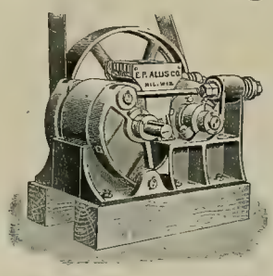
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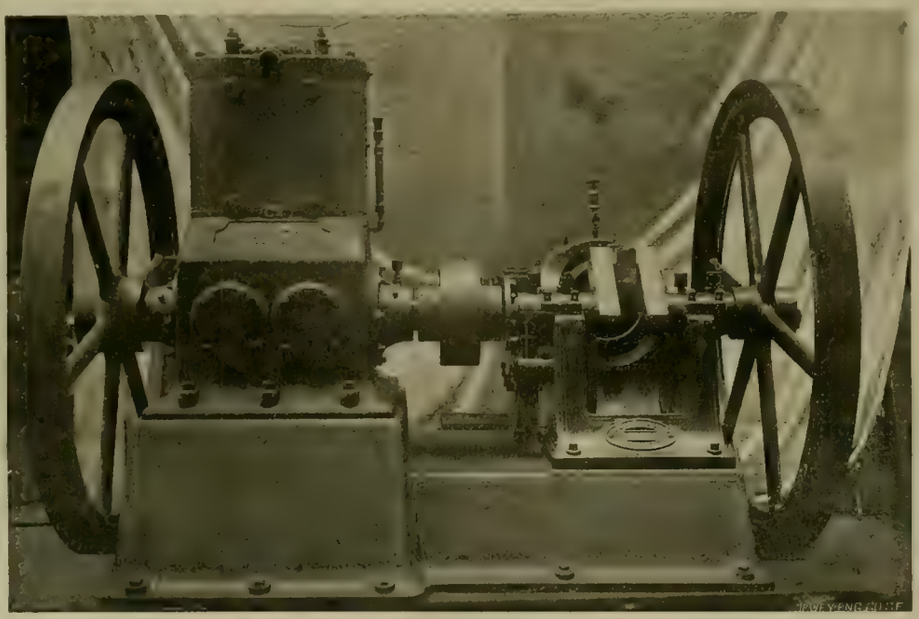
VOLUME LXXII. Number 10. WHOLE NUMBER, 1500

SAN FRANCISCO, SATURDAY, MARCH 7, 1896.

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## Gasoline Engines and Borax Mines.

Herewith is illustrated a new use to which the gasoline engine has been put, showing a twenty-five-horse power Union gasoline engine attached direct to an air compressor of sufficient size to run three rock drills. This compressor was built by the Abner Doble Co. of San Francisco. It is for use in the borax mines of the Pacific Coast Borax Co. at Daggett, Cal. These engines are becoming a factor in mine development, and have done much to develop many properties which otherwise would have remained non-paying, owing to the lack of fuel in the section.



GASOLINE ENGINE ATTACHED DIRECT TO AIR COMPRESSOR.

Reference to cut shows engine on the right, with a vertical double-cylindered compressor on the left. The plant is self-contained, as both engine and compressor are fastened to one base, and the base is so arranged as to carry the necessary oil, also the igniting batteries. This is the fourth engine that this company has used; it now has three hoisting plants, all driven by Union gasoline engines, and the above-mentioned compressor plant. These engines apparently solved a problem for this company, that had given it considerable trouble. Before the introduction of these gasoline engines the hoisting was done by mule power, and water was so scarce in that section that the drinking water for the animals had to be hauled quite a distance. There are other properties in California that have the same natural difficulty.

The Union Gas Engine Co. recently shipped a twenty-five-horse power engine to the Confidence mine at Death Valley. This property is owned by the Sterling Mining & Milling Co., a corporation of Utah. It appears that it had been known for some time that the property was valuable, but owing to the impediments that nature had placed in the way—scarcity of wood and water—the property remained undeveloped until purchased by the company, and as it had had previous experience with this form of motive power, it knew that no difficulty would be had in operating the property. Having purchased some 150-horse power in various sized engines for use in its several mines, the company knew that the gasoline engine was not an experiment for mining purposes. The recent improvements that have been made in gasoline engines have made them reliable, apart from the readiness with which they can be gotten into motion.

At the Marguerite mine in Auburn, Placer Co., one of these engines is in operation. The engine-room and blacksmith shop are one. The engine is used for hoisting purposes, and when there is a bell from below the blacksmith stops blowing his bellows, starts the engine inside of ten seconds, hoists the load, empties the bucket and proceeds with his work.



PACIFIC COAST BORAX COMPANY'S MINES AT DAGGETT.

Many undeveloped properties that are now standing idle, owing to the great cost of putting in power, could be worked to good advantage with the gasoline engine.

The lower illustration portrays the borax mines at Daggett, where the engine is to go. These mines are owned by the Pacific Coast Borax Co. It is a desert country—a dreary, desolate waste—mule power being almost the sole means of transportation.

This valuable salt is found in considerable quantity in this country only in this State and Nevada. The commercial history of the borax industry on this coast is one of loss and disappointment. Prior to any production being made in Nevada, the price of borax ruled everywhere at 28 to 35 cents per pound, figures that held with but little variation up to 1872, when the price dropped during the next two years as low as 6½ cents in the San Francisco market. After touching this low figure the price of refined borax underwent some slight improvement, and, advancing slowly, reached present rates, 7 to 8 cents per pound in New York. The Nevada producers met with disappointment; their deposits were not fruitful; they were unable to put their borax upon the market in satisfactory shape, the product of their refineries was disposed of hastily and through such diverse channels as soon placed them in the attitude of mutual competitors. These evils and errors developed such obstacles as, in the course of a few years, forced every one of these companies to greatly curtail or wholly suspend operations, the production of borax on the Pacific coast having fallen off before the end of 1879 more than 70 per cent from the largest amount previously made.

In calculating their chances for success, the Pacific coast manufacturers made the double mistake of overestimating their own and underestimating the resources of the foreign producers. It was supposed that the previously prevailing high prices of this commodity the world over were due to a scarcity of the raw material, or to the difficulty of obtaining it in the countries where the principal supply was drawn—a manifest error, inasmuch as the borate deposits of Europe, India and Peru, at the time the new industry was striving for a foothold on the west coast of the United States, were ample to meet all the requirements of commerce. The Pacific Coast Borax Co. is now the largest single producer of this bi-borate of sodium, and is introducing it into general use. Borax is a flux for nearly all metals, a solvent for resins and fats, a cleanser, an antiseptic and a preservative of animal tissue. Its production has increased from 24,304 pounds in this State at 39 cents per lb. in 1864 to nearly 10,000,000 pounds in 1895 at 7½ cents per lb.

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J. F. HALLORAN.....General Manager

San Francisco, March 7, 1896.


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## The Accumulation of Amalgam on Copper Plates.

A paper with the above caption was read at the Pittsburg meeting, last month, of the American Institute of Mining Engineers by R. T. Bayliss of Marysville, Montana, which is of practical interest.

Although every millman of even limited experience in the amalgamation of gold ores is probably aware, says Mr. Bayliss, that copper plates will in time become coated by the accumulation of gold amalgam, it may be that many do not know to what extent this accumulation occurs in the treatment of ores dissimilar to those with which they are familiar, and under conditions foreign to those with which they have to contend in any given locality. The writer, therefore, feels relieved from the necessity of offering an apology for dealing with such an elementary subject, believing that certain facts in reference thereto, which have recently come under his personal observation, will be interesting to many, and possibly instructive to some persons engaged in the amalgamation of gold ores. The facts hereinafter stated were observed in the fifty-stamp "combination" mill owned by the Montana Milling Company, Limited, of England, operating the Drum Lummon mine, situated at Marysville, Montana. The material treated in this mill consists of quartz and ores of somewhat variable character, containing gold and silver in native form, as well as in chemical union with the sulphides of iron and copper. There is also present a little lead, some arsenic and antimony, and a little zinc. The last four minerals, however, are of irregular occurrence, and but sparingly distributed throughout the ore, and yield only a trace in the analysis of the average material in this mill. The free gold, which is in a condition of fine division, and rarely visible to the naked eye, carries silver as an alloy; and the native silver, which is only occasionally observed, is present in the richer ores in wire and in leaf form. Of the two precious metals, the ore worked during the past three years and ten months, the period under review, contained about half an ounce of gold, and from seven to twelve ounces of silver, to the ton of 2000 pounds.

The ore, after being crushed in the stamp battery and passed through a thirty-mesh steel wire screen, runs over amalgamated copper plates, and is then concentrated on Frue vanners, to the distributor of which is affixed a small copper plate for saving any amalgam escaping from the battery plate; the tailings from the vanners being subsequently amalgamated in pans. Amalgamation upon copper plates placed inside the mortar is not practiced in this mill, better results having been obtained by amalgamation on outside or apron plates only. It is not the purpose of this paper to enter the wide field of discussion as to the relative merits of inside and outside amalgamation, but it may be observed in passing that an extended experiment upon the two methods proved that a higher percentage of saving was gained by amalgamation outside the battery than by the use of inside plates in addition to the apron plates. The apron plates in use in this mill are 54 inches wide and 8 feet long, made of ¼-inch rolled copper plate, electro-plated with one ounce of silver to the square foot. They are set with a fall of 2½ inches to the foot; are cleaned up once in twenty-four hours, and dressed every two, three or four hours, as may be deemed necessary by reason of their surface condition, which varies according to the mineral contents of the ore submitted to them. In dressing, a weak solution of cyanide of potassium is used when necessary. The copper plates upon the Frue vanners are 46 inches wide and 18 inches deep, made of ¼-inch rolled copper plate, electro-plated with one ounce of silver to the square foot, and are subjected to the same treatment as the apron plates. At the daily cleanup the surface of the apron plates is first washed; then the amalgam which has collected during the preceding twenty-four hours is slightly softened and loosened by sprinkling a small quantity of mercury over the plate and rubbing the surface with a cloth or whisk brush, after which the amalgam is removed with a stiff rubber scraper, 4 inches wide, made out of rubber belting. In this process the daily accumulation of amalgam is removed as completely as possible without the application of a steel scraper, the use of which is not permitted, except for the removal of blisters, or any fixed impurity which may occasionally be found upon the plate. The foregoing brief summary of the method employed in this mill will be sufficient to explain the general conditions surrounding the amalgamation of the free gold contained in the ore, and the treatment to which the copper plates are exposed.

To return to the special subject indicated by the title of this paper: One of the copper plates employed in this mill was recently removed, after having been in continual service for three years and ten months. During this period, the battery of five stamps which it served crushed 14,942 tons of ore, yielding from amalgamation on this plate 6426 ounces of bullion, 541.5 fine in gold and 443.9 fine in silver, giving a standard assay value of $11.70 per ounce, and showing the recovery of $5.03 per ton of ore crushed. In fixing the total tonnage of ore passed over this plate, and the yield in bullion therefrom, the total tonnage and production of the mill during this period has been divided by ten. As all the stamps have been operated continuously, this proportion should correctly represent the duty performed by the particular plate under consideration. The agreeable task of removing the amalgam, known to have accumulated upon this plate (which was new when put in) was then undertaken, and the accumulation or scale was removed by striking the back and front of the plate with a light hammer, a small block of wood being used to deaden and distribute the blow. By this means the plate is slightly buckled, causing the amalgam to scale off, and leaving upon the original electro-plated surface but an insignificant film or layer, which is subsequently removed with a chisel or scraper. Other methods, such as sweating with hot water and immersing the plates in chemical solutions, have been tried, but have proved unsatisfactory; and the process of buckling the plate, although a somewhat drastic and unscientific method, has been found to effect the recovery of the highest percentage of the accumulated amalgam. After this treatment, the plate is usually so damaged as to be unfit for further service; but, notwithstanding that every visible portion of amalgam has been removed, the copper plate is still found to carry a considerable quantity of gold and mercury, and, upon being cut up and melted into a bar, the value of the gold and copper contents amounts to more than twice the value of a new plate, hence the substitution of new plates for old is an expenditure which can be viewed without concern. The results obtained from the foregoing treatment of the particular copper plate here specified were both interesting and of substantial value, the scale or accumulation of amalgam at the head of the plate being no less than 0.16 inch in thickness, and gradually decreasing to a bare one-sixteenth inch at the lower end. The total weight of the amalgam so recovered was 160 pounds avoirdupois, which, upon being retorted, yielded 60.5 pounds, or 38 per cent of crude bullion, and produced after melting a gold bar weighing 866.1 ounces troy, which, upon assay, proved to have a total fineness of 993.9, being 431.4 fine in gold and 562.5 fine in silver, and having a standard value of $9.63 per ounce, thus making the total value of bullion recovered from the accumulated amalgam upon this one plate no less than $8340.54. It may be remarked that the results recorded in this instance are not by any means exceptional. Other plates in this mill, placed in service at the same time as the one forming the subject of this paper, appear to be coated with an accumulation of amalgam of equal weight and value; and, moreover, within the writer's experience of other plates removed from this mill in past years, is an instance in which one plate yielded accumulated amalgam in excess of $11,000. An examination of the facts observed in the course of cleaning this plate, and converting the amalgam into bullion, reveals one or two interesting features which appear to be worthy of record. As stated above, the percentage of bullion in the amalgam obtained was 38 per cent, whereas the amalgam from the daily cleanup never contains more than 20 per cent of bullion, and frequently not more than 10 per cent. This is, no doubt, due to the circumstance that the amalgam remaining upon the surface of the plate is subjected to greater compression than that which is cleaned off, and merely strained through canvas sacks. The accumulated amalgam obtained from the plate in the shape of scale does not appear to suffer any visible alteration in form or size during the process of retorting. A piece one-eighth inch thick and one inch square will pass through the ordeal of retorting and emerge as crude bullion, having preserved, without apparent loss, its original dimensions, and still retaining on its surface any ripple marks or imperfections which it bore during its existence as amalgam. A comparison of the fineness of bullion obtained from the accumulation of amalgam upon this plate with the average fineness of bullion produced from the daily cleanup of the plate, during its service of three years and ten months, of which one would suppose the accumulated amalgam to be a fair sample, shows that, to a striking degree, this is not the case. The average fineness of bullion obtained from daily cleanups during the period mentioned was Au, 541.5; Ag, 443.9; total, 985.4, whereas the fineness of bullion obtained from the accumulation upon this plate during the same period was Au, 431.4; Ag, 562 5; total, 993.9; from which it will be observed that although the fineness of the latter, 993.9, is greater than the fineness of the former, 985.4, the gold fineness is 110.1 less and the silver fineness 118.6 more. That the total fineness of bullion from the accumulated amalgam should be higher than that obtained from the daily cleanups is not a matter for surprise, since the amalgam gathered from the plates from day to day would naturally contain a higher percentage of impurity and base metal than the amalgam which adhered to the surface of the plate; but it does not clearly appear why the gold fineness of the latter should be so much lower than that of the former, the difference being represented by a corresponding increase in the silver fineness. In explanation of this inconsistent feature, it has been suggested that the native silver contained in the ore has a greater tendency to accumulate upon the plates than the free gold, owing to its stronger affinity with the amalgamated surface. If theory furnishes any authority for such a statement, it is rudely disproved by actual experience in this particular instance, for test samples of the accumulated amalgam from the head and tail of this plate prove the former to be .020 finer in gold than the latter, with a corresponding increase in the silver fineness of the amalgam from the lower end of the plate. Furthermore, the amalgam saved upon the copper plates forming the distributor of the Frue vanners invariably shows, upon assay, a lower gold and a higher silver fineness than the bullion recovered from the treatment of the same ore upon the battery plate, a sample of this vanner amalgam yielding bullion assaying Au, 380.5; Ag, 602.0; total, 982.5. In other words, the silver, instead of showing a strong affinity with the amalgamated surface, gives evidence of a persistent tendency to escape amalgamation, as proved by the foregoing assays, which show that the gold fineness of bullion is highest nearest to the battery, and gives place to a steadily increasing silver fineness as the amalgam is deposited upon the copper plates at greater distance from the battery discharge. The natural conclusion to be drawn from these facts and figures would justify the expectation that the bullion derived from the accumulation of amalgam on copper plates would be of equal, if not of higher, gold fineness to that recovered from the daily cleanups upon the plates during the period in which the accumulation was in progress. The foregoing facts, however, incontestably prove that such is not the case; and the purpose of this paper will be served if the facts herein presented, which have been prepared with due regard to accuracy, are the means of suggesting an explanation of this interesting inconsistency, which the writer most frankly confesses himself unable to supply.

## Concentrates.

THE Comstock payroll for February was $84,314.16

THE Waldo, Or., copper mine is working twenty-five men.

OVER 200 men are now employed by the De Lamar, Nev., Mining Co.

THE Morning Star Mining Co., Placer Co., has declared a $6 dividend—its 56th.

THE La Plata and San Juan Miners' Club has been organized at Durango, Colorado.

THE Etna Quicksilver mine in Napa county paid a dividend of 10c per share on the 2nd.

CRIPPLE CREEK, Colorado, is as unanimous as Nevada in excluding Chinese from the mines.

THIS WEEK Rossland, B. C., puts in a claim to the possession of "the biggest gold mine in the world."

THE gold output of Arizona for '95 was $4,250,000, an increase of $2,179,750 over 1894, and of $3,257,495 over 1893.

THE Victorian gold output for '95 was 693,146 ounces; for '94, 674,680; '93, 671,126; '92, 654,456; '91, 576,399.

THREE HUNDRED men are at work on the Rossland-Trail, B. C., tramway. Track will be laid to Le Roi by May 1.

THE Santa Rosa Mining Company of Riverside County has filed a petition in insolvency. The liabilities are $16,000.

THE Checkmate mine in Willow Creek district, Idaho, has been sold to F. L. Chapin, of Ogden, Utah, for $5000 cash.

THE Odin Gold Placer Mining Company of Nevada county has levied an assessment of 50c per share, delinquent March 31st.

THE North Banner Consolidated Tunnel Company of Nevada county has levied an assessment of 3c per share, delinquent March 31st

THE American Developing and Mining Company have removed their main office from their mines at Whitehall to Butte, Montana.

BRITISH COLUMBIA miners are holding mass meetings to protest against the proposed Government 2% tax on the proceeds of the mines.

THE business transacted on the New York Mining Exchange on the 4th was the heaviest since it opened. The total sales amounted to 133,460 shares.

"PURE QUICKSILVER" is reported to the Australian Mines Department as having been discovered near Beaconsfield on the Gippsland line, Victoria.

THE South African *Mining Journal* of Jan 18th suggests as a basis of calculation that 60s.=$15—per ounce be taken as the value of the Randt gold as produced.

THE Northwestern Mining Association urges the addition of a mining secretary to the cabinet. The idea has long been suggested and some day will come to pass.

THE Bullion-Beck, Utah, mine owners have declined to renew any ore contract for '96 and rejected all bids therefor. The present daily output is 100 tons.

A $100,000 FIRE destroyed the mill on Yosemite No. 1, at Bingham, Utah, last Saturday. There was no insurance. Manager P. A. Franklin says he will rebuild.

MINING COMPANIES without number are incorporating in Salt Lake City, Utah. The daily filings of articles of incorporation represent a nominal capital of over $15,000,000.

THE coinage of the United States Branch Mint in this city for the month of February aggregated: Double eagles, $1,240,000; standard dollars, $100,000. Total, $1,340,000.

"TONS OF GOLD!" is what a New York "boom" company advertises. It is located at 80 Broadway, New York City, and has some property in Buckingham county, Virginia.

THE Spring migration to Alaska has begun. Fifty men will leave here next Tuesday on a specially chartered steamer equipped with supplies of all kinds, provisions and machinery.

THE Bendigo, Australia, gold mine has reached a depth of 3,000 feet, at which depth the cost of shaft sinking is $50 per foot. A hoisting engine with a capacity of 4,000 feet has recently been put in.

THE Northern Pacific and Great Northern will make a rate of one and one-fifth fare for the delegates to the mining and immigration convention to be held in Helena, Montana, March 10.

BREEN AND CLARK are buying the machinery for the new War Eagle, B. C., smelter, but decline to say where it will be located. It is assumed that it will be built at Rossland or Northport.

THE Rossland *Miner* says the contract on the Trail Creek tramway was taken at starvation prices and that the men at work are "getting little or nothing more than their board and their board is bad."

NO. 1, VOL. I of the third new mining paper recently started in Salt Lake, Utah, is received. Nothing more strikingly illustrates the present mining activity than the number of new mining papers springing up everywhere.

THE aggregate amount of coin and currency, notes and money of the United States of all forms, Jan. 1, 1896, was $2,197,000,236, the amount in the Treasury was $617,793,512, and that outside the Treasury, $1,579,206,724.

CONSIDERABLE caustic and adverse comment is made on the recently published article on "Ore Treatment," by Mr. W. H. Pellew of Vancouver, B. C. Some of his statements certainly seemed susceptible of successful contradiction.

CRIPPLE CREEK, COLO., barbers charge 50 cents for a haircut. "When whisky was 4 bits a drink" is often reverted to in talking of '49 days in this State. The hair-cut basis of prices may yet form a similar dating point in Colorado chronology.

RENEWED interest is observed in the County Mining Associations. Nevada county has reorganized its Association and sent down $200. Placer Co., which has been the financial backbone of the Association outside of this city, has sent $120 additional.

CONGRESSMAN BREWSTER of New York has introduced a bill to place a duty of 50 per cent ad valorem on silver bullion, or in bars and sweepings; also upon silver bars and ingots and articles and wares composed wholly or in part of silver, whether manufactured or partly manufactured.

IN his semi-annual report the manager of the Broken Hill Proprietary Co. (West Australia) says: "Sales of lead for China have been active, about 5000 tons being shipped, returning satisfactory results. One or two small shipments have been made to America, and your directors venture to think that an opening can be made there for a portion of the output." The kind of national legislation in this country that admits of such a statement in view of all the facts is not calculated to incite respect.

CONGRESSMAN JOHNSON has introduced a bill in the House to amend Section 24 of the Act creating the Federal Debris Commission by adding the clause "*Provided*, That the Debris Commissioner of the State of California shall be ex-officio a member of the Commission created by this Act."

THE Nevada State Land Office has received a Washington transcript of approval list No. 14 of lands situated in the Carson City land district for the two million acre grant, embracing 86,671.69 acres, apportioned by the Secretary of the Interior January 23, 1896, which includes selections made up to June 29, 1895.

THE directors of the Colorado Mining Stock Exchange have adopted resolutions advising the public "to be cautious in the purchase of mining stocks, unless the mines and their members are known, and the stocks are listed on this or some other reputable and long-established exchange, with strict listing rules."

THE Arizona *Silver Belt* says the sale of the Rosemont copper mines to the Lewisohn Brothers of New York will do much to revive copper mining in the Santa Ritas. The company has unlimited capital, and the mines will be opened properly and worked to the best of advantage. The price is understood to be $35,000.

THE current number of the *Canadian Mining Review* crucifies "The Dominion Gold Mining and Reduction Co.," an English mining corporation of questionable standing, which has the audacity to ask of the Canadian Government a cash bonus of $10,000 and $1 per ton for ore treated at the company's "reduction works" at Rat Portage.

THE mint at Carson, Nev., will not be abolished. Director of the Mint Preston and the Treasury officials before the committee on appropriations gave it as their opinion that the mint was a needless expense to the Government, but Congressman Newlands induced the committee to recommend the usual appropriations to run it another year.

A CHICAGO dispatch says Ex-Gov. Van Arman, of Arizona, has succeeded in organizing a placer mining company at Chicago with a capital stock of $2,000,000, for the purpose of investment in a California mining enterprise, which makes a good stand-off to the organization in this city of a million-and-a-half California corporation to operate in the mines of Cripple Creek, Colorado.

TWO NEW PARTS of the Geologic Atlas of the U. S. are received, the Smartsville and Marysville folios, comprising the topography and the economic geology of portions of Butte, Sutter and Nevada counties, superbly produced with colored maps, similar in style and finish to those already received. The descriptive text is by Waldemar Lindgren and H. W. Turner, and is of accurate value.

GENERAL MANAGER KNIPPENBERG of the Hecla Consolidated Mining Company, Glendale, Montana, reports that for the year ending December 31, 1895, the company's mines at Hecla produced 4,919 tons of first-class, and 1,186 tons of second-class ore, at a total expense for labor, timbers, wood and charcoal of $112,591.79. The net profit for the year was $7,333. The cost of mining the first-class ore was $22.91 per ton.

UNITED STATES CONSULAR-AGENT MANYON at Johannesburg has made a report by cable to Secretary Olney, that the Transvaal Government shows every disposition to treat the prisoners leniently, and has a cordial and friendly feeling toward the official representatives of the United States. John Hays Hammond and the other American prisoners are now in Johannesburg awaiting legal proceedings.

THE Sierra county, N. M., *Advocate* calls attention to a trick, not uncommon in these days of leasing, to cover up an ore body or pocket while the mine is in the hands of the novitiate owner, report the mine as "no good," "too low grade," or "played out," and afterward get a lease on the property and stope out the ore which was clandestinely hidden. This is usually done by the connivance of an unscrupulous foreman, often with the innocent collusion of miners under him, who are not acquainted with the ore.

FORT STEELE, B. C., MINERS know what they want and are not slow to ask for it. They have memorialized their provincial parliament, asking to have it take up the abuses of claim jumping, delinquent partners' assessment work and repeal of the act taxing mineral claims until they become wealth-producing. They want a grub-stake law which will require persons grub-staking prospectors to record the same, which will avoid trouble afterwards, and are opposed to the granting of wholesale privileges to individuals regarding water rights, etc.

THE contest of A. P. Tinsley of Springdale, Wash., vs. the Northern Pacific is decided against the corporation, and the railway's selections is cancelled for sections 6, 11 and 15, township 30, range 38, Summit mountain range, the land being more valuable for mineral than for agricultural purposes. This is the first of the mineral land protests to be finally decided in that State; the case in question has acquired considerable notoriety, Attorney Cooney for the Northern Pacific testifying that, from a personal examination of the land, he did not regard it of value for mining.

STATE MINING INSPECTOR C. S. SHOEMAKER of Montana says that in his annual report he will recommend the use of indicators showing the engineer at what station the chairs are in, for all mines below a certain depth and working more than a certain number of men. The only mine these indicators are in use at the present time is the Drum Lummon. He will also recommend the abolishment of all crossheads in mines working below 200 feet deep where the work is of a permanent nature, and advocates the passage of a law prohibiting the use of buckets for hoisting purposes in any mine shaft of more than 200 feet in depth.

THE Pueblo, Colorado, *Opinion* states that tin ore has been found near the city in a very pure state and in vast quantity, and that tin smelting works will probably be erected in that city before the close of the year. The Georgetown, Colo., *Courier* says: "It is rarely that a month passes without the announcement of the discovery of tin ore somewhere in the State. If all these announcements are facts, tin is found along the base of the mountains in every county from Wyoming to New Mexico. Unfortunately these announcements are not backed up by the facts, and the Pueblo discovery may never be heard of again. The only authentic discovery of tin ore in Colorado was on Devil's Head mountain, in Douglas county. It occurs in small crystalline masses less than an inch in diameter, imbedded in quartz. A few isolated crystals have been found on amazonstone in the Pikes Peak region, but their identity has not been fully established. They may prove to be rutile, the oxide of titanium."

THE Park *Record* complains that Utah mining men and most of the papers are rapidly becoming gold blind, and the result is that silver camps are gradually falling away in the interest commanded at both the hands of capital and the leading papers. The big silver properties in operation are of course pushed along and are occasionally noticed by clippings from the local papers, but the many valuable prospects that have the making of good silver mines are seld om seen in print outside of the camp publications. At the same time a sample from a gold prospect showing a $1.50 assay is boomed by individuals and papers until the outside world is almost forced to believe that it is a fabulously rich mine. It is not right, and both papers and interested parties should exercise more care in their statements.

THE South Africa United States Consul Hollis in a report to the State Department from Mozambique says that seven or eight years ago the mining industry in the Transvaal was in about the same condition as to development as that in Mashonaland to-day. Now they are turning out $42,000,000 gold per annum. He also declares that mines in Mashonaland are being more rapidly developed than those of the Transvaal were in the early days. Mining experts tell him that the gold reefs in Mashonaland and Matabeleland are, on the whole, richer and more extensive than those of the Transvaal, and there is no reason why these countries, along with Manica Safola, should not soon rival the Transvaal in gold production. Consul Hollis seems to be badly misinformed regarding the aggregate yield and the other allegations.

AT the drilling contest at Leadville, Col., February 24th, C. O'Neal and M. Sullivan of Leadville, in fifteen minutes, sunk a drill 32 1-16 inches into the granite. J. McKee and T. Sullivan, when time was called, had made a hole 36 5-16 inches deep. Landers and Rabideau of Gilman scored 31 13-16 inches. Bradley and Hill of Silver Cliff drilled 27½ inches. Driver and Kreeger of Butte, Montana, made a record of 33 9-16 inches. M. Burns and J. Burns of Leadville drilled 37 1-16 inches and won first money. The record in Gunnison granite up to that time was 35½ inches, made in the same rock at Knights of Labor Hall a year ago by McKee and Dwyer. The next best performance in that rock was made at the Festival of Mountain and Plain last fall, when O'Neill and Sullivan put in the steel 35 5-16 inches. Leadville now claims the championship of the world.

PROBABLY no organization in the country is carried on with as little expense as the California Miners' Association. Apart from contributing their services gratis to the cause, the officers and members aid in forwarding the Association's interest in every way possible. Even the ordinary expenses of rent, fuel, etc., are not charged. Secretary Sonntag, who holds the only salaried position, pays his own expenses, furnishes an office, fire, etc., and draws no salary. So also with Jacob Neff, S. K. Thornton, Andrew Carrigan, W. W. Montague, W. C. Ralston, and, in fact, everyone connected with the organization. The California Miners' Association has no "organ," and makes little display or announcement, but is constantly at work in aid of the mining industry of the State without prejudice to any other State industry or calling. It is the exponent and central working force of the several County Mining Associations of the State, and upon the zeal and activity of the latter depends largely the success of the central Association and its Executive Committee.

REPRESENTATIVE ALLEN, of Utah, and Senator Cannon of the same State, have jointly introduced a bill to amend Section 2335 of the Revised Statutes by providing that "All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths in any State or Territory in the United States having an official seal, and all testimony and proofs may be taken before any such officer, and when duly certified shall have the same effect as if taken before a register and receiver of a land office. In case of contest as to mineral or agricultural character of land the testimony and proofs may be taken under such notice and regulations as the Commissioner of the General Land Office may prescribe, provided that the presence of rock (in place) or of deposits bearing gold, silver, cinnabar or other mineral shall be regarded as prima facie evidence that the land containing the same is mineral in character; provided, further, that in investigating the character of land, with a view of ascertaining whether it is more valuable for mineral than for agricultural purposes, evidence may be taken of mineral discovered and developed adjacent to such land, proof of which shall be corroborative evidence that the land in question is mineral in character; provided, further, that when the land is proved to be within a well-defined mineral belt it shall be deemed prima facie evidence of the mineral character of said land."

THE mineral land bill in the Senate is not in satisfactory shape. Those who understand the requirements of the situation are trying to get it through the Senate without any amendments, but its fate is uncertain. Senator Mitchell, of Oregon, proposes to tack on an amendment making its provisions applicable to Oregon. Senator Wilson, of the State of Washington, also announces his intention to have an amendment to the California bill applying to his State. While it is not to be assumed that these men want to kill the bill, yet Pacific Coast Senators are presumably acquainted with the fact that such proposed amendments will prevent all hope of its passage. In the 53rd Congress, when the Idaho-Montana bill was going through, California's Senators said they would like to have it amended to apply to California: it was pointed out by Idaho and Montana Senators that might endanger the passage of the bill, and that if California would wait, a bill could go through the 54th Congress. California miners waited, the promised bill is now on its passage, it got through the House, and can get through the Senate to receive the President's signature if it is given a show. As to the Oregon part of it, Congressman Herrman and Senator McBride of that State are now getting a separate bill through Congress creating a similar commission for our sister commonwealth. The railroad people are going ahead with applications for patents for thousands of acres of the very land under discussion. They are applying now for great tracts, at present advertised in Trinity, Shasta and Siskiyou counties. If the bill can emerge unamended from the Senate committee, it has an excellent chance of passing the Senate as it came there, and if the United States Senators mentioned have, as they profess, the interests of the miners at heart, they will aid in having it go through; otherwise, otherwise.

## The World's Greatest Gold Lode.

Written for the MINING AND SCIENTIFIC PRESS by DAN DE QUILLE.

To-day is in progress a more world-wide search for gold than has ever before been seen in all the ages that have passed since the history of our race began to be written. In times past there have been gold mining excitements in various countries, but they have mostly been confined to the region in which the mines were situated. Now, however, gold and gold mining seem to be that which is uppermost in the thoughts of the people of nearly all countries and nations, civilized and savage. All the world is out gold hunting. Fearless and enterprising men are at the front leading the way. The mountains and wilds of almost every known land on the face of the earth, however remote and savage, are being explored in search of the yellow metal. Neither the malaria of the tropics nor the ice of polar regions can turn back or terrify the invading armies of gold hunters. Everywhere bands of courageous and hopeful prospectors go "marching on."

The countries in which the greatest activity in gold mining is now seen are South Africa, America and Australia. The gold fields that have made most noise in the world—particularly in the leading cities of the Old World—in the last year or two are those of South Africa and West Australia. Australia, however, was only a fair second—South Africa was the grand field of European excitement until the late troubles at the Rand began. During the time of the opening of the mines of the Rand and other South African gold fields and the building up of great and flourishing mining towns times were bad and dull in the mining regions of the Pacific coast among those engaged in mining for the precious metals. Government had given silver a "black eye" and the demoralized miners who found their property wiped out and their occupation gone had not yet plucked up heart and turned their attention to mining for gold. Thus this country, which should have held the first place in the whole world in the production of gold, fell behind the new fields of South Africa, in which more activity was displayed and an almost unlimited amount of capital brought to bear. It is not because of the richness of the ores of South Africa that she has pushed a little way to the front, but because of the great number of mines opened, each of which is producing more or less gold. Along the edge of the Rand basin hoisting works and mills are planted two or three tiers deep.

Now, as it is the number of productive mines, big and little, that count in the grand total, the Pacific coast region must very soon surpass every known country in gold production. We have thousands and tens of thousands of veins of gold-bearing quartz in every State and Territory on the coast, from the borders of Mexico to the frozen regions of the Arctic, and as these are opened over thousands on thousands of square miles of fertile mineral belts, all that is now doing or ever can be done in the circumscribed area of the Rand basin will appear quite insignificant in comparison. What is wanted is a full awakening to the value of our possessions and the thorough development of the wealth of gold that lies hidden in our mountains. A start has been made in the work of opening up the gold veins of the Pacific coast region and, though it is little more than a start, already some wonderful discoveries have been made in all parts of the country, with a find of such rich mines at Cripple Creek, Colorado, that a boom has been started almost rivaling that seen in South Africa. At Mercur, Utah, another great auriferous deposit has been found that gives promise of building up a large and rich mining town. In both States there are probably lying untouched other gold belts that are equally rich—also in Idaho, Nevada, Arizona, and other sections—and to be equally productive only require the bringing to bear upon them of men and capital.

In every Pacific coast State and Territory are found veins of gold-bearing quartz that are wonderfully rich, also auriferous belts of considerable extent made up of systems of parallel veins, but the greatest field of America—indeed, of the known world, at the present time—is that of California. Just at present California may be a little behind one or two of the more famous regions of the world in gold production, but it is merely because of her long halt in the industry of mining—because of the many years during which capital was diverted from the mountain regions, when the development of mines almost ceased. The war upon the miners of California by the ranchmen of the valleys and the suspension of hydraulic mining under adverse decisions of the U. S. Circuit Court gave mining of all kinds a "black eye." With the defeat of the miners came an agricultural and horticultural boom during which no man of means thought of anything outside of speculation in ranch lands, orange groves, and irrigation schemes. Thus it happened that for a dozen years or more—nearly fifteen years—California was resting on her "ores," and her ancient honors. Men who had money left the mountains and went down into the valleys to participate in the boom in orange lands, while those who were left poor by the shutting down of the hydraulic mines eked out a subsistence by drifting in their gravel banks or by scraping over old bedrock. Here and there the old productive quartz mines in a few leading camps were at work, but little was anywhere being done for the development of new mines. Mining was under a cloud and at a discount. Groves of golden oranges for a time drove from the minds of men visions of nests of golden nuggets. The wealth of the mountains was sacrificed to the wealth of the valleys.

Recently, however, hydraulic mining, under certain conditions, has been resumed and in places a return of the prosperity of the olden days is beginning to be seen. The development of the quartz veins of the country has been commenced and already there is to be seen quite an awakening to the value of the golden stores of the mountains, so long slighted and almost ignored. At several points there is considerable activity in prospecting, resulting in the opening of new and valuable mines, but in hundreds of other places throughout the State where the indications are equally promising the lodes lie undeveloped. Also there are probably as many veins remaining to be discovered as are anywhere seen on the surface. There is no lack of mining ground in California. Within the borders of the "Golden State" alone there is room, in the quartz mines, and the hydraulic and drift diggings, for every miner of the precious metals now engaged in the industry on the Pacific coast. The great mother lode, which was formed contemporaneously with the upheaval of the Sierra Nevada range, extends in an unbroken line along the western slope for a distance of over 120 miles. It is not a single lode but a system of parallel veins forming a mineral belt in places twenty-five to thirty miles in width. Through this auriferous belt runs that which is known as the mother lode. It is the backbone of the system of parallel veins and by certain "ear-marks"—peculiar characteristics found in the wall rocks—it is traceable along nearly the whole western slope of the Sierra Nevada range. Through county after county it runs—Tuolumne, Calaveras, Amador, El Dorado, Placer, Nevada, Sierra, Plumas, Shasta, to where the Sierra Nevada and Coast ranges unite in Siskiyou, up near the Oregon line—constituting the richest, strongest and greatest single deposit of gold-bearing quartz in the known world. Along the mother lode, between Mariposa and Siskiyou, there is room for fifty such gold mining camps as that of Cripple Creek.

For years the great auriferous region has lain fallow, but the day is not distant when the whole belt along the course of the big central lode will swarm with miners. To-day in every county through which the big lode passes there is room on it and its accompanying veins for thousands of miners, while in several counties to the northward there still remains to be opened and worked, by hydraulic or other process, many rich gravel deposits, with miles on miles of the channels of dead rivers under the lava-capped mountains to be opened up and drifted out. The prevailing opinion in the world at large is that the placers—the auriferous gravel deposits—of California were worked out years ago. This is a mistake. Most of the shallow diggings have for some time been exhausted, but in the big, deep gravel deposits and in the channels of the ancient rivers beneath the mountains there still remain hundreds of millions.

Experienced prospectors always expect to find large and rich veins of gold-bearing quartz somewhere above rich and extensive placer diggings, the rule being the bigger and richer the placers the bigger and richer the vein or veins from which was thrown off the gold found below in gravel deposits. This being the case, nowhere in the world can there be found a more promising region in which to prospect and mine than that along the line of the mother lode, below which has been gathered more placer gold than from any other single gold field in the known world. When hundreds of millions in gold was dislodged from the croppings through weathering and erosion what must have been left behind in the veins themselves? There must lie in the lodes a still greater store of wealth than that brought to light by the chance action of the elements.

However, there is no uncertainty in regard to either the richness or permanence of the great California lode. At several points it has been sufficiently well prospected to show that it is everywhere fertile and reliable, though gold may not everywhere be found on the surface. At Grass Valley, Nevada City, Sonora, Angels, and other places, mines have been opened on the big lode that have yielded millions and are still paying as well as at first, some much better than when first opened. The fact that some of these mines have been worked from thirty to forty years and have attained a depth of over 2000 feet, without showing any indications of exhaustion, tells well for the permanence of the big vein. There is no reason why the lode may not be worked to the depth of 5000 feet, with the improved apparatus of all kinds now available.

Although the big lode is paying so richly and is so thoroughly prospected at a few old camps widely separated, there are in every county miles on miles along its course where little or nothing is being done in the way of opening mines upon it. In El Dorado and other counties to the northward great stretches along the vein are lying idle, though good prospects can be obtained at the very surface. Such claims as are located are mostly held by men who are able to do little more than the necessary assessment work; they were quite unable to procure machinery with which to do real development work. Along the range are many mines on which some work was done in the early days, and most of these lie much as when abandoned years ago.

In all the world there is no better place in which to mine than on the big mother lode gold belt of California. No richer mines can be found in any country on the face of the globe; the gold field lies in the midst of civilization; the climate is perfection; provisions of all kinds are abundant and cheap, and mining supplies can be easily and cheaply obtained. The man who runs away to South Africa, to frozen Alaska, or to the malarial camps of South America, while there is such a field for prospecting and mining here at home in the heart of California, is "wild as an Apache."

The big gold belt of California has a great advantage over South Africa, Australia, and most other gold fields of the world in its abundant supply of timber and water. Immediately along and above the lode are the inexhaustible forests of the Sierra Nevada range, from which may be cheaply obtained mining timbers and fuel. Then all along the range are creeks and rivers that rush down to the west to the great valley regions. Among the rivers may be mentioned the Feather, Yuba, American, Mokelumne, Stanislaus, Merced, San Joaquin and Kings. There are some smaller rivers and many large creeks and canyons that carry considerable volumes of water. All these rivers and creeks, on their way to the valley regions below, cut across the line of the mother lode, and as they have their sources in the high Sierras they are, in their downward course through the mountains, filled with falls and rapids, therefore an abundance of fall may be obtained on all the streams of the region for driving machinery by water power. By means of electrical transmission this power may be used in running the machinery of the mines and mills along the big lode. Indeed, electrical apparatus is already in use at some points, and much machinery is being run by power electrically transmitted. Eventually great numbers of dynamos will be strung along the rivers and creeks, and wires will convey power all about the mountains, making it available in places to which it would be impossible to carry water, for use in driving machinery. That he was unable to make water run up hill was always a matter of regret and humiliation to the miner of the early days; now, however, by the aid of electricity, we are able to lift a big water power from the bed of a river and set it going hundreds or thousands of feet above on a mountain top.

Had the great lode been made and planted to order, it could not have been more advantageously placed for cheap working. Then, with the new and powerful explosives, the machine drills and air compressors for use underground, improved winding gear for handling the rock, improved pumps for handling the water, and improved ore-reducing apparatus and concentrators, with new and cheap processes for the extraction of the precious metals from the pulverized quartz, hundreds of veins that could not be touched by the early miners may now be profitably worked. Mining ground on the mother lode will never be worth less than at present. The immense value of this greatest of all gold-bearing veins is just beginning to be understood, notwithstanding the millions on millions that have been taken out of it from mines opened on it here and there in years past, and the millions that it is still regularly yielding. Whoever now secures a paying mine on the great California mother lode may consider himself fixed for life; he will have a piece of property it will do to "tie to."

Although California has produced over $1,300,000,000 in gold, the source of this immense yield of the yellow metal up in the big gold belt along the mother lode has only here and there actually been tapped in accordance with the rules and methods of modern scientific mining. In other places, for miles on miles, where touched at all, it has merely been scratched over on the surface. Had the English a giant lode such as this of California in South Africa, Australia, or in any of their possessions, as well proved up in value as it is, both by the hundreds of millions taken from the gravel deposits below its croppings and the millions on millions that have been taken and are still being taken from the lode itself at a few points—had the English such a gold belt anywhere, it would be all town from end to end and in every part would be filled with swarms of people. The Comstock was packed with people in the bonanza days, though the productive portion of the vein was only about two miles in length; the mother lode would make fifty Comstocks. It may be thought that paying mines can only be found in the few places where the lode is now being successfully worked, but the immense amounts of gold mined in the whole tier of counties through which the big vein runs shows that it sent down to the placers about as much gold in one place as in another. At the south end Tuolumne county has yielded about $220,000,000; Nevada

county, toward the center, about $250,000,000, Sierra county, to the northward about $200,000,000, and other counties in about the same proportion. These yields show that the great lode is alive and fertile through its whole course.

Outside of the main mineral belt of the mother lode are, in many places, independent systems of gold-bearing veins and many of these contain fine, paying mines. To the southward, in the southern counties, even in the desert regions, some wonderfully rich mines are being discovered and opened. In almost every part of California, in the mountains and foothills, gold-bearing quartz veins are found, and many of them constitute fine, paying properties.

To-day, a man may find any kind of mining he desires to engage in. Beginning with Placer county he may find big drift diggings all along up to Siskiyou, the ancient river channels beneath the lava-capped mountains, in many places, as Nevada, Sierra, Plumas and Trinity counties, being almost untouched. In Siskiyou, along the Klamath, are big hydraulic mines and also drift mines. Immense tracts of deep placer ground yet remain to be washed by hydraulic process, which is freely permitted along the Klamath. In this region are also fine, paying veins of gold-bearing quartz. Many big foreign companies—French, English and German—are getting in here and buying up immense tracts of mining ground. They go for placer, drift, quartz—any kind of mines shown to be paying well.

In Siskiyou county is a region which this country should look after. It is an old lake basin which contains an auriferous conglomerate such as is found at the Rand in South Africa. The gold found in this formation is of the heavy, smooth variety, such as is obtained from the channels of the dead rivers. The deposit is very extensive. The western rim is seen to the east of the town of Yreka, and it has been traced north on that side a distance of twenty-five miles and there it enters what is known as the Cottonwood basin, in the southern part of Oregon. The conglomerate formation doubtless extends into the Cottonwood basin. The gold is found in a stratum of blue gravel which underlies the conglomerate. Parties who have examined this deposit say it is of the same character as that of the Rand. There is in this section of country a small system of lakes and it may be that the basin containing the auriferous conglomerate represents an ancient lake that was filled with lava-like material by some volcanic convulsion, the country being full of old cones and crates, or it may have been filled up by glacial action, as evidences of glacial erosion are abundant in all that region. Be this as it may, gold is gold wherever found, and here is evidently an immense auriferous deposit that is worthy of critical examination by the best experts. We may have here at home a greater and richer golden basin than that which built up the big South African town of Johannesburg.

## A Big "Big Tree."

TO THE EDITOR:—The Puget sound country is famous for its "big trees." But it is not generally known how very large some of the biggest of those "big trees" really are.

In the city of New Whatcom, a seaport town and the county seat of Whatcom county, the northwest county in Washington and in the United States, is erected on the outer edge of the sidewalk on one of the principal street corners an immense slab or section of one of Washington's biggest red fir trees.

The slab, being cut directly across the diameter of the tree, like a butcher's cutting block, is set on edge, the greatest diameter extending upward, the bark all on about its entire circumference.

A stranger naturally feels inclined to walk up to the slab and measure it by his height, and is surprised to find that it would take another man standing on his head to extend to the top of it. Then he steps back a pace and reads the following inscription, neatly painted on a board attached to the face of the slab:

"Tree from Loop's Ranch Forks, Whatcom county, Washington.

"The tree was 465 feet high, 220 feet to first limb, 33 feet 11 inches in circumference at the base.

"If sawed into lumber, would make 96,345 feet.

"Would build eight cottages, two stories high, seven rooms each.

"The tree is about 480 years old, according to the rings.

"If sawed into inch square strips, would fill ten ordinary cars.

"The strips would reach from Whatcom to China."

The section shows the tree sound to the core.

HENRY W. BROWN.

Custer, Wash., Feb. 24th, '96.

FOURTEEN MILLION FEET OF LUMBER will be required to double deck the stock yards at Chicago. The first contract for supplying a million and a quarter feet was let recently. Work will be commenced in April.

WE do not see the moon as it is, but as it was a second and a quarter before. Were the moon dispersed into atoms, we should still see it entire and perfect for more than a second.

## Mining Titles on Spanish Grants in the United States.*

BY R. W. RAYMOND.

The "law of the apex," with its vague and impracticable "extra lateral rights," is defended—if it is defended at all—on the ground that it is required by the peculiar conditions of the mineral deposits or of the mining industry in those States and Territories in which it is operative. As I have repeatedly attempted to show, in papers read before the Institute, and most recently in an article on "The Relation of the Mining Law of the United States to the Development of Its Mineral Resources," published in Mr. Rothwell's *Mineral Industry* for 1894, there is now (whatever may have been the case formerly) no peculiarity of conditions in the regions referred to which warrants the subjection of their mining industry to a burden so vexatious and injurious as this law imposes. I have called attention to the absolute freedom from expensive litigations over mining titles enjoyed by all other States in the Union and all other regions in the world where the absurd extra-lateral right does not exist. Certainly, it will not be contended that the metalliferous deposits of our public domain in the West are radically different in kind or form from those which are successfully exploited elsewhere under the operation of the simple principles of common-law boundaries. Even in the territory still afflicted with "the law of the apex," that law is not applied to coal mines, though in some cases coal seams are mined which dip more steeply than many of the most productive "lodes." It might be supposed that the absence, in such cases, of all litigation concerning the boundaries of mining rights would be instructive and suggestive to the owners of metal mines in the same regions, leading them to desire a similar certainty of ownership for themselves.

Yet it remains true, on the whole (though for a smaller portion of the citizens than formerly), that proposals for a change in the existing law are unpopular in the West. The opinion of intelligent lawyers, I think, has come very generally to favor the adoption of the vertical boundaries which work so well everywhere else in the world. But lawyers, as such, have no direct interest in putting an end to the system which gives them so much profitable business; and although I feel sure that the members of that profession, if consulted, would frankly express the view I have ascribed to them, it is scarcely to be expected that they should engage actively in the agitation of the subject. The late Mr. Symes of Denver, entering Congress as a Representative from Colorado, after a long experience as counsel in mining litigation, introduced in the House of Representatives a bill providing for the future location and sale, on the public domain of the United States, of mining claims with vertical boundary planes, and encountered, as a consequence, the vehement disapproval of his constituents, or, at least, of such of them as chose to express themselves through mass meetings. The bill failed, as had failed also the earlier bill to the same effect, framed by the Public Lands Commission in 1880. In both instances the cause of failure was the hostility to the proposed reform exhibited by the communities affected. It is not my purpose here to analyze in detail the sources and reasons of this hostility; but I may be permitted to offer a very general statement.

We my roughly divide the Western communities in which this sentiment is manifested into three classes: Those who own mines; those who hope to own locations of speculative value; and those who profit indirectly by the mining industry. The first class would not be affected by a change in the law, since such a change would not affect vested rights. The second class, comprising a much larger part of the population, is afraid that the proposed change in the law would diminish the chances and rewards of the prospector; and the third class, impressed by this attitude on the part of the second class, and feeling that anything which hinders activity in prospecting will react unfavorably upon general trade and the value of real estate, gives at least a passive support to the demand of the prospectors.

We have, then, to deal with the feeling of the prospectors as the true kernel of the difficulty; but in this class must be included not merely the individuals who are, at any given time, ranging the mountains in search of promising outcrops, but also those who are, as partners, paying their expenses ("grub-staking" them), and also those who are earning wages, but who intend to go prospecting when they have saved enough to furnish them for such an excursion. To take the State of Colorado as an example, I think I may say that almost all the miners working for wages are also from time to time prospectors, and that almost all the merchants are from time to time supporting prospectors or acquiring property in undeveloped mining claims, so that the interest of the prospector is really shared by a large part of the population.

I must include in this class also (although they are not worthy to be ranked with honest explorers) those who make locations on the outskirts of valuable claims for the express purpose of piracy or blackmail, and those who support them by furnishing for vexatious litigation the means which would not be forthcoming for honest mining. These people thrive on the ambiguities and complications of the mining law. If it were made simple and clear, their occupation would be gone. There is no doubt, therefore, on which side they stand. But disregarding them, let us consider the interest of the bona fide prospector.

Since it happens but seldom that a mine pays "from the grass-roots down," the prospector must be aided, in most instances, with the capital necessary for development. Even when his own labor in prospecting pits and drifts is repaid by the ore incidentally produced, the time soon comes when capital is needed for operations on a large scale. As a practically universal rule, prospectors work in the hope of selling their claims or interests therein. If the law should be so changed as to give them claims twice as large as they can now locate, but, at the same time, forbid transfer of title by sale, the business of prospecting would be ruined. Everybody knows that. Moreover, the sellers of mining claims to non-resident purchasers have found out that U. S. patents are required to make the titles acceptable. Everybody knows *that*, too, and everybody has submitted to it. But under the present law, the United States patent does not give a satisfactory title. It is "iron-clad" and invulnerable as to what it actually grants, but what that is it does not set forth, so that a purchaser can know what he is buying. The consequence is that, by reason of this cloud upon title, mining claims cannot be sold so easily or at as good prices as if the title was more completely defined. This is a distinct injury to the prospector more than to any other party concerned. The other victims have their escape, if not their remedy. The Eastern or English company which has bought a good mine, only to lose its profits in litigation, can buy mines in some better-governed country; but the prospector who finds it harder and harder to secure foreign capital, can only give up his barren trade. Just now immense sums are forthcoming for the purchase of mines in South Africa and West Australia. Can there be any doubt that the investment in those regions of hundreds of millions, without a single instance of litigation over boundaries, such as blights our West, has been an object-lesson of much significance to English capitalists? Can there be any doubt that if the Witwatersrand had been located in Colorado, instead of South Africa, there would have been, long before this, a crop of lawsuits over apexes, side-lines, strikes, dips, faults, vein-matter, assays, theories of formation and subtle expert distinctions which would have choked the new industry and corrupted the atmosphere surrounding it?

Such considerations ought certainly to have weight with our prospectors; but they are short-sighted, and need to have object-lessons nearer than South Africa or West Australia, or even the Carolinas and Georgia, or Michigan and Wisconsin, or Missouri, or British Columbia. I am very glad, therefore, that the practicability of the "square location" can be illustrated in the heart of Colorado.

Under the famous California decisions, confirmed by the U. S. Supreme Court, a patent from the United States, issued in confirmation of a land grant from the former Government of Mexico, invests the patentee with the ownership of the precious metals which the land may contain. The owners of these old Spanish grants have, therefore, the power to make such regulations for the sale or working of mines as they may deem advisable. In most cases, I believe, they have followed the apex feature of the United States law, fearing to arouse local prejudices by departing from local usage. This is the case, if I am not mistaken, upon the Cerrillos and Maxwell grants in New Mexico. But the proprietors of another similar estate have adopted what seems to me to be a wiser policy, as the following proclamation shows:

NOTICE TO MINERS AND PROSPECTORS.

The western slope from the summit of the range of mountains forming the eastern boundary of the San Luis valley, and extending southerly from a point in the neighborhood of old Fort Garland, into New Mexico, is included in what is known as the Sangre de Christo grant, and is *patented* land.

Beginning at a point nearly opposite the town of San Luis, the county seat of Costilla county, Colorado, this range of mountains, to the summit thereof, and in some places beyond the summit, and to the boundaries of the Maxwell grant on the east, is the property of the United States Freehold Land and Emigration Company, the title of said company being perfect and undisputed. Said range of mountains, from specimens of float ore, found from time to time, is known to contain numerous mineral-bearing veins and lodes, and is believed to be rich in precious metals.

The United States Freehold Land and Emigration Company now throws open to prospectors its lands in said range, in Colorado and New Mexico, upon terms more reasonable than those offered by the United States Government. (See Mining Regulations below.)

The country is very accessible, and may be easily reached by good roads from Garland, on the Denver and Rio Grande railroad. For particulars, apply to

E. C. VAN DIEST, Manager, San Luis, Colorado.

*Mining Regulations for Prospectors and Intending Locators Upon the Lands of the United States Freehold Land and Emigration Company.*

Notice is hereby given that the lands of the United States Freehold Land and Emigration Company, situated in the county of Costilla and State of Colorado, and county of Taos, Territory of New Mexico, are thrown open to prospectors for the discovery, location and actual ownership of mineral-bear-

*Read at the Atlanta meeting of the American Institute of Mining Engineers.

ing veins, lodes and deposits (except such as are chiefly valuable for coal and iron), under the following regulations:

SECTION I. The discoverer of any mineral-bearing lode, vein or deposit within the limits of the estate now owned by the company may locate a claim upon said vein, lode or deposit, 1500 feet in length along the supposed course of said vein, lode or deposit, by 150 feet on each side of the point of discovery of such vein, lode or deposit, by posting a notice at the point of discovery, giving the name of the claim, the number of feet claimed in each direction from the point of discovery, the name or names of the locator or locators, and the date of discovery, and by filing a copy of such notice in the office of the company at San Luis, Colorado. (No fee for filing such notice will be charged during the years 1891 and 1892, but on and after January 1, 1893, a fee not exceeding three dollars will be charged for each notice.) Blank forms of notices will be furnished to intending locators free of charge.

SEC. II. The extensions for 1500 feet in length by 300 feet in width along the vein, lode or deposit, each way from the end-lines of every claim so located, shall remain the property of the United States Freehold Land and Emigration Company, and shall not be subject to location, under these regulations, but may be negotiated for and purchased upon terms mutually satisfactory to the company and the purchaser.

SEC. III. The locator or locators, upon filing the notice of their claim provided for in Section I, shall, within sixty days from the date of such filing, determine as nearly as may be the extent and course of the vein, lode or deposit claimed by them, and mark the bounds of the claim upon the ground, by stakes or other readily distinguished monuments, one of such stakes or monuments to be set as nearly as may be at each corner and one at the center of each side-line of the claim, and shall, within the time aforesaid (60 days), file in the office of the company at San Luis, Colorado, a plat of the said mining claim, showing the supposed course of the vein, lode or deposit, and the number of feet claimed along the strike of the same in each direction from the point of discovery, which plat must connect said mining claim with the surveys of the company, or with some locating monument to be established by the engineer of the company. (No fee will be charged for this filing.)

SEC. IV. Except as modified by the consent of the company, or by prior contracts or conveyances, each claim shall be 1500 feet in length by 300 feet in width. The side-lines of the claim must be parallel with each other, and except as provided above in this section, must be equidistant from the point of discovery, but need not be equidistant from the center of the lode, vein or deposit. The end-lines must be parallel with each other.

SEC. V. Within one year from the date of filing the notice of location in the office of the company, as provided in Section I, the locator or locators shall do at least one hundred dollars' worth of work upon the lode or vein, and shall make written application to the company to purchase said mining claim and have an official survey of the same made by the company's surveyor, and shall deposit in the office of the company fifty dollars in payment for such survey.

SEC. VI. Upon completion of the survey provided for in Section V, the company will execute a deed to the surface ground of the mining claim, together with all the minerals contained therein (except coal and iron, as aforesaid), upon the payment to the company of ten (10) dollars per acre for the land contained in said claim, within thirty days from the completion of said survey.

No right to mine beyond the boundaries of said claim (either side-lines or end lines) will be given.

SEC. VII. Priority of location shall govern all awards, but in case of adverse claimants to the same lode, vein or deposit, the company will not undertake to adjudicate the rights of the respective claimants, but will recognize such rights as may be successfully established in the courts, in proceedings between the claimants, provided these regulations have been complied with by the successful litigant.

SEC. VIII. Failure on the part of any locator or locators to comply with any of the foregoing regulations shall work a forfeiture of all rights, and shall be deemed an abandonment of the mining claim.

SEC. IX. These regulations shall not be construed so as to prevent the company from disposing of its unlocated lands as it may deem fit.

UNITED STATES FREEHOLD LAND AND EMIGRATION COMPANY.

Mr. E. C. Van Diest, the manager of this estate, who is a member of the Institute, writes me that two years' experience under these regulations has shown them to work admirably. More than three hundred claims have been located under them, and Mr. Van Diest says that he has met but two persons who objected to the rules. The company provides forms of location certificates and records them in its office. Moreover, the company, as I am informed, maintains a map, showing at a glance what mining claims have been sold or are held under location. When any claim has been forfeited (under Section VIII) prior to its final sale, the map is altered accordingly. I understand that the blue prints of this map are made monthly and furnished to applicants, so that any person desiring to make a mining ocation can ascertain at once what land is free for the purpose. This simple system is in striking contrast with the blundering confusion of the United States law. According to that law the making of a mining location, in compliance with certain rules (which include no notice whatever to the officers of the United States, but only a record with a local State, territorial or county officer, or a "mining recorder"), immediately withdraws from the public domain the land concerned. Not until proceedings for United States survey and patent are commenced (and that need never be done if the locator prefers to hold by annual "assessment work") does the United States Land Office receive any notice of the location; and the maps of the Government to-day represent hundreds of thousands, perhaps millions, of acres as belonging to the public domain which have, in fact, been withdrawn from it and are held by parties unknown. Uncle Sam doesn't know what he has to sell. All he can do for a proposing purchaser is to smile feebly and say: "So far as I know, the land belongs to me. But you must advertise for ninety days, and if nobody turns up to claim the land I will assume that it is mine and sell it to you."

In other words, the United States surrenders to locators on its domain rights and titles of which it makes no record. Such record as there is is made and kept by officials not in its service.

Some of the provisions in the regulations quoted above seem to me unnecessary. I do not see, for instance, why the side lines of a claim must be equidistant from the point of discovery, especially as that point is not required to be on the "apex," and the side lines need not be equidistant from the center of the deposit or parallel with its course. The point of discovery is purely an accident. Why not sell locations of any desired size or shape up to a certain maximum area? It must be observed, however, that the company does, in fact, reserve the right to consent to modifications of form.

The final conveyance is made by warranty deed; and I do not hesitate to say that such a deed, under the circumstances, conveys a better title than can be got by United States mineral land patent in other parts of Colorado. It need scarcely be added that no lawsuits have yet arisen on the Sangre de Christo grant over the boundaries and nature of mining rights. Two disputes, which would doubtless have developed into promising suits under the United States mining law, were settled by simple reference to the records in the office of the company.

It is to be hoped that the experiment thus inaugurated may result in a productive industry, all the profits of which shall go to miners, teamsters, smelters or millmen and stockholders, without any deduction for lawyers, judges, juries and experts; and it would be pleasant to see the owners of other land grants take courage from this example, and deliver forever from the nuisance of extra-lateral rights the mineral lands which they control.

## Notes on Gold Milling in California.

NUMBER XVI.

By E. B. PRESTON, M. E., Field Assistant State Mining Bureau.*

*Transmission Ropes and Belts.*—Six hundred feet best manilla or cotton rope, 1½ inches in diameter, to drive battery line shaft.

Two hundred and fifty feet best manilla rope, 1½ inches in diameter, to drive rock-breaker line shaft.

One hundred and fifty feet best manilla rope, 1 inch in diameter, to drive concentrator line shaft.

Two hundred feet best rubber belting, 16 inches by 5-ply, for batteries.

One hundred and eighty feet best rubber belting, 10 inches by 4-ply, for rock breakers.

Thirty-two feet best rubber belting, 7 inches by 4-ply, for cleanup barrel.

Sixty-five feet best rubber belting, 6 inches by 4-ply, for batea.

Thirty feet best rubber belting, 6 inches by 4-ply, for concentrator shafting.

Four hundred and twenty feet best rubber belting, 3 inches by 4-ply, for concentrators.

Thirty feet best rubber belting, 3 inches by 4-ply, for cleanup pan.

BUILDINGS AND ERECTION OF MILL, ETC.

*Stonework.*—All foundations and retaining walls to be built of large stone, properly banded, and well laid in cement mortar, composed of ten parts good, clear sand, two parts good quality of lime and one part best Portland cement, special care being taken to keep all dirt or clayey material excluded, all exposed faces of retaining walls to be well painted up and finished with the same material.

*Ore Bins.*—Mudsills to be made of 12x14-inch timbers, laid flatwise; foundation posts to be made of 14x14-inch timbers; sills, posts and caps for ore bins proper to be made of 12x12-inch timbers, the posts to be boxed one inch into the sills and caps; braces for incline bottom to be made of 10x12-inch timbers; supporting braces to be made of 8x12-inch timbers. All planking to be three inches thick and lined throughout with one-inch boards to break joints over the planks.

*Battery Frame.*—Mudsills to be made of 14x16-inch sugar pine, or good yellow pine free from sap; to be well bedded in concrete, which must be put on the clean bedrock. Linesills to be made of 12x16 and 20x16-inch sugar pine or yellow pine, of good quality, to be well bolted down to the mudsills.

Mortar-blocks to be made of two pieces each, to be 30 inches thick and wide enough to fill space between the linesills and battery posts; all to be sized and well fitted. The timbers for mortar-blocks are to be accurately fitted together and secured with six 1-inch bolts, and two oak keys, 4 inches wide by 5 inches thick at the point and 6 inches at the head. Keys to be accurately fitted and firmly driven. Blocks to be sized and finished above the floors.

Yokes to be made of 10x10-inch timber, well fitted and bolted to the linesills and battery posts.

*Bulletin No. 6, California State Mining Bureau.

Battery posts to be made of 12x24 and 20x24 inches, good quality pine timber, to be dressed all over, and bolted down to the linesills with 1-inch joint bolts, the large posts to be made with double tennon on the bottom. The knee beams to be made of 12x16-inch timber, dressed all over. The knee posts to be made of 12x16-inch timber, dressed all over. The stringer on top of the knee posts to be made of 12x16-inch timber in two pieces, to be spliced with a ship splice 3 feet long, stringer to be dressed all over. Knee posts to be framed into stringer with double tennons; outside stringer at end of the knee beams to be made of 8x12-inch timber in two pieces, spliced with ship splices in center 3 feet long and to be dressed all over.

Bottom guide girt to be made of 12x16-inch timber, dressed all over, one piece for each twenty-stamp battery, and to extend past the outside posts 12 inches; the top girt to be made of 12x14-inch timber, dressed all over, and made the same length as the lower ones; all braces to be made of 8x12-inch timber, dressed all over, and framed with double tennons; no keys are to be used in braces or guide girts, but they must be accurately fitted without.

All boxing about battery frame to be ½-inch deep, and where braces or knee beams are smaller than the timbers they frame into, they must be housed in ½-inch deep; *i. e.*, the timber must not be boxed out clear across.

The cam-shaft is to be set 4¾ inches from the center to the center of the stems.

A 2-inch plank floor is to be put on top of the knee beams, which is to be planed on the under side; also, a 2-inch double board floor to be put in back of the battery, on about the same level as the knee beams.

The whole battery frame to be painted with two coats of light-cream paint, properly mixed with oil, and the wood pulleys and guides to be painted blue, the ironwork to be painted black. The out-board bearing frame to be made of 12x16-inch timber, planed all over, well framed and bolted together, and anchored to a solid stone foundation, as shown in plan, and to be painted same as battery frame.

*Frame Work.*—Ore-house main frame is to be made of 8x8-inch timbers throughout, with 3x6-inch girts and studding.

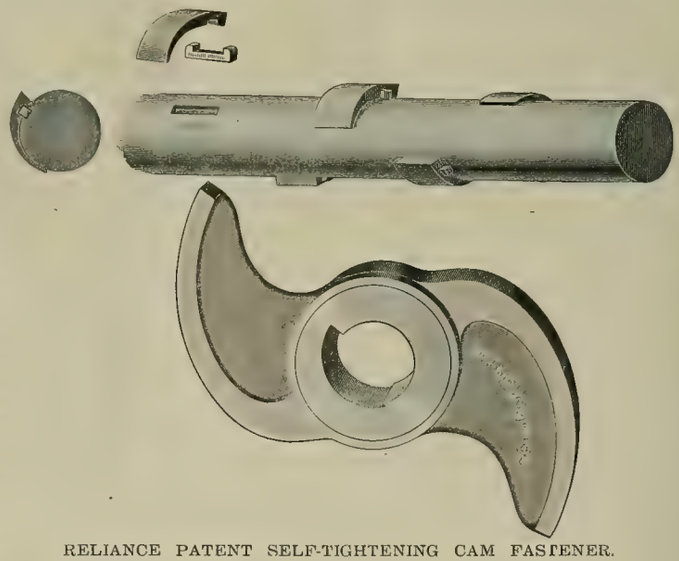
Battery and concentrator rooms frame is to be made of 8x10-inch posts and chords, 6x10-inch sills, 8x8-inch principal rafters and straining beams, 4x8-inch truss braces, and 3x6-inch girts and studding.

Clean-up, sulphuret, and water wheel rooms main frames are to be made of 8x8-inch timbers, with 3x6-inch girts and studding.

*(To be Continued.)*

## The Reliance Patent Self-Tightening Cam Fastener.

Herewith is illustrated the Reliance self-tightening cam fastening, which consists of a wedge curved to fit the circumference of the cam shaft, held in position on the shaft by a double-headed key. The key is to locate the curved wedge in its proper position while the cam is tightening itself. It does not take the place of an ordinary key. The back of the wedge is curved to a true involute which coincides with the curve of the recess in the hub of the cam; and when in position, the strain is distributed equally over the whole surface of the wedge. The recesses in the cam hub are all cut alike, the position of the cam being governed by the position of the wedge on the shaft, therefore cams for renewal can be sent from the shop finished.



RELIANCE PATENT SELF-TIGHTENING CAM FASTENER.

The manufacturers are The Edward P. Allis Company, Milwaukee, Wis. Branch office, 9 Fremont St., San Francisco, Cal.

# Electrical Progress.

## A New Electrical Current Rectifier.

Written by Consul General Frank H. Mason

Extension of incandescent gas lighting, its cheapness and brilliancy, added to the possibility of changing its tint by varying the combination of oxides in the incandescent mantles, have checked the adoption of electric lighting in Germany, and forced electrical companies to seek new outlets for their energy in the directions of motive power and electrolysis. The central electrical system at Frankfort has proven technically successful, but private consumers generally complain of its high cost, and it is already evident that the financial success of the enterprise will depend in future upon the more general adoption of electricity for motive and electro-chemical purposes.

These conditions lend interest to a device known as Gleichrichter, or rectifier, invented by C. Pollak, a Frankfort engineer, which solves the difficulty of converting an alternating into a direct electrical current with a loss of but a trifling percentage of its energy. In nearly all cases where the central generating station is located at any distance exceeding a mile from where the electrical energy is to be finally used, alternating currents are preferred as more available than continuous ones, for the reason that the former can be readily condensed to very high pressures and in that condition transmitted to any reasonable distance, and then reduced to low working potential by stationary transformers. A continuous current, on the contrary, can be reduced only by the use of a working converter, running in synchronism with the central generator—an additional machine which greatly increases the cost of the plant. For this and other reasons, alternating currents are usually produced at modern power stations in Germany, and while equally available for incandescent lighting and for motors which can be run synchronously with the dynamo, they are distinctly inferior for arc lighting, and can not be used at all for electrolysis or charging storage batteries.

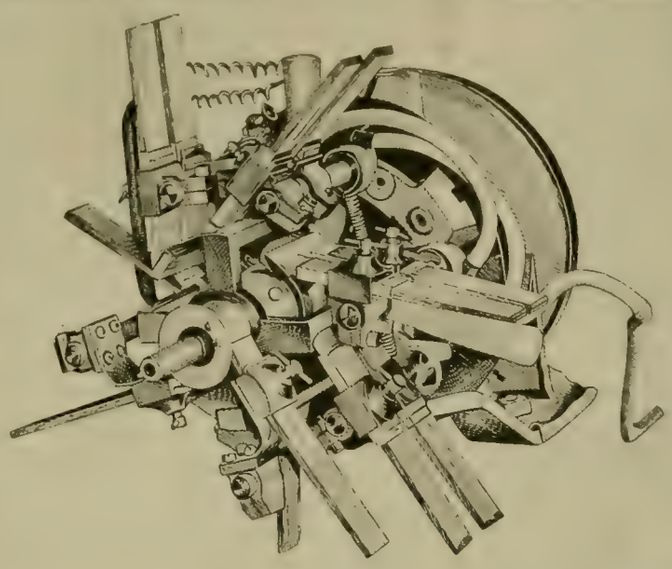
The invention herein described bridges, therefore, an industrial difficulty which has become more and more serious with each step of progress in transmitting electrical energy over long distances from the place of generation. Electricity is supplied at Frankfort from the municipal central station at 7¼ pfennings (a little more than 1¾ cents) per unit, in the form of single-phase alternating currents of 3,000 volts. At the accumulator works, where the Pollak system has now been in successful operation for more than a year, this current is reduced by transformers to 65 volts and then rectified—that is, converted into a direct current by the new device, which may be described briefly as follows:

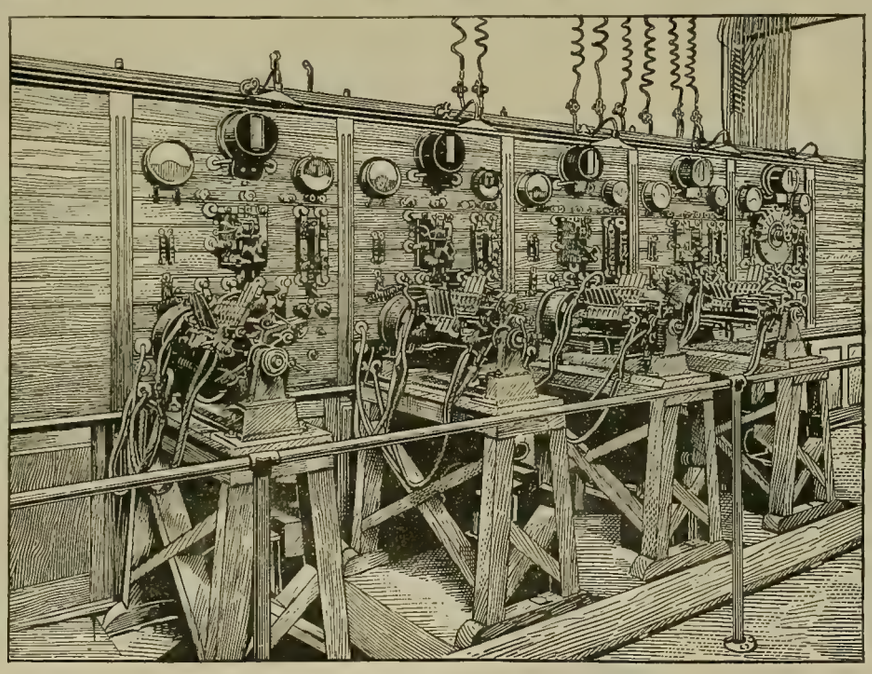
It is well known that every continuous-current generator produces to a greater or less extent alternating-current impulses, but in such machines this tendency is corrected by the commutator, which is fixed directly on the armature shaft and imparts to the entire current a uniform direction. The problem was, therefore, to devise a plan by which a commutator, located at any distance from the dynamo creating alternating currents, and turning synchronously therewith, should have the same effect of turning the entire current in a uniform direction—in other words, converting the alternating currents after they have passed into the outer circuit into a direct one. For this purpose, the present invention employs two collector rings and two rows of commutator bars, the latter insulated from each other and the shaft and alternately connected with the rings. The alternating currents, having been received from the central station and reduced to 65 volts as above stated, enter the machine through brushes resting on the rings. The direct current is taken off by four more rows of brushes arranged adjustably, the first and third and the second and fourth rows being connected with each other.

The rectifier is turned by a sychronous motor of small dimensions, which receives its alternating currents, likewise reduced to 65 volts, from a small special transformer. The outer circuit of the continuous current which passes from the rectifier includes an automatic disconnector, fluid-resistance amperemeter, and, in various parallel shunts, electric motors and cells with their volt meters and other apparatus. The converted current produced by the rectifier is not entirely continuous, but pulsating, the length of the pulsations being governed by the width of the commutator bars and the speed of the central generator. The duration of contact can be regulated by adjustment of the brushes, and this adjustment should be so made that the motive force of the current shall not fall below that of the battery, which would otherwise charge back into the circuit.

Four of these rectifiers, each for 350 amperes, have been in continuous service day and night at the works of the company in Frankfort for more than a year, with such complete success that the system may be fairly claimed to have passed the experimental stage. Their efficiency is stated to be 96 per cent—that is, the alternating currents are converted into direct ones with a net loss—including the slight reaction of about two per cent on the transformer—of only four per cent.

The direct pulsating current thus created is adapted for electrolytical work, it being an established principle that the induced currents resulting from such pulsations greatly promote electrolytical action. It also lights arc and incandescent burners, runs continuous-current motors of all sizes down to the smallest, and is used for charging storage batteries, which is the chief function of the Frankfort company. The rectifier and its accessories are compact, the whole installation, including seven transformers, occupying only 25 square yards of space, within which compass the apparatus and its capacity might easily be doubled should occasion require. The rectifiers are small, require no other foundation than wooden trestles resting on a solid factory floor, and demand no more oversight than an ordinary dynamo. From the testimony of the inventor and the experts who have visited Frankfort especially to examine the system, the current supplied by the new rectifier is for all practical purposes indentical in value and effects with the continuous currents hitherto produced in the ordinary manner.





NEW ELECTRICAL CURRENT RECTIFIER.

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The Daddy Company, of Murray, Idaho, have their new dynamo at work. It will furnish eighty incandescent lights of 16 candle power each, and will enable them to light the tunnels, tramway, mill, outbuildings and yard. Such things show enterprise and confidence in the country.

## Storage Battery Traction in Sight.

Herbert Lloyd, in a lecture on recent improvements in America and Europe in the storage of electricity, says that the number of storage battery installations being made in England is astonishing. Private house plants, run by gas or gasoline engines, are met with everywhere, and central station batteries are going in as fast as central stations are being built. The English have a high appreciation of American batteries, of which they are purchasing large consignments. Hitherto the running of the storage battery railroad in Birmingham has given varying results. It is now equipped with American batteries and the service is much more satisfactory to the public and profitable to the company. A new element, termed by experts "recuperation," has assumed great importance in storage battery car operation. It is found that a car, while descending a ten per cent grade, can recover fifty-seven per cent of the energy expended in ascending it; on a four per cent grade a return of forty-two per cent is effected, and on a two per cent grade, twenty-three per cent. The new electric line in the Isle of Man, equipped with a trolley system having a battery in the power house, has an almost uniform grade of twelve per cent. The car on this grade delivers back to the battery about thirty-three per cent of the energy it consumes in ascending. This means a considerable economy. Great improvements are being made in the casting and recasting of grids, which reduce both the first cost and the operating cost of the installation. It is well known that in this country patent litigation has long interferred with the progress of the storage battery. Now, the incidental restrictions have in a great measure been removed and the use of the storage battery for traction purposes is rapidly approaching a commercial stage. The question of electric vehicles is attracting the attention of the large carriage and bicycle manufacturers, many of whom are now building such vehicles, and with a battery such as is now produced, capable of very heavy discharges, and with good roads, the business prospect would appear promising. Storage battery plants for train lighting are found most useful, and their use is rapidly extending. The use of electric launches is also growing steadily in this country. The improvement in storage cells for this work is shown in the fact that the batteries on the launches, which ran for three months at the Atlanta exposition, did not cost one cent for repairs, which was not the case at the World's Fair.

## Edison and the Roentgen Rays.

So far, Crookes tubes, which were supposed to be necessary for reaching the best results in the Roentgen experiments, have been quoted at about $50. Edison has been busying himself, and has succeeded in turning an ordinary incandescent lamp bulb into a miniature Crookes tube, which will serve many of the purposes of the investigator. He seals into the narrow end of a sixteen-candle power bulb a wire carrying a disc of aluminum five-eighths of an inch in diameter. To a wire passing into the thick part of the bulb he attaches another aluminum disc, about one and three-eighths inch in diameter, which stands at right angles to the first disc. That is all; the bulb is then ready for experimentation. It costs about 50 cents. The current with which Mr. Edison is con-

ducting many of his experiments is obtained from a two or three-cell storage battery, passed through an induction coil which would give a spark across a gap of about three inches; so that for $10 anyone can purchase a plant by which he may become an original inventor or great discoverer. What Edison has already shown of the permeability of different metals to the cathodic rays, as revealed by the use of the simple apparatus referred to, is of the greatest value and has excited universal attention. There is now no hindrance to the prosecution of similar investigations in hundreds of laboratories where insufficiency of equipment has deterred experimenters from entering this fascinating field, and some remarkable developments are likely to follow. While electricians are immensely interested in the work that is being done with these invisible rays from the negative end, a great many of them are convinced that the final outcome will be a great advance towards the efficient production of the direct light rays of these vacuum tubes; so that our lamps, in the near future, will simply be exhausted glass bulbs without any light-giving material of any description, the light being obtained by the electric vibration set up of the ether or air within them.

### A Point in Central Station Economics.

To what extent a labor-saving device can be made to effect an economy has been very strikingly demonstrated in the case of one of the large electric illuminating companies which recently concluded to fit up each one of its arc light poles with a clock-switching device designed to automatically throw into and out of circuit each of the lights at certain hours of the evening and morning, and thus to supplant the service of the men hitherto employed to make the rounds of the poles and do the same thing by hand. The company had at the time 600 arc lights in use for street illumination. The lights were 400 feet apart, and the city contract specified that they all had to be turned on not later than fifteen minutes beyond a certain hour of the evening, and might be again turned off not earlier than fifteen minutes before a certain other hour in the morning. Experience had shown that a man could walk about 4,000 feet in a fifteen-minute interval, and turn on or off the ten lights within that distance, so that, for the whole 600 lights, the services of sixty men were required, which could not be secured for less than $4 per week per man, entailing thus the expenditure of $240 per week, or $12,480 per year. The clock-switching devices, which did the same work, cost $5.50 apiece, making a total for the 600 poles of only $3,300, which investment, of course, will not be a yearly recurring one. What the saving effected by the automatic switches will be may be left to the reader's own calculation. The whole affords a lesson in central station economics in which station superintendents ought to find something decidedly interesting.—From Cassier's Magazine for March.

WRITING in Cassier's Magazine for March, on "Electric Power Stations," C. J. Field says that an up-to-date station, say one of 5,000 kilowatts capacity would cost as follows: Steam plant, $85 (£17) per K. W., including engines, boilers, pumps, heaters, coddensers, piping, etc.; electric plant, including generators, switchboard, cables, etc., direct-connected units, $30 (£6) per K. W.; power station, building under average building conditions of good foundations and no rock excavation, including foundations, building, stack, etc., $15 (£3) per K. W.; sundries, $10 (£2) per K. W. This makes a total of $140 (£28) K. W. This is exclusive of real estate.

ELECTROLYTICALLY formed seamless copper steam pipes made by an English firm have been carefully tested by the marine department of the Board of Trade and declared to be acceptable for ships built under the Board's survey.

## Scientific Progress.

### Acetylene Gas.

The *Engineering Record* says: "If we compare pure acetylene and carburetted water gas, the former furnishes by far the greater quantity of light for the same money. The especially violent character of the explosions of certain mixtures of acetylene and air will always constitute one of the most serious objections to its use alone. To be sure, these explosive mixtures are sometimes formed with ordinary illuminating gas, but in this case the explosions are not so violent. The danger increases as the quantity of combustible gas necessary to form an explosive mixture decreases. In the case of acetylene only one-half the quanity of gas is necessary to form the most explosive mixture with air that is required if coal gas is used. The most serious objections may be urged against the scheme of reducing the acetylene to the liquid form and distributing it to consumers in cylinders. While such a plan is perfectly feasible, it does not appear that any possible advantages can offset the danger incurred, and a few serious explosions will probably end the matter."

IT appears that the rays of the sun's corona, though differing from Roentgen's X rays, may affect photographic plates through metallic sheets, which screen out the less refrangible radiations of the solar disc. This is reported by David E. Packer of the Astro-Physical station at South Birmingham, England, as a result of many experiments since last July. Advantage has been taken of the discovery in photographing the corona of the uneclipsed sun, screens of tin and lead foil and copper sheets being successfully employed over camera lenses of four-inch and one-inch aperture, and the protographic plates being affected in proportion to the thinness and electrical conductivity of the screen. Prominent equatorial extensions over the region of active sun-spot groups are the chief features of the pictures. But much more remarkable coronal photographs were obtained without any camera lens, through a neat pin-hole aperture, which transmits rays of every degree of refrangibility entirely unaffected. In these interesting and surprising features of sun-spot development are shown.

IT is announced by the French Academy of Sciences that it is possible to photograph through so-called opaque bodies with ordinary light. A kerosene lamp will do it. M. Lebon asserts that he has taken photographs in this manfor several years. He proceeds as follows: "Inside a box, with rather thin sides, he places a sensitized plate. Behind the negative in front of the box he places an iron plate, and on the other side of the plate a lamp. After three hours' exposure an image is found. On development this image is indistinct, but if a sheet of lead be placed behind the box and rolled over to touch the iron plate so as to form a metallic shell, the reproduction of the negative for the same length of exposure is quite distinct. This experiment cannot be accounted for on existing theories." M. Lebon has ascertained that the image is not due to any phospherescent light which might have been stored up in the negative. The experiment will not succeed if heat rays only are used.

THE ethereal medium, in which certain wave motions occur, presents many striking similarities to the behavior of elastic matter, and more especially of that which is gelatinous. Gelatinous substances are always capable of transmitting longitudinal as well as transverse waves. It has, therefore, been inferred that longitudinal waves must exist in the ether, although they had not been discovered, or at least recognized. Roentgen, guided by what appear to be the probabilities of the case, has stated his opinion, with all due reserve, that the rays which he has discovered must be the long-sought longitudinal ether waves. In all elastic bodies, particularly in gelatine, the rate of the propagation of longitudinal waves greatly exceeds that of the propagation of transverse vibrations. Professor Boltzman argues that, if such be the case also in the luminiferous medium, Roentgen rays, although of high frequency, may be of considerable wave length. The high frequency of such waves would accord with their power of exciting fluorescence, which, presumably, should be a maximum when the periodicity of the wave motion approaches most nearly to that of the molecular swing. Professor J. J. Thomson writes, respecting the electric leakage due to the incidence of Roentgen rays: "This differs materially from that investigated by Elster and Geitel and due to ultra-violet light. In the first place, the Roentgen rays discharge positive as well as negative electricity, and, secondly, the leakage goes on even when the electrified plate is embedded in paraffine, ebonite, mica, sulphur, etc. This shows that all substances through which the Roentgen rays are passing become for the time conductors of electricity. The result seems to me very suggestive both as to the nature of the rays and also of the conduction through the insulator."

BY the apparatus of a French chemist, E. Hardy, it is made easy to determine whether the acetylene in the air of a room or the firedamp in a mine is approaching a dangerous proportion. The apparatus is an acoustical one, giving to the ear a very accurate quantitative analysis of mixtures of two gases having different densities. A microphone is attached to each of two sonorous tubes, which an electric current traverses in succession, passing then to a telephone receiver at a little distance away. This receiver repeats distinctly either the pure sound or the beats produced by the sonorous pipes. With air containing 1-1000 of coal gas from two to three beats were obtained in twenty seconds; with 2-1000, about six beats; and with 20-1000 of gas, sixty beats in the same time. Perhaps some genius will now apply the principle to an alarm for promptly notifying the hotel clerk that the occupant of a certain room has blown out the gas.

DR. G. SCHATT, studying the form and height of the waves of the deep sea, found that under a moderate breeze their velocity was 24.6 feet per second, or 16.8 miles per hour, which is about the speed of the modern sailing vessel. As the wind rises, the size and speed of the waves increase. In a strong breeze their length rises to 260 feet and their speed reaches 360 or 364 feet per second. Waves, the period of which is nine seconds, the length 400 or 425 feet, and the speed twenty-eight nautical miles per hour, are produced only in storms. Dr. Schatt does not think that the maximum height of the waves is very great; his maximum is just 32 feet. He believes that in great tempests waves of more than 60 feet are rare, and that even those of 50 feet are exceptional. In the ordinary trade winds the height is 5 or 6 feet.

MANGANIN, which is the alloy of copper, nickel and manganese, has remarkable electrical properties. Its resistance hardly varies at all even through a range of temperature varying from 15° to 97° Centigrade. It thus becomes a superior metal for the construction of artificial resistance.

AMONG the victories of science registered in 1895 may be reckoned as especially important the establishment of anti-toxine as the reliable foe to diphtheria in all the hospitals of the world and in general practice.

IT is said that the wild lettuce is "one of two well-marked compass plants," and that it has the property of twisting its leaves until they point straight upward, with the edges directed north and south.

## Mechanical Progress.

### Gunning With Compressed Air.

A new army rifle has been constructed by Paul Brand of Berlin. It differs in its construction from all other guns in that no provision is made for the the firing of a discharge, since the shooting of the projectile is caused by the sudden expansion of compressed gas. The greatest advantages claimed for the new system are: First, the trifling heat generated in the gun barrel; second, the absolute absence of smoke; and third, the impossibility of the formation of dross in the gun. The cartridges are also entirely differently constructed from the present style; since there is nothing but the projectile itself, there is no danger handling it, and considerable space and weight are saved to the soldier and hunter. The reservoir carried with the gun contains a quantity of compressed gas, sufficient for 2500 discharges. The force of a shot surpasses that of the present repeating army rifle one and one-half times. About fifty shots may be delivered without interruption. The development of heat within the barrel amounts to 0.03, which is equivalent to the heat occcasioned by the friction of the ball alone when forced through the barrel. The new gun has been patented in all countries, and its manufacture in great quantities is now being provided for.

THE longest distance that a shot has been fired is a few yards over fifteen miles, which was the range of Krupp's 130-ton steel gun, firing a shot weighing 2600 pounds. The gun cost $195,000, and each projectile $4750. The 111-ton Armstrong gun has an extreme range of fourteen miles, firing a shot weighing 1800 pounds, and requiring 960 pounds of powder. These guns, however, proved too expensive, being unable to stand firing a hundred times, and their manufacture has practically been abandoned. The twenty-two-ton Armstrong gun hurls a solid shot for a distance of twelve miles, and the discharge of the gun cannot be heard at the place where the ball strikes. From twelve to thirteen miles is the computed range of the most powerful guns now made, and to obtain that range an elevation of nearly 45° is required. Quick-firing guns are more depended upon at the present day than extreme length of range, and in this respect, perhaps, the most wonderful gun is one of the Maxims, which can fire 600 shots a minute, and yet is so light that a soldier can carry it strapped to his back.

IN comparing the four great tunnels of the world there is seen to be a very remarkable decrease in the time and cost of the successive works. The Hoosac tunnel, the oldest of the four, cost $379 a foot; the Mont Cenis, the next in date, cost $356 a foot; the St. Gothard cost $229 a foot, and the Alberg, the latest in date, cost only $154 a foot. This rapid decrease in cost within comparatively few years is a marked indication of the great progress in mechanical methods and improvement in rock excavating and tools. A still more striking result exists in the case of a tunnel through the Cascade mountains, on the line of the Northern Pacific, in the State of Washington. The tunnel, which is 16½ feet wide, 22 feet high, and 8950 feet long, was bored through the mountains in twenty-two months, at a rate of 413 feet a month, and at a cost of the completed tunnel of only $118 a foot.

AN easily fusible metal composition is now being put upon the market by Houser & Co. of Zurich, Switzerland, under the name of "patent metal cement." This metallic cement melts like lead at about 250° C., and can be cast into the most delicate molds; in addition to this, it sticks like glue to all substances, as stone, masonry, metal and wood. It is almost entirely proof against water, acid and oils, so that it appears well suited for repairing leaks in oil tanks and pipe

conduits. This cement possesses a great power of adhesion, because it extends somewhat during cooling off. Another advantage of the new metal is its small specific gravity of but 1.5. For use it is broken up in small pieces and molten in an iron kettle over a moderate fire, until the mass has become thinly liquid. For casting small objects, molds of plaster of Paris, clay or sand can be used.

## Practical Information.

### Largest and Smallest Books.

Prof. Max Muller of Oxford, in a recent lecture has called attention to the largest book in the world, the wonderful "Kuth Daw." It consists of 729 parts in the shape of white marble plates, covered with inscriptions, each plate built over with a temple of brick. It is found near the old priest city of Mandalay, in Burma, and this temple city of more than seven hundred pagodas virtually makes up this monster book, the religious codex of the Buddhists. In accordance with the three parts of which it is composed, generally called in a figurative sense "baskets" (pitaka), the whole is often termed "the three baskets" (tripitaka), and constitutes a library larger than the Bible and the Koran together. As the Jews figured out that the Old Testament contained 59,493 words and 2,728,100 letters, so the Buddhist priests have computed that the "Tripitaka" contains 275,250 stanzas and 8,808,000 syllables. This monster book is written in Pali. Rather strange to say, it is not an ancient production, but its preparation was prompted by the Buddhistic piety of this century. It was erected in 1857 by the command of Mindomin, the second of the last kings of Burma. As the influence of the tropical climate has already marred the inscriptions, a British official, Mr. Ferrars, proposes to have these 729 plates carefully photographed, and asked that the Government, or some friend of science able to do so, make provisions for this. Professor Muller urges that this be done in order to preserve at least the pictures of this unique temple-city book.

A noteworthy contrast is furnished by a recent German literary journal describing what is probably the smallest book in the world This is a "Konversationslegicon," published in Berlin, and prepared by Daniel Sanders. The volume occupies the space of only six cubic centimeters (.366 cubic inch), although it is claimed to contain 175,000 words. The book must be read through a microscope especially prepared for it.

### Women's Pursuits in Japan.

A recent report on labor in Japan shows that women are employed in a greater variety of work than in almost any other country in the world. Not only do they engage in common agriculture, like many European peasants, but it is by their labor chiefly that the tea and silk of the island empire are raised. In all of the mechanical arts woman has there an active share. The choicest pottery and most elaborate decorative lacquer work come from her hands. She weaves mats and other articles of straw, braids baskets of bamboo, and manufactures countless other articles of the latter material. She goes out in the fishing boats with her husband, and aids in salting and drying the catch. She engages in cabinet work, house building and various other industries in which women in America do not participate. She works almost as rapidly as a man, but receives scarcely more than half the pay. Japanese women are frequently employed in mercantile establishments (as in the United States) as bookkeepers and cashiers, and some of them actually manage large concerns of this class. Nothing is said in the report from which these facts are taken about the professions.

For much of the labor here referred to the average wages (for men and women) is from $1 to $5 a month. Domestic servants get from $2.40 to $7.20 a month. In the city of Yokohama, where the best pay is given, artisans receive on an average between 10 and 72 cents a day, the last-mentioned figure representing the earnings of superior decorators of porcelain. Weavers receive from 10 to 15 cents a day, and silk spinners about 17. In many of the tea shipping houses a large number of skilled persons—men, women and children—are employed from 5 A. M. to 6 P. M., with twenty minutes or half an hour for refreshments at 8, 12 and 3 o'clock. Their pay ranges from 6½ cents a day to 21 cents, and they board themselves. It is said that there is not a single almshouse or street beggar in Japan.

### Wiring the Sahara.

The telephone and the telegraph are rapidly making inroads into the arid portion of the Desert of Sahara. Engineer Bayolle is now on the way from Biskra to Tuggurth with a working force of 100 men for the purpose of laying telegraph wires between the two places. The line is erected as the party proceeds, and the first news from Bayolle was received at Biskra when he telephoned from a point some twenty miles south of Biskra. He advanced at the rate of from three to five miles a day, and will probably reach Tuggurth about the first of the year.

He reports over the 'phone that he has met with a peculiar difficulty; the camels which he has taken along are not used to carrying burdens of a long shape like telegraph poles, and in many cases they refuse to go on with their loads. Each camel was loaded with four poles, two being strapped at each side, the smaller ends dragging on the ground. Bayolle found it necessary to leave half of his poles at stated points, and continue on the trip with the lightened burden; since only short distances are covered at a time, he then sends the camel drivers back for the rest of the load, and in this way the poles are transported without being dragged on the ground. Since the camels will not carry the poles when strapped alongside of them, he had to resort to the peculiar mode of balancing the telegraph poles across the pack saddles, and fastening them in this position by means of straps and ropes. From a little distance it is quite a curious sight to behold the file of camels with their swinging gait and a load extending many feet to each side. One would think that a drove of gigantic birds with spread wings were sailing over the desert.


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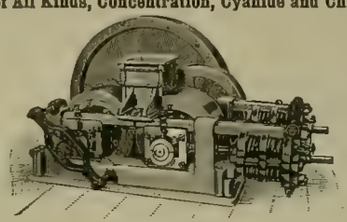
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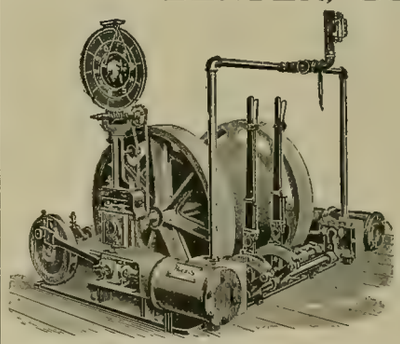
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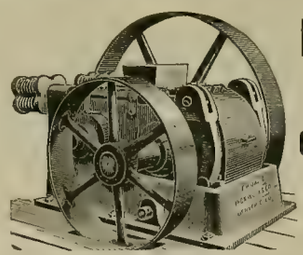
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# Mining Summary.

## CALIFORNIA.

### Amador.

*Record:* The Wheeler and Chandler gravel claims, bonded by Wait and Keeney, have been disposed of conditionally by the bonders to C. W. Haskins, who has begun to work on the claims. A line of pipe 4100 feet long and of 16 inches diameter has been ordered from below. Three hundred inches of water from the McLaughlin ditch will be used working the property. The tailings will flow into Sutter creek, and a restraining dam will be constructed to hold the heavy material. The bond calls for an immediate installment of $5000 on the purchase price of the Wheeler claim, and $1000 on the Chandler property in April.

The mill has started up at the Gover mine. They are now running on rock of a higher grade than before, taken from the 900 level. Two new boilers are being placed in position.

One hundred feet of 11-inch pipe has been laid to operate the gravel claim at Aqueduct.

Some more surveying was done this week in the underground works of the Kennedy mine for the Argonaut company; also, samples of ore were taken from the ground claimed by the Argonaut, and recently worked by the Kennedy company.

The Amador Queen is yet at a standstill. J. F. Parks inspected the works, and has reported in favor of sinking the shaft 500 feet deeper. It is expected the company will soon authorize this work.

The Kennedy chlorination works, which have been idle for several months, started up this week. There is a four months' supply of sulphurets on hand.

### Butte.

The Mascot mine and mill has reopened, M. Coney foreman. The ore runs $5 to $30 a ton.

At the Golden Butterfly the air shaft is completed.

At the Princess two steam pumps are being put in.

### Calaveras.

*Echo:* Work is progressing at the Pure Quill mine; the ore in the drift on the 100-foot level is rich. Judge Cross has arranged to take possession of the mine and open it up in satisfactory shape, and if discoveries prove the property to be one of value, then he is to purchase the same and work it on a large scale.

### Del Norte.

Crescent City *News*: The Craig's Mining Company have commenced work developing their mine on the south side of Craig's Creek, near French Hill. The last steamer brought one hydraulic giant and a lot of pipe for the company.

### El Dorado.

(Special Correspondence)—Judge Morrison of Los Angeles has secured an option on the old Esperanza mine near Garden Valley and will begin next week to pump the shaft with a view to operating the property on a large scale.

S. F. Woodworth made a short run with his new ten-stamp mill, in the Kelsey district, milling 381 tons of ore taken from the grass roots to a depth of forty feet. Though of a low-grade quality, the returns are quite satisfactory. He has a ledge eight feet wide with a nine-foot porphyry gouge on the foot-wall which also prospects well.

The new two-stamp mill recently started by C. F. Bryant is grinding out ore netting $12 in free gold. The ore is taken promiscuously from three parallel veins. Two shafts at a depth of 50 feet and one of 108 feet and a tunnel 200 feet show large ore bodies both on the east and west sides of the diorite.

At the Wykel mine they are ground-sluicing to uncover the vein. The work thus far done yields a good product and is showing a fine ore body. This is near Mud Springs.

The new shaft on the Dark Canyon property has reached a depth of ninety feet. The remaining thirty feet under contract will be completed in a few days. This is situated in the Kelsey district about five miles north of Placerville. It is under bond to a San Francisco party.

Pumping machinery on the Big Sandy will soon be ready for operation. The old Sandy will make a record when started.

Placerville, March 3, '96.

### Inyo.

The Confidence Mining Company of southern Inyo has started up its mill in Death Valley, eighteen miles north of Saratoga Springs. The company has about twenty-five men employed.

The Sterling Mining Company at Montgomery has suspended issuing checks, and lately several checks which were sent out to be cashed have been returned protested, but all are assured that payment will be made in thirty days.

At the Hirsh mine twenty men are employed. Three hundred buckets of ore are handled every day, the buckets of the tramway holding about forty-five pounds each.

The Owens River and Big Pine Canal Company has levied an assessment of 20 cents per share, delinquent April 4th.

### Mariposa.

AT THE SWEETWATER.—*Gazette:* This mine is thirteen miles northeast of Mariposa. W. J. Quick employs seven men running a tunnel at present in 394 feet.

Ludwig's mill has been sold to Macfarlane and Duncan of Sugar Pine Gap, two miles above Hazel Green and thirty-five miles from Coulterville, which will be taken to pieces and moved to its new location.

Three new mines of excellent promise have been opened up at Mt. Ophir, and a new mill to work ores from the Grant will shortly be erected there.

A sale of mining claims in the neighborhood of the Francis mine in Cathey's valley has been made by Moise & Bisland to C. G. Barnd of Fostoria, Ohio.

At the Santa Rosa the mill has been temporarily shut down.

THE HORSESHOE MINE.—This mine is shut down pending partnership arrangements that have taken the form of incorporation under the name of the Horseshoe Consolidated Mining Company, San Francisco. Directors—N. T. Messer, H. Zadig, O. F. Griffin Jr., J. W. Twiggs, E. L. Parker; capital stock, $1,000,000. Some new machinery is to be sent up from San Francisco at once.

The twenty-stamp mill at the Tendron (Whitlock district) is running steadily, and development work in the mine is keeping pace with it. About 80 men are employed, and the pay-roll is in the neighborhood of $4,500 a month.

PERSIA MINE.—There has been a slight accident to the machinery of the Persia which has caused the mill to be stopped for a few days. The owners of the Persia are W. H. Wright, Chas. Benton and Oswald Pertsch. The co-partnery will probably be incorporated as the "Persia Company." Chas. Benton will have charge of the work at the mine, and Mr. Wright will go to San Francisco.

THE TYRO MINE.—The ten-stamp mill on this property is now running again, and thirty men are employed. The property is situated one mile from Coulterville, and is owned by the San Francisco Mining Company. Capital, $100,000.

### Mono.

The State Mining Bureau has received six specimens of marble from the Walker River Marble Quarries. H. S. Durden says it is surface stone, giving promise of improvement when the quarry was worked.

In the Bodie Consolidated the east crosscut from the north drift on the 200-foot level shows porphyry. The north drift on this level has four feet of low-grade quartz in the face. The south drift, same level, is following a small seam of low-grade quartz. The face of the east crosscut from the upraise sixty feet above the 300-foot level is in hard porphyry. The south drift from the east crosscut on the 300-foot level is also in porphyry. The upraise from the fourth incline on the red ledge is in low-grade quartz.

In the Mono mine the east crosscut from the south drift, 400-foot level, was extended seven feet. The face is in hard porphyry.

### Nevada.

*Transcript:* At the old Pittsburg mine excellent rock is taken out. About fifty loads will pay in the neighborhood of $25 per ton. The work is being done on the 500 foot level. Recently the plates at the Pittsburg mine were cleaned up by a thief who evidently understands his business. He scraped them very thoroughly and carried away over $200 in amalgam.

*Herald:* W. M. Mather has fourteen men at work at the Plumbago mine, with John Bovey, foreman, in charge. Two tunnels are being run for the ore chute, and a third may be started this spring. The first tunnel is now in 1300 feet.

### Placer.

Harold Power tells a Colfax newspaper man he intends to push right ahead at the Haskell gravel mine and go clear through the hill, if necessary. At Bath, the Paragon mine has laid off all the men but six. They expect to resume soon with a full force.

The Auburn *Herald* hears that C. F. Reed has sold his Drummond quartz mine above Forest Hill to Denver men for $100,000.

Colfax *Sentinel:* A. B. Eastwood, superintendent of the Hathaway quartz mine at Ophir, has leased the Dardanelles drift mine below Forest Hill, and has men repairing the ditch. At Bath, at the Washington quartz mine, owned by J. B. Sellier, the tunnel will tap the ledge 200 feet from the surface. It is now in 600 feet. The Sellier Consolidated will be developed. This mine embraces holdings of 1000 acers southwest of the Hidden Treasure. Men are getting out timbers.

### Plumas.

*National-Bulletin:* At Thistle shaft 110 men are now employed. A large amount of gravel is being hoisted and washed. The channel is of immense width, estimated by some from 800 to 1000 feet, and evidently is yielding good pay. This mine is disbursing large sums of money for labor and supplies, thus making good times at Gibsonville and La Porte. Even with the large force of miners at work, it will take many years to exhaust this productive mine.

Most of the sluice mines are operating, and such of the hydraulic mines as have permits are preparing to begin work.

### Riverside.

A. H. Naftzger has been removed as receiver for the Good Hope Company. The property has reverted back to the company and E. H. Wilson is reinstated as general manager. The late superintendent, I. E. Boicourt, has paid off all the men, discharged them and work will be suspended temporarily.

The Pinacate mining district, near Perris, is attracting considerable attention.

The Golden Chariot mine, south of the Santa Rosa, and on the same vein, has completed a steam hoisting plant.

The Ophir mine, to the south of the Good Hope, has been developed by a shaft about eighty feet deep.

The Briggs mine at Leon, south of Perris twelve miles, will soon be equipped with a ten-stamp mill.

### Shasta.

*Free Press:* H. Westlake was down from French gulch Thursday with three tons of ore from the Niagara mine, shipped by McCurry to Selby & Co. This makes eight tons sent down this week, five being sent down Monday by Dave McQueen. This ore is valued at $200 per ton. The Niagara mill will start up next month. Mr. Westlake says that John Syme will soon start the Washington mill. A batch of ore from the Washington has been sent to Keswick for trial.

FRENCH GULCH.—*Searchlight:* Mr. Brightman, receiver of the Gladstone Mining Company, is gone to San Francisco. A small force is working at the Gladstone mine.

The Ellery mine continues to be prosperous, and yields fine returns.

The Washington mine is idle, except that several men have a lease on a small portion of it. A number of miners would gladly take leases there if they could get them.

The Harney Bros. have struck an eight-foot ledge of paying ore in their lease of the Scorpion.

The Niagara mill has closed down for a short time. It is expected that a new force will be put to work in the mine before long. Several of the lessees are doing well there, and the company has several good ledges in plain view.

The Brown Bear holds on its usual steady course of prosperity, running constantly, day and night without ceasing, just as it has been doing for the past seven years.

Mr. Jackson has a property near Kennet resembling on the surface the Iron Mountain mine; the ore is rich in copper, and the ledge well defined.

The Baer & Simons gravel mine, near Muletown, is now ready for a thorough test; if the result is up to expectations arrangements will be concluded to bring water eleven miles sufficient to work all the year.

Jas. Ragan is mining with his big giant on the Bally ranch, in Watson gulch, with good success.

The Ancient Channel Drift Gravel Mining Co. has finished the flume and ditch on its Dog creek property, near Delta.

### Sierra.

*Enterprise:* Ten men are working at the Union gravel claim at Gibsonville.

W. A. McNaughten, who represents the Primrose Company, Hog canyon, upon his return from North Carolina will start work there.

Supt. Hansborough, of the Rising Sun and Early Dawn placer mine, Sierra City, says the incline is down 170 feet, and the gravel looks well at the bottom. The bedrock is still pitching. There is an abundance of water power to run pump and hoist, and a ditch over a thousand feet long has been brought in from Reis ravine, which furnishes 80 to 100 inches of water for washing gravel.

### Siskiyou.

MINING NOTES.—*Journal:* The Espey, Hunter & Co. pumping plant and mine will be conducted in the future by J. Quinne, proprietor of the electric light works at Shasta river.

D. McCook crushed six tons of ore from his ledge on Humbug, in the McCook mill, from which he realized over $30 a ton.

The miners along the Klamath have all been working lately, having received a plentiful supply of water from the storms of a few weeks back. The present storm will also serve to prolong their supply of water. Supt. Brokaw, of the Steamboat mine on McAdams creek is expected here from the State of Washington in a short time and will prepare to resume work on the old Steamboat. This mine will be worked on an extensive scale.

*Journal:* The Eastlick mine at Oro Fino was started up last Wednesday morning, sixteen men running two giants. Work on this mine will probably not be interrupted now for the remainder of the season unless a cold snap should come and freeze the water in the high mountains. It takes between 4000 and 5000 inches of water to operate this mine.

All the mines in the Oro Fino district are in operation now.

The Espey, Hunter & Co. mine at Shasta river is now constantly worked.

### Trinity.

AT MINERSVILLE MINES.—The Minersville Hydraulic Gold Mining Company are fitting up for a good spring and summer's run. The main ditch from the east fork of Stuart's fork is being extended three miles. Forty men are employed. The ditch will be ready for water by April 1. Whenever necessary, flumes and pipes are put in as the ditch is extended, so that as soon as dug it will be ready for use. It will carry 4000 inches of water. When completed the mine will be opened up in three places. A large reservoir will be built and an electric light put in. The company now own 3500 acres of auriferous gravel. On the mine are 4000 feet of pipe and three large giants; 300,000 feet of cut lumber is piled up ready for use, and the sawmill near by is able to furnish all lumber needed at short notice. The boarding houses and other buildings are substantial and permanent structures. The mine was operated last season with good results. Since the season closed over $2500 has been expended in prospecting the gravel. H. B. Gordon is superintendent; F. Beaudry, of Weaverville, and E. Saladin, of Junction City, resident managers.

AT COPPER CITY—*Journal:* Messrs. White and Armstrong, at Town creek, Copper City, are working four men on their placer claim, and taking out ten dollars a day to the man. James Salee is working six men at Bully Hill. He is trying to get an upraise open from the end of the old 800-foot tunnel to connect with the old upper workings. The Poyejoys, Kells and Binc are all working ground claims. A hill one mile east of Bully hill is having considerable exploration work done on it by Jennings & Co. A large body of low-grade baryta ore carrying a little copper, gold and silver, has been uncovered.

### Tuolumne.

*Independent:* The App mine is developing at a rate which, if it continues, will make it a second Rawhide. Mention was made in these columns last week of a rich strike in the 400 level, the character of the ore interesting mining men of all classes, on account of the peculiar form in which the gold grows in the quartz. A strike like this in Johannesburg or West Australia would be re-echoed all over the world within reach of a press correspondent. But we are a modest set in California, and in the matter of mines invariably show a disposition to keep the light hidden under a bushel. The truth will, however, prevail in time, as it always does.

## NEVADA.

### STOREY COUNTY.

ON THE COMSTOCK.—Seven bars of bullion, valued at $24,735, have been received from the Con. Cal. & Va., being the production of the last run of the mill. The bullion statement of the mine for February is as follows: Worked at Morgan mill, 1169 tons 1630 pounds of ore; bullion produced, gold, $10,690.90; silver, $14,044.56; total, $24,735.46; yield in bullion per ton, gold, $9.13; silver, $12; total, $21.14; assay value of the ore per ton per battery samples, gold, $11.87; silver, $15.30; total, $27.17; assay value of the above ore per ton per railroad car samples, $34.54.

A telegram from Superintendent Kinkead of the Occidental says the engine and compressor were started up.

CROWN POINT.—The southwest drift on the 600-foot level is now out a total distance of 282 feet. The face continues in heavy ground, composed of clay and porphyry with bunches of quartz through it of about the same character as last reported. The south drift from No. 1 crosscut on the 700-foot level has been cleaned out and retimbered 21 feet; total length, 87 feet. They have reopened and repaired the east drift on the 800-foot level 33 feet. The raise from the 1100-foot level east crosscut is up 67 feet on the slope, having been raised 11 feet for the week. The top continues in low grade quartz. The usual repairs in the shaft are under way.

CHALLENGE.—The joint Confidence and Challenge and Imperial west crosscut from the surface tunnel is out 443 feet, having been advanced 8 feet; the face shows porphyry.

BELCHER.—There have been hoisted during the week and stored in the ore house at the mine, 28 mine carloads of ore, the average top car sample of which shows an assay value of $27.35 per ton.

OVERMAN.—Extracted from north drift, 900-foot level, 36 tons and 1700 pounds of ore. Value of same as per car sample asaay, $50.43 per ton. On the 1100-foot level of the Caledonia have extended southwest drift 35 feet, through porphyry seams of clay and quartz. The quartz is of low value. Have cut water in this drift and have timbered the same. Total length of the drift past east crosscut No. 1, 48 feet.

### LINCOLN COUNTY.

In its report of mines and prospects of Ferguson district the De Lamar *Lode* says that grading for the April Fool mill, under the direction of Robert Francis, is being pushed. The mill is to be a ten-stamp, with a capacity for twenty, and copper plates combined, with a cyanide leaching plant.

Work on the De Lamar Company's new pipe line over the Flagstaff hill is being pushed ahead and much of the pipe is already on the ground. From the present appearance of things the town will not suffer for want of water the coming summer.

The creditors of the Keystone Mining Company, the company itself and all parties interested have joined hands and agreed to lease the property of the Lincoln Consolidated Mining company of Denver. As a consideration the lessee contracts to pay off all the indebtedness, amounting to something like $70,000, and to provide the plant with a new mill, capable of handling 100 tons a day, of which the mine is to be made productive. A pumping plant is also to be put in, that the water which is now being used at the present mill may be forced a distance of six miles to the site selected for the new one. The new mill and other improvements will involve an expenditure of about $100,000.

### STATE LINE MINING DISTRICT.

The DeLamar *Lode* says encouraging reports are heard from the newly organized State Line mining district. A townsite has been surveyed and christened Bonanza. It is believed that before the expiration of the present leases the new district will show the foundation of a permanent mining camp established on the western border of the State of Utah.

### WHITE PINE COUNTY.

In Robinson district Watson and Lawson are running an incline in the Racine mine. The vein is a boneycomb quartz, is over four feet wide and averages $20 in gold. The ore is free.

### LYON COUNTY.

*Times:* The Pecks will work the Douglass tailings in the Douglass mill at this place this summer; work will begin soon to put the mill and railroad shops in shape to begin operations.

MASON VALLEY MINES.—*Times:* The gold mines in the Spragg and Martin district in Mason valley are looking better than ever, and there is considerable ore on the dumps. Some of the mines are waiting for the new mill to start up. The ditch to bring water to the mill for power was completed this week, and it will be but a short time now before the mill will be pounding out gold.

### ESMERALDA COUNTY.

W. J. Sutherland, president of the Holmes mine, Candelaria, reports the work about finished for working the tailings at the Belleville.

## OREGON.

The Rogue River Mining and Water Co., composed of residents of this city, has located as a water right one hundred thousand inches, to be taken out of Rogue river, conducted through flumes to Galice creek, Josephine county. J. W. Northrup is president of the company, W. F. Hyde secretary and American Banking Co. treasurer, all of San Francisco. It is thought they will build the ditch which Jas. Braden has been securing the right of

way for in Gold Hill and Willow Springs precinct, for which a preliminary survey has already been run.

JACKSON COUNTY.

Ashland *Tidings*: F. O. Chezum of Tacoma has purchased the Boggs mining property.

Yesterday morning one of the men working at the Lone mine cleaned up the snug sum of $310 from five pans of dirt.

The continued dry weather is disappointing to the placer miners, but they are living in hopes that March will bring a better water supply.

Another run of sixteen tons of ore from B. F. Warner's mine, just west of Ashland, has been completed at the Hicks & Co.'s quartz mill this week, yielding $10 per ton.

The Hayes Placer mine in Gold Hill district now owned by J. H. Beeman, is being operated this season. The bank averages sixteen feet in height and pays well. A three foot flume of good grade carries the tailings to the river, and a tramway with a dump car is used to remove the large boulders. On the hill 200 feet above, is an ingeniously arranged reservoir, in which at regular intervals the water rises high enough to overflow into a small tank, the weight of which lifts the gate and allows the whole body of water to rush down the gulch, thus washing the ground in its path.

BAKER COUNTY.

A. Geiser, manager of the Bonanza mine, has a $3000 brick, the result of twenty-one days' work. The expense of producing this was a little over $1100. A new body of ore has been uncovered while crosscutting in the lower level.

WASHINGTON.

At Monte Cristo snowslides have greatly interfered with mining operations for the past few weeks, and the damage done by the two big slides of last week has not yet been fully repaired. As a consequence work cannot be resumed in the Mystery mine until some new machinery arrives from San Francisco, and a number of men are out of work. A greater portion of these are spending their enforced holiday in the various Sound cities. A number of unoccupied cabins in the lower part of town were demolished by a big slide which came down over the Sauk lode. The concentrator has also been closed since the slides. At the time it was operating on Golden Chord ore, but the Golden Chord run of 500 tons has been nearly all concentrated, and the present output of the Pride of the Mountain is not sufficient to keep the big concentrator running. The work of repairing the Mystery tram is progressing rapidly under Mr. Bass, and if good weather continues it will be ready in a short time for the bull wheel.

BRITISH COLUMBIA.

The smelter at Pilot Bay began treating ore one year ago. To December 30th, 3220 tons of bullion were sent to Aurora, Illinois, for refining. During 1895 the smelter company transported 52,000 tons of ore and lime rock from the Blue Bell mine, and purchased 2500 tons of ore, of the value of $156,464, from outside mines. Since July 10th, 1894, the company has expended in cash for machinery, labor and the purchase of ores something over $650,000. During 1895 the company employed over 200 men, and paid out for labor $170,000. It also paid out during the same time over $85,000 for supplies, $70,000 for duties, and $92,500 for freights.

Two carloads of hydraulic pipe are at Ashcroft for Cariboo. One carload of 38,000 pounds was for the Ward Horsefly Hydraulic Gold Mining Company, on the Horsefly river. Twenty kegs of rivets also accompany the pipe. The rivets go north to rivet the Ward pipe. The other carload of pipe, 20,000 pounds, is for Hobson's Cariboo mine on Quesnelle river, and is to be used in extending the system of pipes and connections in that mine.

G. Lange has organized a company with $10,000 capital to carry on mining on Dragon creek, where at one time three ounces to the set of timbers was taken out by drifting. When water is brought in Mr. Lange expects to wash 2500 yards per day.

The Victoria Hydraulic Company will operate their ground on a large scale this year.

Large pieces of float cinnabar ore have been found on the west bank of the Fraser river, opposite Big Bar.

Supt. Helgerson has organized, with a capitalization of $10,000, the Elk Mining Company, which has taken a lease held by him on Goose creek, a stream emptying into Cariboo lake, opposite Keithly creek.

ALASKA.

The Nowell Gold Mining Company are putting out an issue of $500,000 in bonds through the International Trust Company of Boston, the bonds being secured by a mortgage to the above amount on their Basin property. Of the amount, $300,000 will be used in retiring previously issued bonds of like amount on the same property, the balance of the half million to be spent in acquiring other mining property, as stated in a mortgage filed for record at Juneau. They are of $1000 denomination, bear seven per cent interest, and run from 1901 to 1914.

UTAH.

PARK CITY.—On the 29th ult. the Ontario mill shipped 53 bars base bullion. This brings the total shipment for the month up to 172 bars. It is understood that each bar will average 475 ounces of pure silver. The Ontario mine paid a ten-cent dividend that day.

The Silver King will pay its regular monthly dividend of $37,500 on Saturday, March 7th.

The board of directors of the Dalton and Lark Mining Company at its meeting on the 29th, declared a dividend of half a cent a share, a total of $12,000, payable on March 15th. It is but ten days ago that the organization of the company was effected, but it was with ores in sight, the value of which Prof. Palmer estimated at $1,500,000. The dividend, said Treasurer Bacon, will be repeated monthly.

IDAHO.

AT MULLAN.—The Hunter mine is running with about eighty men.

The Morning mine is in operation with 105 men employed by Larsen & Greenough.

IN THE COEUR D'ALENES. *Mines*: Ore was struck on the 400-foot level of the Gem mine last week, and the mill has resumed operations again. Seventy five men are employed in the mine. The improvements at the Standard mill are about completed and it is expected to start up about March 1st. The force at the Standard mine will not be increased for a while yet, as the ore bins both at the mine and mill are full of ore.

The Silver City *Idahonian* says: The past week has seen more money "turned loose" in Silver City than in any like period at this season of the year for some time. Last Saturday the Black Jack, Poorman and Boonville had their regular monthly pay day of about $10,000. On the same day the Black Jack purchased the Phillips & Sullivan group for $25,000, most of which went into general circulation. On Monday the Morning Star dispensed $4500, and to-morrow the Trade Dollar will throw about $8000 into the hands of its employes. Something like $47,500 inside of eight days is no slouch.

TIGER AND POORMAN.—The Tiger-Poorman mines in the Coeur d'Alenes are in excellent condition. Sinking is going on in both mines, but the ore is being handled in the Tiger mill. The Poorman mill is being overhauled and will be put in good condition.

*Idahonian*: Supt. Hutchinson, who recently returned from a visit to the Trade Dollar Company's home office at Pittsburg, Pa., says that it has been decided by the management to put in an electric plant at the mill in the spring for power at the mine and for illumination. It has been deemed advisable to extend the development work on the Trade Dollar group to greater depth, and to do so it is necessary to sink from the adit level. Complete arrangements are not yet made as to details. Sinking is expected to commence as soon as the new upraise to No. 3 is finished a distance of but sixty or seventy feet.

IDAHO'S PLACER MINES.—The placer mines of Idaho county produced $75,000 in '95, taken from small properties, only a few men employed, scattered over a large area. There was not last year a single company working in the county employing more than a dozen men, and no company working with a large supply of water hauling more than 1000 cubic yards per day.

Last season several companies installed plants of large capacity on various properties throughout the districts, and although there will be but few men more employed in active mining work, a vast amount more of gravel will be handled by the large hydraulic plants, steam excavators, etc. The Warren Placer Mining Company put a large steam shovel on the Warren meadows last season and a successful run was made toward the close of the season. The plant weighs on the track 100 tons. Its capacity is 1500 cubic yards per day. The company own about 100 acres of rich ground.

At Florence a large tract of valuable ground is to be exploited by a New York company and a bedrock flume put in if ground proves satisfactory. This property is the catch basin for all the rich deposits that were sluiced off in the early days.

The same company is working on the Clearwater river, properties for years unworked for want of sufficient capital to open them on a large scale. The plant will have a capacity of 6000 cubic yards per twenty-four hours.

The Victor Mining Company at John Day's creek and the Slate Creek Mining Company at Freedom have ditches and water privileges, and will handle considerable gravel. Active mining will commence in March.

Elk City has a large hydraulic elevator plant, owned by the Idaho Company of Chicago, and another one is being put in by Butte, Mont., people.

MONTANA.

AT COOKE CITY—Fifteen miners employed on the Daisy have uncovered a body of ore 22 feet wide which shows wire gold. The Daisy mine was purchased last fall from its locators for $30,000 by Dr. Lehnan, of St. Paul, representing Mr. Bliss of Saginaw, Mich., a stockholder of the Burlington Railway Company. The mine is developed to a greater extent than any of the other of the hundreds of claims in the New World district.

COLORADO.

The Columbine-Victor Deep Mining and Tunnel Company will install the first electric drilling and lighting plant in Colorado. New tunnel houses have been erected at both ends of the enterprise, the company being engaged in driving through Squaw mountain from both ends simultaneously. The tunnel from the east end is in a distance of 460 feet, and the west end has been driven over 600 feet, the combined work accomplishing about ten feet per diem. The size of the tunnel is 7x8 feet in the clear.

Colorado Springs *Gazette*: The Metallic Extraction Company of Florence has contracts for all the low-grade ore of the Elkton Company for six months. The company is also getting the low-grade dumps of the Raven Company. The reduction plant has now been enlarged to handle 400 tons every twenty-four hours, and will call upon the Cripple Creek mines to furnish it with that amount of low-grade ore every day. The plant has a capacity of roasting 250 tons of ore every day.

A stampede to Yellowstone gulch, ten miles from Lake City, began yesterday because of the discovery of fine specimens of wire gold in the Woodstock mine recently made. The mine is an old location classed as a low-grade copper and silver producer, and was not considered of especial value. Recently the owners have been developing their property by a drift and shaft in the tunnel, and for some time they found pocksts of wire gold quartz which they threw over the dump, thinking the stuff was wire copper. Specimens valued as high as $25 have been taken from the dump.

ORE CONTACT DEPOSITS.—The experience of Colorado mining says, State Geologist T. A. Rickard, has made the prospector familiar with the term "contact," as applied to the occurrence of valuable ores along the line separating two dissimilar rock formations. The bonanzas of silver lead found between the white porphyry quartz felsite and blue lime of Leadville made the Western miner aware of a type of ore deposit new to his experience and radically unlike the conventional fissure systems of the older gold-producing districts.

There is a fashion in mines as in bonnets, in formations as in cloaks, therefore the phenomenal yield of the city above the clouds caused an eager inquiry and an active search for similar limestone contacts. Across the Saguache mountains Aspen was found with rich ore measures incased between shale and magnesian limestone, both members of the carboniferous. And as the prospector wandered farther afield he discovered the successive ore horizons of the remarkable section cut by the Eagle river, explored the lime-quartzite contacts of Ouray and stumbled upon the gold and silver wealth inclosed within the shattered lime and shale of Newman hill, at Rico.

Ore formations of this class have been chiefly found in carboniferous limestone, and the wealth which they have yielded has been principally in silver. Therefore, the fickle miner may, at this day, refuse to give the subject consideration which it would readily have commanded at an earlier date. Nothing, however, is so likely to retard the development of the mineral resources of a region as a prejudice in favor of any particular mode of ore occurrence or narrow ideas concerning the multitudinous ways in which generous Nature has incased her treasures of gold and silver. While Colorado permits of certain generalizations, such, for instance, as that the granite of the front range is gold-bearing, where penetrated by later eruptives (porphyry), or, again, that the carboniferous limestones are the particular habitat of our largest silver deposits, yet, while recognizing these geological environments, we must take heed not to overlook the existence of valuable ores in formations not as yet, perhaps, identified with important mines.

The object of this communication is not to offer any geological generalizations, but simply to point certain features peculiar to the contact deposits which have poured so large a tribute into the coffers of the State. Of this type the mines of Rico, in Dolores county, afford a very instructive example. Instead of masses of rock several hundred feet thick, the formation is there composed of a series of very thinly bedded shales, limestone and sandstones. The contact consists essentially of a zone of crushed rock whose composition is variable in different workings, because of the non-persistence of the beds. That is, the sand and mud originally laid down in the estuaries of the seas of the carboniferous were not distributed over a large area but deposited patchwise as determined by the currents and eddies of incoming streams.

Within this layer of crushed rock there have been found ore bodies of great richness, containing not silver alone, but gold also. When first intercepted by prospecting shafts it was supposed that a flat vein had been discovered, for up to that time only the ore bearing fissures of Newman hill (since rendered famous by the yield of the Enterprise and Rico-Aspen mines), had been uncovered and the new lode was therefore imagined to be a flattened portion of one of the vertical veins. When, in the course of exploration, this became disproved it was thought that a continuous ore measure, resembling the Leadville and Aspen contacts, had been stumbled upon. But further development made it evident, first, that the vertical veins came to an abrupt termination when reaching the contact and that the ore bodies of the latter were in the form of narrow channels whose direction corresponded exactly with the trend of the veins underneath. Later on it was seen that the ore bodies of the contact lay along a plane which underwent distortion and dislocation traceable to the agency of the fault fissures followed by the veins which had been found to be related to them. Thus the connection between the ore on the contact and that in the veins became established, the occurrence of a vein indicated the place where ore was to be searched for upon the contact and the finding of valuable minerals along the latter was proof sufficient of the existence of some tributary vein underneath. The determination of this geological structure became a key unravelling a veritable tangle of perplexing phenomena and served as a pretty illustration of the application of science to the furtherment of industry.

The miners' first idea was that the ore of the contact had "spilled over"—so he phrased it—into the fissures underneath but there is ample evidence to prove the contrary, namely, that the ore-bearing solutions ascended up along the line of the fissures and then, their further upward progress being ended by the termination of the fissures, which had heretofore been their channel of circulation, they spread out along the zone of crushed rock making the contact. The deposition of ore at this horizon was due partly to chemical causes, such as the precipitating agency of the graphitic matter of the shales, and partly to physical conditions, such as the shattered nature of the rock which afforded a waterway along the bedding. To the miner the important fact is the connection established between the ore on the contact and the veins underneath. It is an association always to be kept in mind when working deposits of this class. A similar geological connection has also been observed at the mining camp of Sawpit, in San Miguel county, and in the slate and sandstones of the Potsdam formation in South Dakota. Whether other larger contact deposits have not some, as yet unrecognized, connection with similar feeders underneath them is a matter worthy of diligent inquiry.

The Cripple Creek *Times* says:

The Stanley Bros. are putting up a fine plant of machinery on the Ida B.

The Doctor mine is shipping 140 tons of ore per week that averages $150 to the ton.

The John E. Smith lease on the Jennie Sample is in fine ore and shipping more than ever.

The Ingham is now shipping about 75 tons of ore per month of an average value of $160 per ton.

The Acacia Company has begun hoisting ore from the Burns lode and will make its first shipment this week.

There are three large hoisting plants on the cars at Anaconda, all of which are to be set up on Raven hill the coming week.

The Barney Barnato Company is diligently pushing things on its properties on Grouse mountain. Two shifts are working and the shaft is 47 feet deep, and the vein matter extends the entire width of the shaft.

The Phoenix and Ellen McGregor on Gold hill, near the Irish Mollie, have been purchased by A. B. Twombly and J. T. Grayson, who were in camp a few days ago. Mr. Twombly is a representative of the Vanderbilts.

The Standard Gauge Gold Mining Company yesterday purchased eleven claims on Big Bull mountain, upon which patents have been applied for. Some development work has been done on these properties and assays obtained as high as $66.

A good strike is reported on the Henrietta No. 2, worked by Dr. J. T. Reid, of Colorado Springs, and associates. A four-foot vein of pay ore is exposed in the bottom of a 45-foot shaft. The claim is about a half a mile south and west of the Lincoln mine.

In the Maid of Lawrence tunnel, on the Lawrence townsite, about half a mile south of Victor, in the breast of the tunnel at a distance of 55 feet a 3½-foot of phonolite quartz has been struck which assays $40. This claim is the property of McMahon & Collier, of Pueblo.

Some good results are being obtained by the active work which the Gold Development Company is doing on a number of its properties in this district. On the Pueblo, Gold Queen and Trinidad claims, south of the Washington, near Victor, prospecting is conducted. The May-Be-So on Globe hill is worked under a lease by this company. A contract has just been let to sink the shaft, now 115 feet, another 100 feet.

ARIZONA.

PRESCOTT NOTES.—*Journal-Miner*: There are seventeen men employed in the Po & Hamilton mine, on Big Bug, of which Henry Murphy is superintendent.

Vincent E. Frost, manager of the Leland Stanford Company, has seven men at work in the Leland Stanford and Snipe claims.

J. J. Milliken is building a five-stamp mill on Lynx creek to work the ore from a number of claims owned by him there.

Nogales *Oasis*: An English outfit has taken a bond on the Goddess of Liberty group of mines, below Union Pass, in Mojave county.

F. L. Fleishman, of Cleveland, Ohio, has purchased the Senator mine in Mojave county, and has employed Mr. Comstock as consulting engineer.

Six feet of sulphuret ore has been struck in Wilson & Bradley's Black Oak mine, in Yavapai county, at a depth of 350 feet in a tunnel, which is now in 400 feet.

There is said to be a pay streak in the Last Chance mine, near Prescott, 3½ feet in width, the ore from which ranges in value from $25 to $80 per ton; that one miner can pick down four tons of this ore per day without the use of powder.

As soon as the litigation over the Flores property in Mojave county is settled, the mill will be started up on a gold property in this vicinity.

The Cherrick mine, on Cherrick creek, Yavapai county, is said to give promise of becoming a bonanza.

S. A. Parnall, superintendent of the Old Dominion Copper Mining and Smelting Company, announces that his company is prepared to buy all the copper ores desirable for smelting, which are offered.

Tombstone *Prospector*: The Mohawk group of copper mines is in the south east end of the S. H. mountains, 12 miles north, 20 degrees west from Aztec on the S. P. R. R., and six miles from the Gila river. This group of ten claims was discovered and located by Geo. W. Norton, Chris. Horner, S. M. Franklin and James H. Graham, about one year ago. The development so far shows one of the largest bodies of copper ore discovered for many years. The ledge is 1200 feet wide, taking two claims in width to cover it. The ledge is composed of iron, lime and copper. On these ten claims there is all kinds of copper ore. Red oxide of copper shows the most. The ore also carries some gold and silver.

Mohave *Miner*: From a stope 12 feet in length, and 12 feet high in the Nighthawk mine, Wm Brandon took out $3,000.

An English outfit has taken a bond on the Goddess of Liberty group of mines, below Union Pass, and have agreed to spend $100,000 putting them in shape.

Theo. B. Comstock, of Prescott, and a Mr. Fleischman, of Cleveland, O., have gone out to inspect the Senator mine and mill. Alfred Ver Mehr accompanied them.

It is reported that an immense flow of water has been encountered in one of the mines in Gold Basin, recently purchased by the Scotch syndicate. Already enough is flowing away to supply a 40-stamp mill. This shows that there is an abundant water supply in our mountains if only properly developed.

## Coast Industrial Notes.

—The Pacific Rolling Mills have resumed operations.

—The Gerlach Wave Motor at Capitola is reported to be a practical success.

—The Alaska Packers' Association has declared a dividend of 75 cents, payable March 12th.

—The Biddle Purchasing Co., of Philadelphia, will operate the old Pacific Nail Works at Oakland, Cal.

—The *Tidings* reports that the Clipper Gap powder mills shipped 1000 kegs of powder to Mexico last week.

—The annual meeting of the stockholders of the California Wire Works has been postponed until April 15th.

—The Berkeley, Cal., Electric Light Company are about to issue bonds for $30,000 to buy a new site and build a new plant.

—Oregon is shipping bacon and ham to this city. The Union Meat Co. of Portland sends an average of 20,000 pounds here on every steamer.

—The Redding *Free Press* hears that the Red Cross Lumber Company will build a narrow gauge railroad from a point on the line of the Southern Pacific near Mott to tap the McCloud river belt.

—The Southern Pacific Company has placed an order for fifteen engines, to cost $180,000. Six will be twelve-wheel locomotives, nine will be ten-wheelers, and will be used for passenger and freight trains.

—The Western Packing Co., Portland, Ore., incorporated in '95 to slaughter horses and export horse meat, has quit, owing to shipments from Chicago of diseased horse meat. Several European Governments have closed their ports against the new American delicacy.

—Oil shipments to San Francisco are increasing. Over 22,000 barrels have come from Ventura county within the last month, nearly all of which was brought by the tank steamer Geo. Loomis, which makes the trip in forty hours. The Ventura shipments for February will be 30,000 barrels, most of which goes to the Rodeo refinery.

—The *Transcript* hears that the Nevada County Electric Power Company is negotiating for the purchase of K. Casper's electric light plant in Nevada City, and that the transfer is about to be made. The company is considering the purchase of the electric light and gas plant at Grass Valley, and is talking of buying Nevada City gas works.

—At present Oregon flour is cheaper in Hongkong than in Portland, where merchants are arranging to ship Oregon flour from Hongkong to Australia. The rates of freight from Portland to Hongkong and from there to Australia combined, being less than from Portland to Australia direct, gives them an opportunity to do this with a prospect of profit.

—Olive growing is one of the few industries outside of gold mining that now pays in California. The largest olive grove in the world is now being planted near Fullerton, in Orange county, by Andrew McNally of the firm of Rand & McNally, Chicago. It will consist of 400 acres of 40,000 trees. It is calculated that when the season is over there will be 3,000 acres of land that have been planted to olives. The demand still exceeds the supply.

—The railroad which Russia is building across Siberia has been extended to a point over 3000 miles from St. Petersburg. When Russia has a railroad connecting St. Petersburg with Vladivostock it will take a pronounced and aggressive stand in relation to Chinese matters. In all that it has recently done in the Orient it has had the completion of this railroad in view. When the line is open it will be able to transport troops rapidly from St. Petersburg through Siberia to the Pacific Coast.

—The Northern Pacific steamship Tacoma sailed for the Orient on the 15th. Her sailing date at Hongkong on the return voyage was originally April 7th, but her date will be taken by one of the new Northern Pacific Steamship Company's vessels, which will leave Hongkong the first week in April. The names of the new vessels are the Columbia and Olympia. The owners of the present line found it necessary to build these two new steamships, which, with the Tacoma and Victoria, will make a fleet of four vessels operated regularly.

—The largest store in the United States is approaching completion on Market street, this city, and the 600 workmen expect to finish by April 15th. It fronts 275 feet on Market street, extends south 350 feet to Jessie street, and is eight stories high. It is built of steel, marble, copper and terra cotta, has fifteen electric elevators, nearly 100 miles of electric wire, and will cost, exclusive of the ground, about $1,500,000. A general stock of everything will be kept; there will be all the usual facilities of a city within its walls, and will be a triumph of concentration in business, and a death blow to several individual dealers.

—The Spokane and Columbia Telephone and Telegraph Co. has organized at Spokane, Wash., with $75,000 capital. It proposes to build from Spokane to Trail Creek, B. C. N. R. Stone says 224 miles of line will be built. "Two contracts have been let for a supply of poles to Rossland and Trail Creek, and work will commence when the franchise arrives from the provincial authorities and when the snow permits, at the latest by the middle of May. We will put on a force of men large enough to complete the line from Spokane to Rossland in forty days. Poles will cost us 40 cents apiece and we can get 3,000,000 at that price. At first a No. 9 galvanized steel wire will be strung. Cross arms will be added and a copper metallic circuit put on, consisting of No. 10 copper wire. We will use the steel for way business and the copper circuit for through business."

—Government work on the Cascade locks of the Columbia river, Oregon, was commenced twelve years ago with a small appropriation. A contract was taken by McBean of Chicago. He was unable to complete the contract, and the Government finished the appropriation. The last contract was intended to complete the entire work and was taken by J. G. and I. N. Day of San Francisco for $1,235,000. At that time the Government had about $300,000 available outside of the amount of the contract. The work was to have been completed last March, but owing to high water of two years ago, which did considerable damage, a year's extension was granted. The money is now all expended, but the contractor will endeavor to get another extension. To protect the work already done it will be necessary to have the wall protected by riprapping on the river side of the locks for a distance of from 3500 to 4000 feet. The point of that protection on the plans already made must be in crescent form, built of stones of certain dimensions set in cement. On the up-river side there is yet to be excavated about 100,000 yards, and about 15,000 yards before a boat can pass through. At the lower end of the submarine work, between the blasted rock and gravel, there is yet to be excavated about 5000 yards, all contemplated under the present contract, and no money to do it with. The high water of two years ago did great damage, being at that point seventeen feet higher than ever before known. The upper guards were seven feet lower than the high water, and when they were put in they were thought to be ten feet above any high water. The water to open and close the valves and gates is obtained from the mountain, about 6000 feet distant, and is operated under a 600-foot head. It is brought down through a ten-inch steel-cap welded pipe, the heads of the pipe being reinforced and put together with lead in the same manner as is usual in making connections of cast-iron pipe. Of the concrete work, speaking approximately, there is about 45,000 yards, and the steel and iron in the gates and connections aggregate 1,250,000 pounds. The gates were made in sections and were shipped out in sections, weighing from sixteen to thirty tons, and from 13,000 to 30,000 rivets were used in putting each gate together. The gates have no out-bearing at the points, but move on hinges the same as a door. The weight of the upper guard gate is about 356,000 pounds, and when completed it was so nicely adjusted that four men could easily open and close it. To proceed with a work of such magnitude requires an immense plant, which consists of six locomotives, fifty-five hoisting engines, fifty-five derricks, 2000 overhead travelers capable of handling fifteen tons, one steam shovel, largest size, one large modern steam dredge, two air compressors, an electric light plant operating fifty arc lights, a complete machine shop with all the necessary tools, a blacksmith shop with six forges, ten pumps with capacity ranging from 200 to 10,000 gallons a minute with engines and boilers to drive them, four large sand washers, one largest size rock crusher and a small crusher with a cement roller and three cement mixers and engines to drive the same, one complete sawmill plant with a capacity of 25,000 feet a day. The stone-cutting sheds are 400 feet long. The stone for the work on the locks is quarried on Herman creek, about four miles above the locks. The contractors built a spur from the O. R. & N. to the quarry, and the stone is brought down with their own cars and locomotives. From the head of the locks to the lower end is about 3500 feet. The work at present is in charge of Lieutenant Harry Taylor of the corps of engineers United States army.

## Obituary.

REUBEN RICKARD, a well known mining man of this coast, died at Perth, Western Australia, on the 27th ult., in the fifty-sixth year of his age. He sailed about the middle of last November under engagement from some English capitalists, at a salary of $10,000 per annum, to examine West Australian mining properties. Mr. Rickard was prominently identified with silver-lead interests in Eureka, Nev., for many years, and acquired considerable wealth. Mr. Thos. Rickard of the Parke & Lacy Co. of this city is his eldest son. Mr. T. A. Rickard, State Geologist of Colorado, is his nephew. Mr. Rickard left an honorable memory and his death is a source of sorrow to many.

## Recent Mining Incorporations.

The Last Chance Gold Mining and Milling Company, San Francisco. Directors—A. D. Taylor, D. M. Tomblin, W. R. de Frees, P. W. Johnson and A. L. Jenkins; capital stock, $100,000; all subscribed.

The Mariana Marsicano Gold Mining Company, San Francisco; capital stock, $1,000,000; $500 subscribed. M. O'Brien, H. Hinchmann, P. Marsicano, G. A. Hinkelbien and F. W. La Bonte, of San Francisco, directors.

The Tenabo Mill and Mining Company, San Francisco. Directors, Simeon Wenban, William P. Shaw, W. E. F. Deal, Thomas J. Read and Oscar R. Jones; capital stock, $1,500,000, all of which has been subscribed.

## Commercial Paragraphs.

The Union Gas Engine Company sent five gas engines and hoists to Australia on the Monowai last Friday.

There will be eight Woodbury concentrators shipped to Australia by the next steamer. Mr. Woodbury has just shipped two to Idlewild Mining Company, El Dorado county, and has recently put in six machines for the Carson Creek Mining Company and has sent one to Mexico; another to Boise City, Idaho, and another to Butte, Montana.

## Personal.

J. C. CALLAHAN is inspecting mining properties at Pony, Montana.

S. P. DORSEY of the Maryland mine, Nevada Co., has returned from Louisiana.

SUPT. KEATING of the Savage and Justice mines has returned to the Comstock.

H. G. BLAISDELL, first governor of the State of Nevada is visiting Nevada City, Cal.

THE leave of absence of T. L Ford, who is now in Washington expires on the 18th inst.

SUPT. G. W. Dickie of the Union Iron Works has gone to Japan on business and pleasure.

CLOUD R. WATSON, of Edinburg, Scotland, is making a trip through Utah's mining camps in behalf of Scottish capitalists.

ED SCHIEFFELIN who was the first successfull discover at Tombstone, Arizona, is now interested in placer properties at Woodville, Or.

MESSRS. BIGELOW AND NELSON are understood to be on their way from Boston to inspect the Merced Gold Mining Co.'s properties in Mariposa county.

WALTER S. KELLY, until recently connected with the United States assay office at Helena, Montana, has taken charge of the Elkhorn mine, Elkhorn, Montana.

T. B. COREY, formerly superintendent of mines for the Oregon Improvement Company, has taken charge of the Navy Coal Company's mines at Cumberland, Wash.

CHARLES M. ALLEN, superintendent of the Butte & Boston smelter, has retired from that position to devote his time to other enterprises. It is understood that Rob't White will be his successor.

RECEIVER SMITH of the Atlantic & Pacific has appointed Don. A. Sweet general freight and passenger agent, with headquarters at Albuquerque, New Mexico. At one time Mr. Sweet was general traveling manager for the Santa Fe system.

L. F. J. WRINKLE, who for the past five years has been developing his borax plant at Keeler, has sold it to an English syndicate. His sons, Herbert and Noah, who have been under big salaries as assistant superintendent and foreman respectively, have been retained under the new management.

DR. GEO. C. MUNSON, mining engineer, known throughout the West for the past thirty-five years, is now connected with the General Gold Ore Extraction Co., Ltd., of Denver, Col. This company treats refractory gold ores by the Pelatan-Clerici process and is putting in plants on several mines.

PROF. ALEXANDER AGASSIZ sailed Friday on the Monowai to explore the great barrier reef of Australia and similar coral formations in south Pacific waters. He is about the highest living authority on some forms of marine life, and his long-cherished plan to make extended research in the south sea will inure to the benefit of science. Prof. Agassiz spent a year in mine examination in this State in 1859-60, and is greatly interested in the progress of scientific gold mining since then.

## Catalogues Received.

JOHN TAYLOR & Co. (Incorporated), 63 1st St., Cor. 1st and Mission, San Francisco, Cal., catalogue and price list No. 6, 6x9 inches, 212 pp., profusely illustrated, containing prices and descriptions of assayers' materials, chemical apparatus, mine and mill supplies, including everything in the way of material required by assayers, chemists and millmen, with price and description annexed. Prospectors' outfits are specified, and differently priced assayers' outfits are quoted in their entirety. A list of books and their prices on assaying, mineralogy, chemistry, etc., is also published, and a complete price list of the chemicals most ordinarily used by miners and metallurgists, with reference tables and information, with index. The book is well gotten out typographically and will be sent to any address upon application.

UNION IRON WORKS, 222 Market St., San Francisco, Cal., catalogue No. 3, metallurgical and mining machinery, 10x7 inches, 203 pp., illustrating and describing in detail ore feeders, rock crushers, dies, cams, stamp heads and batteries, with specifications as to weights and requirements; steam stamps, gold and silver mills, plants for treatment of sulphurets, base ore roasting furnaces of various patterns, condensed description of the various processes, a treatise on concentration with a detailed account of the new Union concentrator; slime tables, Cornish rolls, smelting plants of various kinds, including different makes of water-jacket smelting furnaces, etc. The closing thirty-one pages of the work are devoted to miscellaneous information, practical and up-to-date, measures, weights, formulas, tables, etc., of value to every one connected with mining or metallurgy. The catalogue is an unusually fine one and will be sent upon application to any address.

GEO. W. KNEASS,

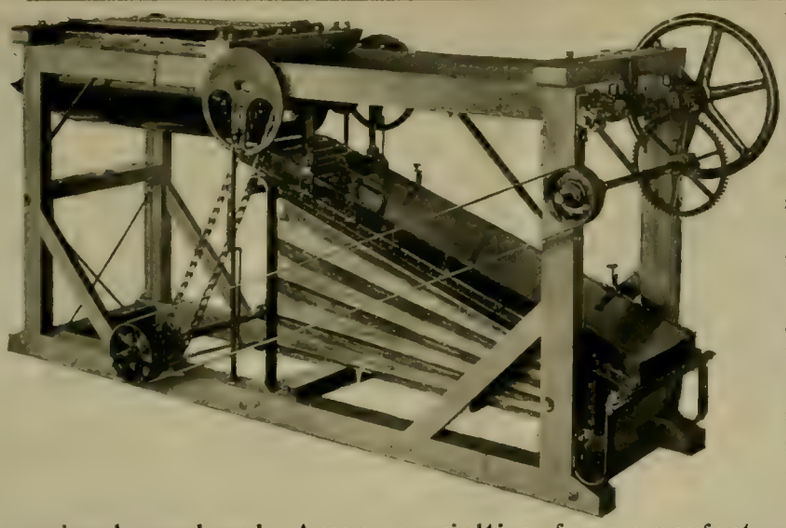
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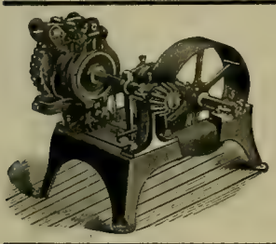
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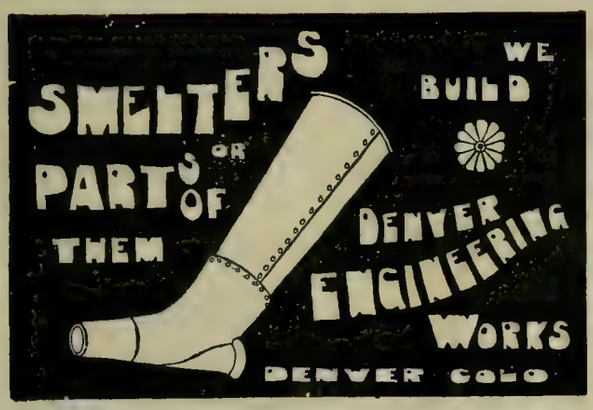
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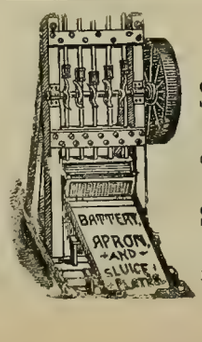
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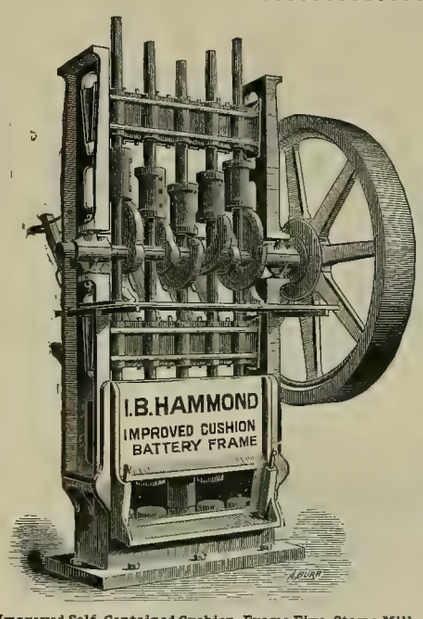
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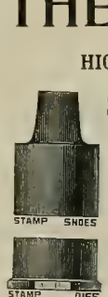
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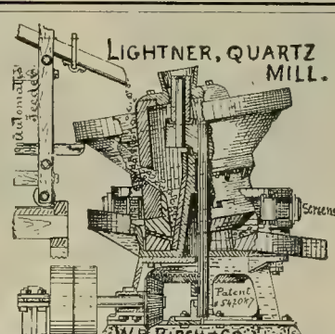
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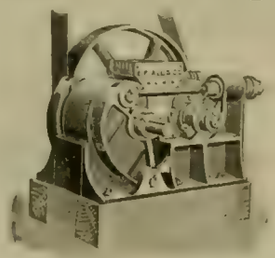
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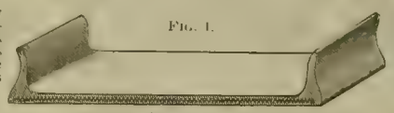


FIG. 1.



FIG. 2

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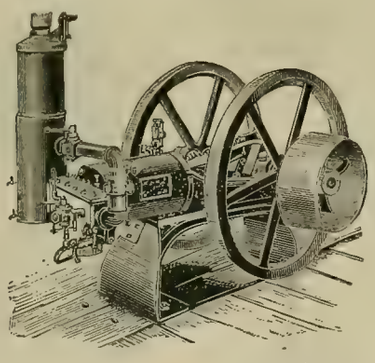
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| | |
|---|---|
| Coal Gas, ten hours' run, 1000 feet | $2 00 |
| Gasoline (74 deg.), ten hours' run, 8¾ gallons @ 14c. | 1 25 |
| Coal Oil, ten hours' run, 7½ gallons @ 10c. | 75 |
| Crude Petroleum, asphaltum base, 16 gallons @ 3c. | 48 |
| Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c. | 65 |

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon—21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¾c per horse power per hour; on domestic coal oil, 1¼c per horse power per hour; and on gasoline, 2¾c per horse power per hour.

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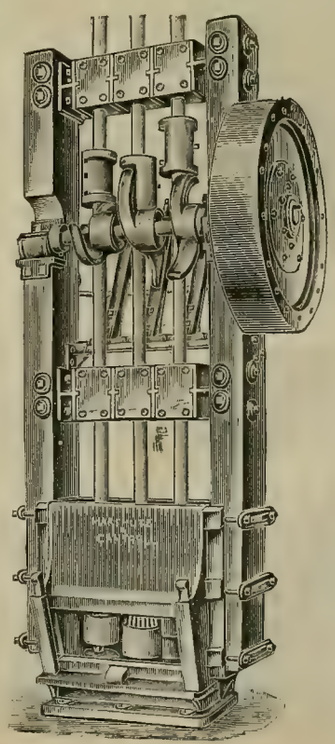
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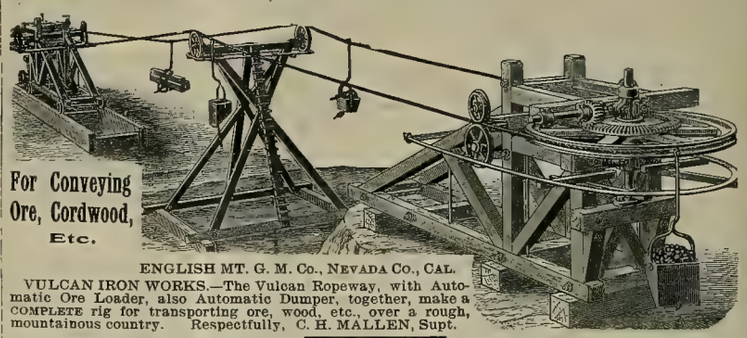
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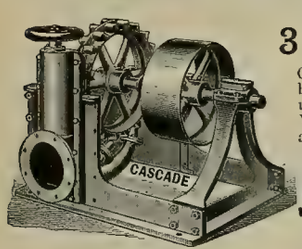
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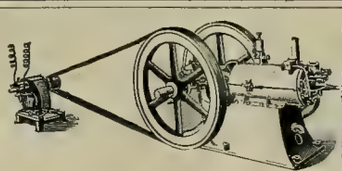
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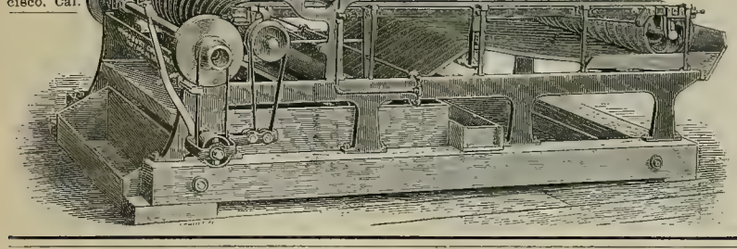
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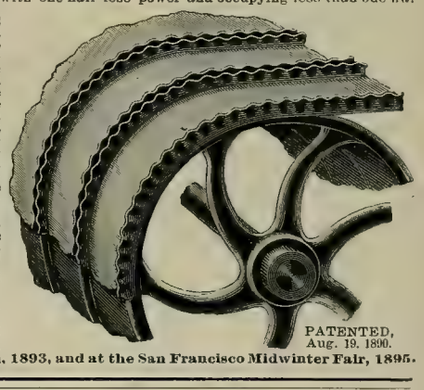
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PATENTED, Aug. 19, 1890.

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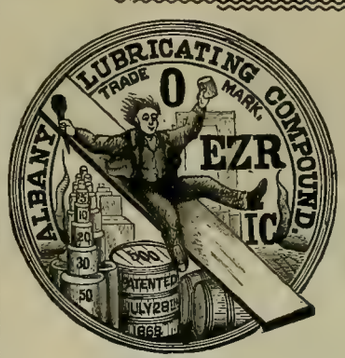
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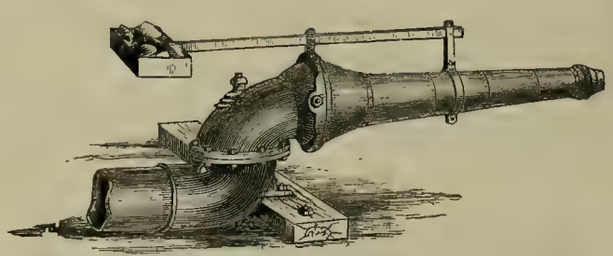
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# Market Reports.

## The Markets.

SAN FRANCISCO, March 5, 1896.

Heavy deposits of snow on the mountain ranges and rainfalls in the valleys have created a greater degree of confidence in mining, financial and business circles. The snow deposits insure water in mining districts at later dates in the season, while the rainfalls in the valleys insure good crops, particularly of grain. This favoring condition inspires the belief that more active times are in store for all industries on this coast. I is the impression that the iron manufacturing industry in this city will enjoy a better degree of prosperity this year than for several years past, and this is always promotive of better times in all other industries. There is still a good inquiry for gold-mining properties, but prospective buyers are exercising greater caution as to the situation, condition and future prospects of the mines offered for sale.

**New York Silver Prices.**

NEW YORK, March 5.—Following are the closing prices for the week:

| | Silver in— | | | |
|---|---|---|---|---|
| | London. | N. Y. | Copper. | Lead. |
| Friday | 31⅛ | 68 | 11 | 3 25 |
| Saturday | 31 3-16 | 68⅛ | 11 | 3 25 |
| Monday | 31 3-16 | 68⅛ | 11 | 3 25 |
| Tuesday | 31¼ | 68⅛ | 11 | 3 25 |
| Wednesday | 31 5-16 | 68½ | 11 | 3 22½ |
| Thursday | 31 5-16 | 68⅝ | 11 | 3 25 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.86¾ |
| London Merchants | $4.84½ |
| London Sight Bankers | $4.88 |
| Refined Silver, peroz., 1000 fine | 68⅝c |
| Mexican Dollars | 54c |

SILVER.—The market has been declining since February 23d, when the price touched 70 cents an ounce. To-day quotations come through from London at 31 5-16d and from New York at 68⅜ cents an ounce. The receding of the market is said to be due to large holders in London having placed considerable quantities at the late advances, and that these sales meet the more urgent temporary wants of India and other demand countries. From all that can be learned the demand for China has been rather disappointing, but still the belief prevails that when that country comes in for new loans a considerable quantity of silver will be required. It is stated that the leading smelters in the United States have contracted their outturn for two or three months ahead. The output of the silver mines in this country, it is said, will not show an increase this year over that of 1895.

COPPER.—The local demand is slow for ingots, but at the East the consumption continues large, causing a fairly firm market. The jobbing trade reports a fair business for this season of the year. The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 14 |
| Ingot, wholesale | 13 |
| Sheet copper | 17 |

LEAD.—The market shows a fair degree of firmness at the East for pig. It is the belief that the consumption will be larger. This is founded on the advice that corroders are confident of large increase in the demand for paints due to a gradual improvement in the situation. On this coast it is now stated that the consumption will show quite an enlargement, owing to more favorable conditions in agricultural and mining sections.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 90 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—There is nothing new to report. There is nothing new in a jobbing way.

The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

QUICKSILVER.—Dealers look forward to a more active demand on this coast. The market is steady at the following quotations:

| | |
|---|---|
| Home trade, per flask | 40 00 |
| West Coast of Mexico, for Export | 35 00 |

BORAX.—The output on this coast is still restricted to actual requirements. The shipping demand is only fair, but an improvement is looked for.

The market is quoted as follows:

| | |
|---|---|
| Refined, in car lots | 6½ |
| Refined, in sacks | 5⅝ |
| Powdered, in car lots | 6⅛ |
| Concentrated, " | 5⅝ |

TIN.—The European markets for tin have held to fairly firm prices. The movement seems to be somewhat of a speculative character. In our market no essential change is reported. Tinplate, both at the East and abroad, is slow. The consumption by canners will probably show a falling off this year for fruit-preserving purposes, but for other uses it will be fully up to last year's. For invoice parcels, the market is quoted at $3 95@4 00 a box, for manufacturing cans. The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14⅝c@14¾c |
| Plate, I C-coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

ANTIMONY.—There is nothing new in the market. We quote the market at from 9 to 10 cents a pound.

COAL.—Liberal spot supplies and free shipments on the way cause a weak and somewhat demoralized market. It is stated that purchases have been made below quotations for to arrive and also shipment. The consumption of steam, it is expected, will be larger this year, but that for household purposes will be essentially unchanged.

The market is quoted as follows:

SPOT FROM YARD—PER TON.

| | |
|---|---|
| Wellington | $ 8 00 |
| Greta | 6 50 |
| Nanaimo | 7 00 |
| Gilman | 6 50 |
| Seattle | 6 00 |
| Coos Bay | 5 00 |
| Cannel | 8 50 |
| Egg, hard | 10 00 |
| Wallsend | 7 50 |
| Scotch Splint | 7 50 |
| Brymbo | 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 25 |
| Liverpool Steam | 6 25 |
| Scotch Splint | — |
| Cardiff | 6 25 |
| Lehigh Lump | 9 00 |
| Cumberland | 13 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

COKE.—Offerings on spot are reported to be heavy and quotations low. The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — — | @ | bbl. |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 8 50 |
| " in sacks | — — | @ | 9 50 |
| Cumberland | — — | @ | — — |

LUMBER.—Rains have interfered, temporarily, with the home demand, but the export movements are said to be large from milling points. There is still more or less cutting in prices.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

NAILS.—There is an increasing outturn of wire nails on this coast, and consequently there is more or less selling competition. The consumption promises to be larger. The market is quoted as follows:

| | |
|---|---|
| Wire, carloads, basis per keg | $3 07½ |
| " jobbing, " " | 3 20 |
| Cut, carloads, " " | 2 82½ |
| " jobbing, " " | 2 95 |

## Mining Share Market.

SAN FRANCISCO, March 5, 1896.

As usual, the market moved on contrary lines the past week, for instead of going up as the many had been led to expect, it went off up to Monday, when Hale & Norcross showed more activity and sold at twenty per cent advance. The rest of the list did not sympathize much. On Tuesday the market hung at around Monday's prices, but Wednesday afternoon it strengthened. The strengthening allowed the Belcher Mining Co. to levy a 25 cent assessment, and Con. Virginia one of 30 cents. Other companies will follow and levy assessments soon. While believing that a turn in the market is near at hand, still the writer does not believe that there will be any deal for several months to come. The turns will, as it now looks, be in one or two stocks, which, after being sent up in price will be let alone and the market allowed to fall back, and then take up two others. These moves will be for the purpose of not letting interest in the market die out, and at the same time encourage holders to pay assessments. This opinion is based on the belief in well informed circles that there are quite a number of good sized blocks of shares held by outside parties in the hope the market will be put up and they be able to sell out at a good profit. Parties able to make a good sized deal being cognizant of this are not slow to encourage them to hold and pay assessments, so the mines can be well exploited. The writer will venture the assertion that until conditions at the East are greatly improved there will not be anything in the share market except small spasmodic moves. In a presidential election year it is not to be expected there will be as much of a change for the better in speculative markets, but it is reasonable to expect dull and dragging markets. This is experience derived from the past, and it is quite safe to claim that it will hold good in the future. While saying this, yet it must be conceded that there is work under way in some of the mines on the Comstock that deserves watching, although it may be several months before it reaches the points desired. The observance of Sunday on the Comstock will cause less work to be done, besides which, fewer men are employed. One mine, Con. Virginia, laid off quite a number of miners the past week. In this city brokers are said to be feeling the depression more than ever. They seem to be following in the footsteps of the Stock Exchange by reducing expenses, some even say they intend going out of the business until times improve. This kind of talk comes every few years, but still they do not go out, but continue along well knowing that the Comstock has as many lives as the proverbial cat, and when it is least expected a new lease of life is given to the industry by an important ore strike and a share deal.

The reported contest for the control of Hale & Norcross is not attracting much attention. Outside of the "ins" trying to keep control and the "outs" trying to get in, presumably to draw salaries, very little interest is being taken in the contest. Moneyed men were never known to let the public in on a "good thing;" they want it themselves, and reasoning on this basis it seems strange that the contestants are so anxious to have outside holders of shares not sell but give them their shares for voting purposes. It may be all right, for no one can tell, yet it looks rather strange.

News from the Comstock mines is not materially changed since our last week's review. The general situation is full of encouragement that there are better things in store, yet the work, as it is understood, will take quite a number of weeks if not months before the objective points sought, and when found the expected ore may not develop as large and as rich as miners look for. In Alta dilatory work is still the order in the vicinity of the Keystone ledge. This ledge, wherever it has been struck, has heretofore proven rich, and it would seem singularly strange if it should prove contrary now. It may take another assessment yet before the rich strike can be made. In Overman, while exploiting work is under way, a few tons of good ore is extracted each week. The assessment on Belcher ought to give the company sufficient funds to more actively prosecute the work to the west, where it is believed there is good to high-grade ore. In Crown Point active work is still the order, but it takes money and funds from a 20-cent assessment do not last long. From Yellow Jacket no news is allowed to leak out. In Challenge and Confidence the work is still of a skirting character. It looks as if they are trying to find out the extent of the ore found about a year ago. In the Con. Imperial west drift slow work is being made. Miners are confident that they will strike the west lode before the year passes. In Alpha they are still "fooling" around the vicinity of the west lode. How much longer time will be required for the work is still an open question. In the middle mines the most active work is being done, and better results follow. From each of the mines ore is being extracted while exploiting or developing them. The quantity of the ore is not sufficient to pay expenses, unless Hale & Norcross be excepted, yet it helps to keep off assessments. From Gould & Curry and Best & Belcher nothing of interest comes to hand and all interests seem to be centered on Con. Virginia, and apparently correctly so. The work in this mine is on several levels and seemingly done for the best interest of shareholders. Miners are confident of good results within the next nine months from the work going on in the 1750 and 1000-foot levels. In Ophir, Mexican, Union and Sierra Nevada the work that is being done seems to be for the purpose of laying the foundation for more activity next summer or fall.

From the Brunswick lode our advices continue to report active work, particularly in Occidental. As yet the results have been disappointing to some, still those in control have confidence in the mine. This is emphasized in the work that is being done. Work in the other mines on the lode is not being pushed so energetically as is that in Occidental. This is doubtless due to a desire to see what will result from that in the latter mine. If a strike of a large body of good ore should be made then the other companies will increase their forces of men and prosecute the work more energetically.

From the Bodie district nothing of interest comes to hand. So far the work done in several of the mines has resulted in nothing more than depleting the funds in the treasury, which will necessitate assessments before long.

The monthly financial statements are as follows:

| BODIE MINES. | | | |
|---|---|---|---|
| Bodie | $ 6,745 | Crown Point | $ 2,497 |
| Bulwer | 195 | Exchequer | 3,716 |
| Mono | 2,871 | E. Sierra Nev | |
| Standard | 22,153 | Gould & Curry | 1,308 |
| Syndicate | 782 | Hale & Norc'ss | 10,804 |
| | | Julia | 900 |
| | | Justice | 2,303 |
| COMSTOK MINES. | | Kentuck | 2,322 |
| Alpha | $ 3,961 | Lady Wash'n | 624 |
| Alta | 4,296 | Mexican | 11,632 |
| Andes | 423 | Ophir | 4,539 |
| Belcher | 279 | Occidental | 5,077 |
| Best & Belcher | 5,337 | Overman | 5,870 |
| Bullion | 3,336 | Potosi | 18,203 |
| Caledonia | 1,018 | Savage | 4,226 |
| Challenge | 1,078 | Segr. Belcher | 1,067 |
| Chollar | 16,191 | Silver Hill | 311 |
| Confidence | 4,542 | Sierra Nevada | 755 |
| Con. Cal. & Va | 6,355 | Union Con | 17,366 |
| Con. Imperial | 2,501 | Utah | 457 |
| Con. New York | 1,295 | | |

The following illustrates the changes of the week:

| MINES. | Feb. 27. | Mar. 5. |
|---|---|---|
| Alpha | | |
| Alta Consolidated | | $ 14 |
| Andes | | 27 |
| Belcher | | |
| Best & Belcher | $ 76 | 70 |
| Bodie | | 17 |
| Bullion | 12 | |
| Challenge | | |
| Chollar | 53 | 51 |
| Confidence | | |
| Consolidated California and Virginia | 1 95 | 1 65 |
| Consolidated New York | | |
| Crown Point | | |
| Exchequer | | |
| Gould & Curry | 36 | 33 |
| Hale & Norcross | 1 25 | 1 40 |
| Justice | | |
| Mexican | | 56 |
| Ophir | 1 25 | 1 25 |
| Overman | 15 | 13 |
| Potosi | | 45 |
| Savage | 42 | 33 |
| Sierra Nevada | 35 | 65 |
| Union | 47 | 56 |
| Utah | 10 | |
| Yellow Jacket | 35 | 35 |

# MINING SHAREHOLDERS' DIRECTORY.

**ASSESSMENTS.**

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alta S M Co, Nev | 51 | 10c | Jan 13. | Feb 17. Mar 9. | J E Jacobus, 309 Montgomery |
| Andes Silver M Co, Nev | 42 | 15c | Jan 30. | Mar 6. Mar 28. | J W Twiggs, Nevada Block |
| Bay State M & D Co, Cal | 30 | 2c | Feb 1. | Mar 9. Mar 28. | F E Luty, 330 Pine |
| Belcher S M Co, Nev | 52 | 25c | Mar 3. | Apr 7. Apr 28. | C L Perkins, Mills Building |
| Bulwer Con M Co, Cal | 12 | 5c | Feb 5. | Mar 11. Apr 3. | J E Jacobus, 309 Montgomery |
| Con Cal & Va M Co, Nev | 6 | 30c | Mar 4. | Apr 8. Apr 28. | A W Havens, 309 Montgomery |
| Crown Point G & S M Co, Nev | 66 | 25c | Jan 16. | Feb 20. Mar 12. | Jas Newlands, Mills Building |
| Gold Bar Con M Co, Cal | 3 | 5c | Feb 10. | Mar 19. Apr 10. | E C Godfrey, 38 Crocker Building |
| Julia Con Co, Nev | 27 | 5c | Jan 17. | Feb 20. Mar 11. | J Stadtfeld, Jr, 309 Montgomery |
| Justice M Co, Nev | 60 | 10c | Jan 13. | Feb 17. Mar 9. | R E Kelly, 309 Montgomery |
| Lady Washington Con Co, Nev | 11 | 5c | Jan 16. | Feb 17. Mar 10. | J E Jacobus, 309 Montgomery |
| Orleans Mining Co, Cal | 1 | 10c | Jan 21. | Feb 29. Mar 24. | W Olney, 101 Sansome |
| Osceola Con M Co, Cal | 5 | 1c | Feb 11. | Mar 14. Apr 8. | H Smith, 307 Montgomery |
| Sierra Nev S M Co, Nev | 110 | 25c | Feb 3. | Mar 7. Mar 27. | E L Parker, 309 Montgomery |
| Silver King M Co, Arizona | 13 | 25c | Jan 28. | Mar 9. Apr 6. | J W Pew, 310 Pine |
| Union Con M Co, Nev | 52 | 20c | Jan 14. | Feb 17. Mar 17. | A P Swain, 309 Montgomery |

**MEETINGS.**

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Hale & Norcross S M Co | A B Thompson, 309 Montgomery | Mar 11 |
| Potosi Mining Co, Nev | C E Elliot, 309 Montgomery | Mar 11 |
| Pyramid Mining and Mill Co, Cal | C A Hare, S F | Mar 14 |
| South Eureka M Co | A Halsey, 530 Cal | Mar 18 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, March 5, 1896.

9:30 A. M. SESSION.

| | | | | | |
|---|---|---|---|---|---|
| 300 | Alta | 14 | 600 | Mexican | 56 |
| 100 | Andes | 27 | 200 | Occidental | 04 |
| 400 | Best & Belcher | 70 | 200 | Ophir | 1 25 |
| 100 | Bulwer Con | 17 | 100 | Overman | 13 |
| 400 | Chollar | 51 | 300 | Potosi | 45 |
| 50 | C. C. & Va | 1 65 | 500 | Sierra Nevada | 65 |
| 50 | Gould & Curry | 33 | 150 | Union Con | 56 |
| 50 | Hale & Norcross | 1 40 | 200 | Yellow Jacket | 35 |

SECOND SESSION—2:30 P. M.

| | | | | | |
|---|---|---|---|---|---|
| 100 | Ophir | 1 20 | 200 | Sierra Nevada | 62 |
| 100 | Mexican | 54 | 500 | Exchequer | 03 |
| 300 | Gould & Curry | 30 | 300 | S Belcher | 08 |
| 150 | Best & Belcher | 67 | 100 | Overman | 13 |
| 650 | Con Cal & Va | 1 60 | 200 | Union | 52 |
| 100 | Savage | 33 | 200 | Occidental | 90 |
| 100 | Potosi | 43 | 500 | Bodie | 17 |
| 350 | H. & N | 1 30 | | | |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., March 4, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| CALIFORNIA STATIONS. | Total Rainfall for the Week | Total Seasonal Rainfall to Date | Total Seasonal Rainfall Last Year to Same Date | Average Seasonal Rainfall to Date | Maximum Temperature for the Week | Minimum Temperature for the Week |
|---|---|---|---|---|---|---|
| Eureka | | | 32.33 | 29.82 | 60 | 32 |
| Red Bluff | 1.51 | 14.43 | 25 13 | 18.73 | 64 | 30 |
| Sacramento | .50 | * | 21.54 | 12.14 | * | 34 |
| San Franc'co | .50 | 14.51 | 21.97 | 18 02 | 58 | 32 |
| Fresno | .50 | 4.89 | 11.32 | 6.26 | 72 | 34 |
| S. L. Obispo | 1.52 | 13.52 | 22.46 | * | 68 | 32 |
| Los Angeles | .27 | 7.47 | 11.68 | 13.35 | 84 | 36 |
| San Diego | 1.04 | 4.12 | 10 17 | 4 23 | 68 | 44 |
| Yuma | .54 | .86 | 3 01 | 2.73 | 90 | 40 |

* Indicates no record.

**Treatment of Gold Ores by the Pelatan-Clerici Process.**

The General Gold Extraction Co. Ltd., of Denver, Colorado, has just issued a neat and comprehensive pamphlet explanatory of the treatment of gold ores by the Pelatan-Clerici process. The remarkable results reached in the treatment of refractory ores by this process is fully and clearly set forth and should be read by every mine owner in the west, who wishes to be informed of the latest up-to-date discoveries in the economic treatment of refractory low-grade ores. The pamphlet will be sent free to any address upon application.


## GOLD MINING PROPERTIES.

Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR WEEK ENDING FEBRUARY 25 1896.

555,201 LOCK JOINT—H F Ascheck, Alameda Cal

555,208 ELECTRIC RAILWAY—C M Bridges, Seattle Wash

555,247 CAN SOLDERING—F V Butler Elko Nev

555,167 LADLE—W Hainsworth Seattle Wash

555,247 CAN SOLDERING MACHINE—M Jensen Astoria Or

555,173 LIFE SAVING DEVICE—W H Martin Los Angeles Cal

555,167 CUT OFF VALVE—J B Pitchford, S F

555,181 CAR VALVE BOX—A D Richmond, Santa Barbara Cal.

NOTE—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible on mail or telegraphic order. American and Foreign patents obtained and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention.

LOCK JOINT. Henry F Ascheck, Alameda, Cal. No. 555,201. Dated Feb. 25, 1896. This invention relates to that class of joints rigid or bendable as required, and which may be properly termed "lock" joints. It consists in a joint composed of a pin or stud in each of the parts to be joined, and a guide in each of said parts to receive and permit the travel of the pin or stud of the other part, said guides being corresponding but reversed and each having a portion in which the other's pin or stud may play about and move past its own pin or stud whereby the joint is bendable, and a portion in which each pin or stud is locked and locks the other against a movement about each other whereby the joint is rendered rigid. The object of the invention is to provide a joint applicable in all cases and to all structures in which a part or member has at one time to be turned or moved with relation to another and at another time to be held rigid or locked with respect to that other.

CONDUIT ELECTRIC RAILWAY. Christopher M Bridges, Seattle, Wash., assignor of one-fifth to John S Fanning of San Francisco, Cal. No. 555,208. Dated Feb. 25, 1896. This railway consists of the combination of a series of rollers in the conduit, swinging arms on which said rollers are mounted, insulated sections or pieces carried by said arms, contact pins slidably mounted and positively and normally bearing on said insulated sections or pieces and an electrical connection from said pins to a supply conductor and a contact bar carried by the car and having electrical connection with the motor thereof, said bar being adapted to travel in contact with said rollers and by said contact to swing the arms successively to throw the contact pins from the insulated sections of the arms into electrical connection with said arms whereby the circuit of the motor is established. The contact bar carried by the car conforms to the several bends and curvatures of the track, and to this end its best and preferable form is in the shape of a bar rendered flexible either inherently or by means of its hangers.

CAN SOLDERING MACHINE.- Matthias Jensen, Astoria, Or., assignor of one-half to Jensen Can Filling Machine Co. No. 555,247. Dated Feb. 25, 1896. This invention relates to improvements in machines for soldering cans, and it is especially applicable to the soldering of the end seams of square, oval and other shaped cans in a single machine. It consists of a series of stalls adapted to receive and turn the can so that the seams are dipped into the molten solder, the stalls being carried over the soldering trough by a horizontally moving carrier and being so constructed that the cans are movable between the parallel sides of the stalls, while being rolled on their largest diameters. In conjunction with this is a mechanism for feeding the cans successively into the openings of the stalls as these openings pass beneath the chute which carries the cans, so that each stall will receive a can as it passes, the cans being delivered upon a carrying discharge belt at the opposite end of the apparatus.

## Assessment Notices.

MARGUERITE GOLD MINING AND MILLING COMPANY. Location of principal place of business, San Francisco, Cal. Location of works, Auburn, Placer county, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 20th day of February, 1896, an assessment (No. 2) of 10 cents per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 25 Twelfth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of April, 1896, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on THURSDAY, the 30th day of April, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. WINTERS, Secretary.

Office, 25 Twelfth street, San Francisco, California. Office hours, from 9 to 10 A. M.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 10th day of February, 1896, an assessment (No. 3) of 5 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 38 Crocker Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 19th day of March, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 10th day of April, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. C. GODFREY, Secretary.

Office, 38 Crocker Building, San Francisco, California.

CON. CALIFORNIA AND VIRGINIA MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Storey county, Nevada.

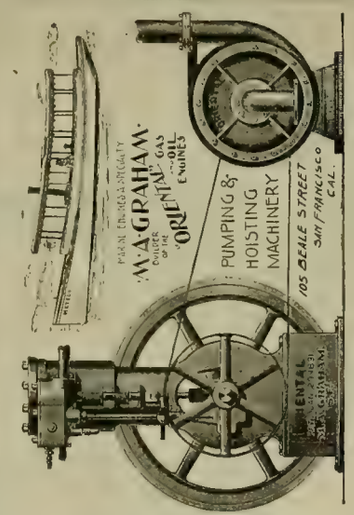
Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of March, 1896, an assessment (No. 6), of 30 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 47 Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of April, 1896, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the 28th day of April, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office: Room No. 47 Nevada Block, No. 309 Montgomery street, San Francisco, California.




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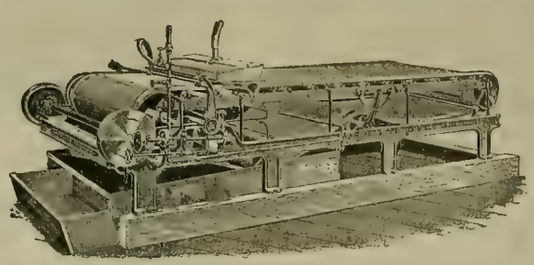
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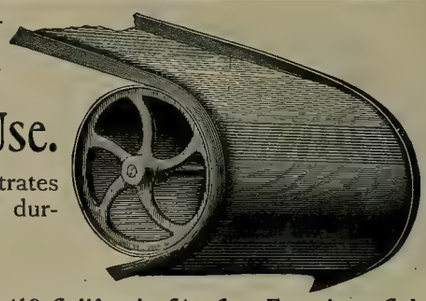
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VOLUME LXXII. Number 11. WHOLE NUMBER, 1867

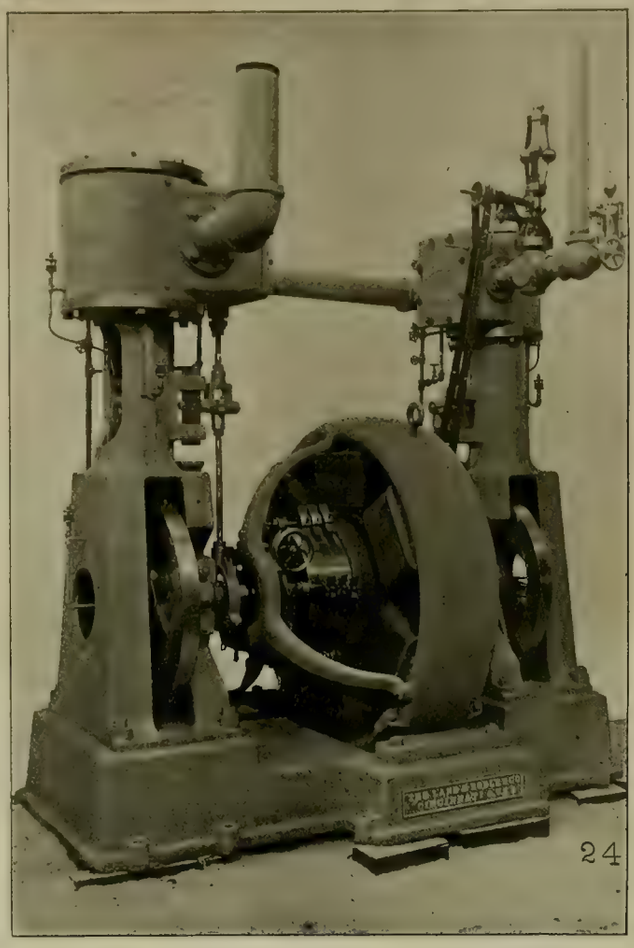
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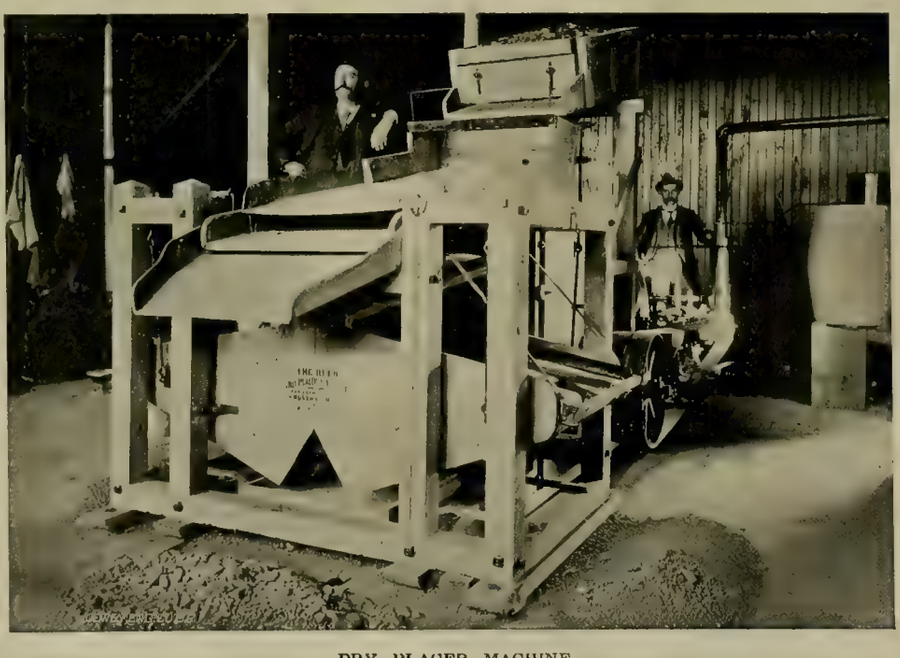
## A Dry Placer Machine.

Dry washers, machines designed to extract gold from dry ground, are in constant demand on this coast, and their use is extending to South Africa. There are a good many different designs and makes. While recently in Denver, Colorado, the writer saw five of varying construction, from the old fanning-machine type to a more elaborate and complicated system, the air blast and agitation of the contents being the two features common to all. Herewith is illustrated a new washer—the Reed dry placer machine. It has two motions, longitudinal and lateral, in combination with an air blast. The earth is shoveled into a chute, from which it feeds automatically into a hopper of the machine, in which is a coarse screen. The jigging motion throws out all the rocks and coarser gravel, the finer material falling through into the bottom of the top device, in which are steel uprights which act as artificial fingers, continually stirring it. The movement of the machine causes the lighter particles to flow over the riffles, where it meets a second screen of finer mesh; here the material is still finer concentrated, throwing out the coarser particles. The finer material falls through this second screen into the hopper of an air-blast device, from which it feeds across another series of riffles, the effect of the side motion. The material in passing these riffles is subject to an air blast from a revolving fan or blower in the air chamber beneath, strong enough to keep each particle of dirt in constant motion, the fine gold settling behind the riffles, and the waste material passing over and out of the chute. Should any flour gold sift through these last riffles it falls into a catchpan. The material is concentrated down to two or three pounds and is cleaned up in the usual manner. The makers claim the top device catches all the nuggets and coarse gold, and a great part of the fine, while the lower catches what fine gold is lost from above. The machines are made of several sizes, from ten to sixty tons capacity, weigh from 100 to 1000 pounds. The makers, who have a machine in present operation at Fifth and Kirkham streets, Oakland, Cal., say that it will save 95 per cent of the gold.

A JOHANNESBURG, South Africa, paper which expresses regret at the prevalent outside ignorance as to localities, informs its readers that "steps are being taken to reopen the mines of Chicago and Philadelphia."



MULTIPOLAR SLOW-SPEED GENERATOR DIRECTLY CONNECTED TO A DOUBLE CROSS-COMPOUND ENGINE.



DRY PLACER MACHINE.

## Multipolar Slow-Speed Generator.

The accompanying engraving of a Card Electric Motor and Dynamo Co.'s type H multipolar slow-speed generator, directly connected to a double cross-compound engine, is made from a photograph of a machine that furnished light and power at the Atlanta Exposition. The speed is 275 revolutions per minute. J. W. Brooks & Co., 523 Mission street, San Francisco, are the general Western agents.

THE Marysville, Cal., *Democrat* affords a good example of a "home industry." Since June 1st, '90, it has paid in its newspaper and job office for labor, rent, water, gas and fuel $69,230, every cent of which has gone into immediate circulation in the community where the *Democrat* is published. A great part of this money has been received from outside sources. Were a similar institution—similar in its benefits to the people of Marysville—to propose starting there, the citizens of that town would feel like offering a big bonus for the enterprise, and they would be right. Entirely apart from this matter of gathering outside money and paying it out in the local community is the attribute of good in a newspaper's talking for the place where it is published, and from whence it draws its main support. This is an attribute possessed by no other manufacturing establishment in the same degree. These remarks apply to every part of the State. Probably no other State in the Union has such a bright, intelligent press. In every nook is published a paper that reflects the local life, says all possible good of its community, extols its surroundings and presents their best features in the most attractive way. It spends nearly all its income among the people in its immediate vicinity, it talks continually for its section, brings to notice anything of value or merit, and very often is unappreciated. The editors of California papers are foremost among the hard-working benefactors of the State, and deserve the highest meed of favor that fortune may bestow.

AT the Magalia mine, Butte county, J. B. Haggin and N. D. Rideout are spending considerable money in sinking a 500-foot shaft to strike the gold-bearing channel. At a depth of 300 feet a stream was tapped that involves considerable outlay in handling, but the ultimate result is considered to justify the expenditure.

# MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

San Francisco, March 14, 1896.


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MINERS in the State of Washington are justly indignant at the questionable conduct of some U. S. officials in the matter of the opening of the Colville Indian Reservation. It was anxiously awaited by several hundred eager prospectors who were on the line awaiting the news of the signature of the bill by President Cleveland. It was generally known that the bill would be signed and intense interest was manifested. With considerable show of truth, it is now claimed that the news of the signature of the bill was withheld through the influence of two or three federal officials, who suppressed the news till after their representatives had secured some of the choicest mining claims. Ordinarily, the Press Association has the minutest detail of news from Washington, and if a Congressman walks across the corridors of the Capitol more quickly than usual, or a postmaster is appointed at some country cross-roads, the important fact is wired at once. Yet though a hundred telegrams were sent asking for the news the moment the bill was signed, and the general interest in the matter was well understood, the fact that the President had signed the bill was kept from the miners for twenty-four hours. It was a trick; and if investigation be pushed, it is probable that President Cleveland would find cause for some removals.

REGARDING the propositions relative to the debris problem, it is to be briefly said that the only measure of any practical value is that advocated by the California Miners' Association, which pays due regard to the interests of mountain and valley dwellers alike. While the Anti-Debris Association is holding meetings and resolving against receiving help from any source, Governmental or otherwise, unless all former legislation is rescinded and the creation of the world begun anew, the Miners' Association, endorsed by the Boards of Supervisors of several counties and the leading commercial organizations of the State, is going ahead securing such Congressional action as will inure to the benefit of the farmers and the miners on the only possible line that can afford desired relief. Instead of beginning do novo to secure the attention of Government engineers as tardily suggested, the effort is making with great probability of ultimate success to secure $250,000 in the forthcoming federal appropriation bill, which will unlock the State appropriation of like amount and enable the U. S. Government engineers to go ahead in accordance with Section 26 of the Caminetti act, which "directs and empowers said Commission when appropriations are made" to use the money so appropriated under Government direction. So far as observed, there is not a single business reason advanced by the anti-debris people for their opposition. They appeal to prejudice and hold post-mortems, but their points are poorly taken. The thing amounts to this: Granting, for the sake of argument, that all they say is so, the matter can only be remedied by the use of money, intelligently and judiciously spent. That money can only be procured by an appropriation. And only by unity and harmony can any appropriation be secured. The only present obstacle to the valley residents securing aid is by their own senseless opposition to those who seek to mutually help all.

## The Mineral Land Bill.

The progress of the Mineral Land bill through the National Legislature has been watched with considerable interest by the miners of California. Nearly a month ago it passed the lower house, and has since been before the Senate committee, during which time it has been the subject of several proposed amendments. Many who have labored long and earnestly for a measure so necessary to the mining interests of the State had hoped it would go through the Senate unchanged and receive the President's signature, but it has found formidable opposition from the very source that should favor it—the Interior Department of the Government. Commissioner Lamoureaux of the General Land Office appears to be impervious to information. Having formed an opinion while disregarding the facts of the case, he ignores all argument or just statement and continues to advance objections that have been long since answered. He now makes objections to the bill that were shown to be baseless, and urges the cause of the corporation in a way that is usually adopted by a paid advocate. His great influence is thrown against the Government, of which he is an officer. He ignores the fact that the California miners ask nothing. They simply want to have the question of title determined, preferring to pay the Government rather than the railroad company. Mr. Lamoureaux seems to prefer that the Government should get nothing, and that the miner shall be compelled to secure costly title from the railroad company when it shall have unjustly absorbed so considerable a part of the public domain.

It is difficult to speak with ordinary courtesy of a Government official who, for occult reasons, steadily favors corporation methods which savor of addition, division and silence, and steadily opposes the rights of the Government and the just demands of the miners who represent public interests. The paid adherent of the railroad company who argues for his employer can at least claim that it is his duty to work for his master. But even the ability to preserve his self-respect is denied the recreant who swears to faithfully discharge the trust confided to him and prostitutes his office to the benefit of the recipient of private gain. At the start the Commissioner might have been acquitted of ignorance, but his steady opposition in the face of the clearest explanation is of that nature that usually arouses suspicion of official honesty.

He places his objections before the committee in writing. On the 11th inst. a letter was sent to Senator Dubois of Idaho, chairman of the Senate Committee in present charge of the bill, signed by U. S. Senator Geo. C. Perkins, U. S. Senator S. M. White, Congressman W. W. Bowers and Tirey L. Ford, representing the California Miners' Association, which says:

Regarding H. R. 5819, and letter 3, from the honorable Commissioner of the Land Office in relation thereto, dated March 4, we desire to say: The criticisms of the Commissioner may be briefly indicated as follows:

First—The honorable Commissioner says: "The lands to be classified under the bill before me are situated within old and well settled communities, are generally surveyed land and presumably have been thoroughly examined and explored by prospectors."

The Commissioner then draws the conclusion that the lands which have been thus explored and prospected should not be made the subject of further examination and classification. From our personal knowledge of the situation, we are able to state that the Commissioner has fallen into error as to the result of former prospecting in the mineral regions of California. The hasty, superficial and methodless prospecting of earlier years in our State is but now giving place to scientific and skillful methods. Abandoned mines are being reopened, more attention is being paid to the development of our mineral resources, and, in short, capital is being attracted to the mineral regions of California as never before in the history of the State, since the first few years of feverish excitement following the discovery of gold on the American river in 1848.

Furthermore, many small claims in the mountains are held by men of humble means, which claims have not yet been patented, but are held by work and possession under the Federal mining laws. The owners of these small mines, living, as they do, in isolated districts, far removed from populous centers, frequently have no notice of intended patents to railroad companies, and their claims are consequently swallowed up by railroad patent.

It is impossible within the brief space of a letter to explain the situation as it exists or to state all the reasons why the classification sought for should be made. We may say, however, that it is a well-known fact among the miners of California that prospecting along methodical and scientific lines has just begun in California, and that it would be a severe blow to the development of the mining industry as well as a grave financial loss to the United States to permit any considerable portion of the mineral lands of that State to be patented to railroad companies

Second.—The honorable Commissioner says: "The cost of examination and expenses in the Idaho district was 6.2 cents (per acre, of course) the cost in other districts (Montana) ranging from 1.15 to 2.3 cents per acre." Just why the classification in California should cost 6.2 cents per acre and why Idaho should be taken as a standard of comparison is not clear. The contested lands in California lie mostly in the Central Pacific and California and Oregon grants. The unpatented lands within these grants comprise altogether 1,331,494 acres, or less than 1,500,000 acres out of 7,500,000 to be classified. A good many thousand acres of Central Pacific and California and Oregon grants lie in the Sacramento valley, in Butte and Tehama counties, while other portions thereof are in barren regions of Lassen and Modoc counties. Less than a million acres within the two grants above mentioned would require careful examination. Proceeding southward through the San Joaquin valley and over the Tehachapi mountains into southern California, the work of the commissioners will not be difficult. This matter was fully explained orally at a recent meeting of your committee and need not be repeated here. We can see no reason why it should cost more in California than in Montana. On the contrary, the very fact, as stated by the Commissioner, that California is an older State and her lands better known and understood would make the task of the commissioners fer California easier. The evidence of witnesses would be more easily obtained and an examination of contested lands more quickly made.

Third—The honorable Commissioner suggests the following amendment to Section 3 of the bill under consideration, namely, by adding to Section 3 the following language: "And provided, further, that this act shall not apply to any lands in which publication has been made or be ordered made by the General Land Office under a circular of the Department of the Interior, approved July 9, 1894, and that all such lands so published or ordered to be published shall proceed to patent under now existing regulations.

The exclusion of published lands as suggested by the Commissioner, while it might save the Government the small expense of publication already incurred, would lose to the United States and to the miners a large portion of the very lands sought to be saved by the creation of the proposed commission. It is apparent that the efficacy of the proposed measure would be seriously crippled if the lands already published, but not patented, were excluded from its operation. The mineral lands within these published lands belong to the Government and not to the railroad companies, and the reasons that apply to the setting apart of mineral lands in other portions of the railroad grants apply with equal force to the published but unpatented lands.

Fourth—In speaking of the recent procedure in the land department, the Commissioner says: "This procedure has protected the rights of mineral claimants so well that no complaints have been made of its action by them." Has the Commissioner fallen into an error as to facts? The dissatisfaction with the present procedure is strong and universal among the miners of California. The California Miners' Association, which is composed of leading mining and business men of that State, expended over $5000 in the year 1895 in fruitless efforts to prevent the patenting of mineral lands to railroad companies. The records in the office of the Commissioner of the General Land Office have been considerably augmented by protests, briefs, etc., proceeding from the California Miners' Association. The association sent a personal representative to Washington in the summer of 1895 to lay the above matters before the proper officials. The fact is the miners of California have been compelled to ask Congress for the relief which they now seek.

Referring to the suggestions made by the members of your committee to the effect that the proposed inquiry should be limited by the exclusion of known agricultural lands, we desire to say that we know of no feasible way to accomplish this entirely desirable result. The California Miners' Association, through its appropriate committees, discussed this very question with a view to modifying the proposed bill as above suggested. They discovered, however, that it was impracticable to designate a geographical boundary line that would properly designate the lands sought to be classified. A designation of lands by altitude was also found impracticable. They also found it impossible to designate lands by counties, since nearly every county affected by these land grants lies partially in valleys and partially in mountains.

The people of the State of California are just as anxious to have this work expeditiously done as are the officers of the Government, for until these lands are properly classified, mineral titles in California must remain in a large part in an uncertain condition, and prospecting and development of our mineral resources correspondingly retarded. We feel, however, that we can safely assure your committee that any commission that may be appointed by the President will have no difficulty in segregating and setting apart with small expenditure of time and money large tracts of agricultural lands that may be found within the railroad land grants. The result of the consideration of this matter by the California Miners' Association was that the only safe and practicable method to be employed was that adopted in the so-called Idaho-Montana act, with which act your committee is familiar, namely, the designation of lands by land districts.

No one not familiar with the conditions in Californian can appreciate the deep interest taken in this subject, not only by those directly interested in mining, but likewise by the people generally. The criticisms which have been made, entirely irrespective of party, upon the plan heretofore adopted for the issuance of railroad patents have been emphatic and practically universal. The laws and regulations now in force are utterly ineffective, and as far as California is concerned we do not hesitate to say that no interest disconnected with a railroad company is satisfied with the prevailing conditions. Every member of the California delegation favors this bill, to say nothing of the representative gentlemen from that section who are here solely in furtherance of its enactment.

The above is a concise, dignified and truthful answer. More might be said: less could not be said.

It is understood at this writing that the committee will report the bill favorably with three amendments: reducing the compensation of the commissioners to $10 per day, without expenses; limiting the time within which lands are to be classified to four years; directing the commissioners to classify large bodies of well-known agricultural lands upon testimony taken and without personal examination, by legal subdivisions. Senator Carter of Montana insists on the first and third.

There is no objection to those three amendments purely as improvements. Indeed the first is of merit, as it removes from the list of possible aspirants to the position of commissioner a class that is not wholly conducive to the best results; the second amendment appears to be unobjectionable, as it places a definite limit to the life of the commission. It is not the character of the amendments that is objected to, but knowing that amending a bill that has passed one house of Congress is a favorite way of defeating it, the friends of the Mineral Land bill fear that the effect of any amendment, however unobjectionable, may be to defeat it when it comes up for concurrence.

## Concentrates.

FIFTY men are now employed at the Plumas-Eureka.

THE small-pox scare at Congress, Arizona, is over, and the quarantine has been raised

SPOKANE PAPERS figure that 5000 miners will enter the Colville reservation this summer.

THE office of the U. S. Debris Commission has been removed to Room 59, Flood Bldg., this city.

ALLEGED discovery of gold in Chiles valley, Napa Co., creates considerable stir in that vicinity.

THE Flagler smelter at Silver City, N. M., is to be started up again in charge of S. E. Bretherton.

THE Shasta *Courier* says so far the rain and snowfall thereabouts have been of no benefit to placer miners.

BEGINNING June 1, '96, a postal route will be established between Juneau and Circle City, Alaska, 893 miles.

CORNWALL, ENGLAND, proposes "assisted emigration" of its unemployed miners to Coolgardie, West Australia.

CHICAGO talks of another mining exchange, the fourth in six months. Membership will entail the heavy outlay of $10.

THE Trinity *Journal* reports the indefinite suspension of operations at the Gladstone mine, near French Gulch, Cal.

IN Colorado, Utah and Washington twenty new companies per day is the present average in organizing mining incorporations.

EVERY north-bound steamer carries miners to Alaska. It is thought over 2000 men will go to the Yukon and Cook's Inlet this season.

THE Calaveras *Chronicle*, the oldest paper in California and one of the best, will celebrate its forty-fifth anniversary next October.

JAS. PORTER of Grant's Pass has a four-foot ledge of asbestos in Jackson Co., about forty miles from Ashland, which he is about to develop.

LEGAL complications at the Carley mine, Murphys, Cal., have been straightened out, and sinking and other development work resumed.

ON the 3rd inst., the Virtue mine, Baker Co., Or., sent to Baker City $9000 in gold, the result of 25 days run. The mine continues to show well.

THE Golden Fleece, Colorado, has declared its usual monthly dividend of three cents per share. This is the twenty-ninth consecutive dividend.

THE production of gold in western Australia for the year 1895 is officially reported at 231,513 fine ounces, against 207,131 ounces in 1894, and 110,891 ounces in 1893.

THE New York Mining Exchange, which recently opened with prayer and champagne, seems afflicted with an intestinal disorder which may detract from its usefulness.

H. C. STEELE of Perris, Cal., is reported to have secured control of the Desert Queen, of which so much has recently been said and sung, and it will now be worked for profit.

THE secretary of the Northwest Mining Association writes that the next annual meeting of that organization will be held on Oct. 3d, '96. The membership is rapidly increasing.

ALL the idle men in Boundary Creek district rushed to the Colville Indian reservation on receipt of the news that the President had signed the bill throwing it open to prospectors.

DEEP SNOW has occasioned the closing down of the Empire mine, Gold Valley, Sierra Co., till May 1st. Work at the Hidden Treasure has also closed, temporarily, for the same reason.

THERE are now five cyanide reduction plants in the Camp Floyd, Utah, mining district, with a capacity for the treatment of between 700 and 800 tons of ore per day of twenty-four hours.

THE bullion report from the Daly and Ontario (Utah) mining companies shows that the Daly between February 6th and 29th produced 104,023 fine ounces of silver, and that the latter turned out 68,703 fine ounces.

THE big Bennett amalgamator at Green River is reported to be a success. It is represented to have the enormous capacity of 4000 yards per day; the gravel runs from 12 to 30 cents per yard. The plant has cost $60,000.

THE *Mail* says the Board of Trade of Colorado has adopted a rule that divides its listed properties into two classes, *i. e.*, shippers and prospects. No mine will be considered a shipper unless it can show $5000 in mill returns.

ON the 18th the stockholders of the Centennial-Eureka, Utah, Mining Co. will formally accept an offer of $3,000,000 for the property by an English aggregation. In the deal there is a 10 per cent commission for a St. Louis man.

THE sub-committee of the Senate Committee on Territories have made a favorable report on the bill to admit New Mexico to statehood. It may go through the Senate, but fear of the silver question will paralyze action in the lower house.

MESSRS. CALLAHAN & RAND, who have been experting British Columbia properties, have bonded the Deadwood claims, Trail Creek, for one year for $35,000. They agree to do daily $25 in work until the date of the last payment, March 1, '97.

A RECENT contract for nearly seven miles of pipe, to be delivered at Santa Ana, Sonora, Mexico, with competition between English and American manufacturers, went to the latter at a price two cents per foot cheaper than the lowest English bid.

A LOS GATOS, Cal., subscriber asks if an empty bottle, tightly corked, be forced down in the ocean 1200 feet, will it, if brought back to the surface, be found to contain water, and, if so, why? If the bottle be intact, when again brought up, it will still be empty.

THE Shasta *Courier*, the second oldest newspaper in the State, celebrates this week its 44th birthday. For thirty-six of those forty-four years the *Courier* has been a welcome weekly visitor in this office, and its excellence and reliability entitle it to favored recognition.

THE fight for the control of the management of the Hale & Norcross resulted last Wednesday in Jeremiah Lynch securing a majority and appointing a new board of directors. R. V. Collins was chosen secretary at a salary of $125 per month, reduced from $200. T. W. Tangerman was appointed to the consolidated position of foreman and superintendent at a salary of $175, a reduction of $200. Other savings were inaugurated in salaries, rent, etc., which imply a reduction of over $500 per month in expenses.

THE Australia Broken Hill Proprietary officially reports that for the week ending February 27, 6438 tons of ore were treated, yielding 419 tons of lead, containing 118,864 ounces silver, also 1058 tons treated by amalgamating and leaching plants, producing 11,528 ounces silver.

IN the Victoria B. C., legislature the government will probably amend the proposed tax bill to tax a two per cent value, less freight, and an amount not to exceed $5 per ton for mining, the improvement not to be taxed. A bill is also being considered to tax timber used for mines in amount exceeding 40,000 feet.

THE penalty for using or attempting to use to pay postage any canceled or marked postage stamp or postal card, or to sell or to offer to sell the same, is not less than six nor more than twelve months' imprisonment, or a fine of not less than $100 nor more than $500, or both such fine and imprisonment, at the discretion of the court.

IN the U. S. Circuit Court this week Judge McKenna denied the demurrer of the North Bloomfield Mining Co. to the action brought by the Government to compel the company to comply with the requirements of the Debris Commission. The case is of interest, being virtually a test of the constitutionality of the Caminetti act.

REPORTS from the Bozeman, Montana, tunnel are to the effect that it will probably be a total wreck. The flames are burning more fiercely, and small cave-ins are occurring frequently. All the summer's work is rapidly being eaten away. Freight traffic at that point is suspended, the yards and city on either side filling up with freight cars.

PEOPLE from the East tell the Denver *Record* that all literature relating to gold mining is eagerly read by all classes. In the small towns the vivid descriptions of the "Great Humbug" mines (whose stock can be had of the promoters at 'steen cents or less a share) are read with interest and the pamphlet is passed from hand to hand until worn out.

ON a basis of $12 per ton, the *Tribune* figures that the Golden Gate mine at Mercur, Utah, is worth $5,000,000. Capt. De Lamar and Manager Robinson are now at Mercur figuring on the erection of a mill with a daily capacity of 500 tons. It now costs the Mercur $3.25 per ton to treat its output, and the idea there is to reduce the cost to $2.25.

EMIL ABADIE, formerly of Grass Valley, Cal., is now in charge of the Buffelsdorn mine, Witwatersrand district, South Africa, where in December seventy stamps ran twenty-seven days, crushing 10,258 tons of ore, yielding 1660.98 ounces; 7630 tons of tailings were treated, yielding 2351.48 ounces, a total of 4012.46 ounces, or $9^{7}_{4}$ pennyweights per ton.

SUPERINTENDENT CHURCH of the Boise assay office reports that the mineral output of Idaho in 1895 was $10,110,485—an increase of $316,405 over 1894; the gold output being $2,594,666—an increase of $285,891 over the previous year; silver, $5,214,498—an increase of $334,643; lead, $2,301,321—a decrease of $304,129. The decrease in the lead output is due to the shutting down of the Shoshone county mines last June.

"INQUIRER," Silverton, New Mexico, is informed that while "Concentrates" is always glad to answer, if possible, any question of general information within its sphere, in matters of individual interest or special bearing on property rights, etc., it is best to consult some competent lawyer. Before making any move in the matter referred to, "Inquirer" should secure legal advice from some good mining lawyer, and be governed accordingly.

MANAGER P. T. FARNSWORTH sends the annual report of the Horn Silver, Utah, Silver Mining Co. During '95 20,000 tons of ore of an average value of $20.56, or a total of $392,416.17, were taken out and shipped, being crude ore and concentrates. The former went to the Germania smelter, the latter to the Pennsylvania Smelting Company. The mine distributed dividends amounting to $5,080,000 among its shareholders.

AT the Wemmer, South Africa, gold mine, the net January profit was £7953; at the Simmer and Jack, £5347. The Robinson, on Feb. 15th, reports: "Mill closed in consequence of native labor difficulties getting worse; will start work again in a few days; it is just possible will have to shut down chlorination and cyanide works; doing everything possible with regard to native workmen; not hopeful of immediate relief unless the Government will grant immediate assistance."

THE difference in the market price of metals, under increased demand and improved methods of production, is noticeable in the case of aluminum. For some years it was a chemical curiosity, then its value being apparent, it came into use. A few years ago its price precluded its general use—$2 per pound. More recently the price fell to 60 cents per pound and now the Pittsburg Reduction Co. state they are selling aluminum made from scrap at the rate of 35 cents per pound, in ton lots.

PRESIDENT NEFF, of the California Miners' Association, in accordance with a resolution passed at the last meeting of the executive committee has appointed a committee of four to confer with himself as to the recommendation to President Cleveland, in the event of the mineral land bill becoming a law, of suitable appointees to the proposed commissionerships. The committee consists of Chas. F. Hoffman, Edward Coleman, C. G. Yale and Jno. M. Wright.

IN the State of Washington nearly three-eighths of the total area of the State is claimed by the Northern Pacific as part of its land grant. Of this it is estimated twenty-five per cent is included in the mineral belt—that is, between 6000 and 7000 square miles. In this strip of Northern Pacific lands are included the St. Helens mining district, the Entiat, the Egypt mines, those of Cedar canyon and the Loon Lake country, the Metaline and Newport mining districts, and the whole of Swauk creek, Peshastin and adjacent districts.

IF all that our southern Oregon subscribers write us is borne out by developed facts, that region is unusually rich in a variety of mineral resources. A Grant's Pass man now writes that he has a deposit of bismuth. This brittle metal is of considerable commercial value, and at present is worth about $2 per pound. Bismuth has been found at various places in this State, Utah, Colorado and Arizona. The most important deposit, so far as the writer knows, is at the Bismuth Queen, near Golden, Colorado. The principal reducers of the ore are in Saxony and London, the ore mostly coming from Australia, though Schneliburg, Saxony, yields some native bismuth in its cobalt mines. The process of reducing bismuth ore is roasting, smelting and subsequent cupellation. Where designed for medicinal purposes, the metal must pass through a special process of purification.

CONGRESSMAN HYDE of Washington State writes that he fears the California mineral land bill will fail owing to the opposition of Lamoureux and other interior department officials, and that if it does he will have a substitute bill framed for Washington alone. And if he does Mr. H. may rest assured that will fail also. Unless the California bill goes through all right and becomes a law, Oregon and Washington need not expect to secure similar legislation and the sooner our northern friends realize that the better for all concerned.

THE Broken Hill Proprietary Co., N. S. W., think they have solved the problem of economically reducing the enormous quantity of sulphides hitherto of no commercial value at the mine. A. E. Ashcroft has demonstrated a method which has resulted in the formation of a London company with £1,000,000 capital to buy the patent, build and operate a plant. Mr. Ashcroft's plan embraces the extraction of the silver and lead and, incidentally, the production of zinc. It is in the economical production of this last that the profit of the new system lies. If the plan proves successful, there is enough ore to insure dividends for many years.

COLORADO now begins to argue that all mining stock should be made assessable. Paying mines need no assessments, but when money is needed to continue work, and it can't be got out of the mine, the only practical way is to levy an assessment. Of course, this has been done to death; but all good business practices are liable to abuse. Sometimes a mine is developed on the installment plan, the requisite funds being raised by a per capita monthly payment. A man can own 100 shares at a par value of $1 per share, and pay for them at the rate of 25 cents per share per month, but, practically, that amounts to a monthly assessment after all.

IN the case of the Puget Sound Machinery Depot vs. Rigby, arising over a contract for the manufacture of mining machinery, the Supreme Court of Washington decides: "A contract for the sale of a mining and pumping plant, to be manufactured in accordance with special specifications, which require the furnishing of special engines and pumps, connected by shafting specially fitted, the specially manufactured parts of which would be of little value except in connection with the plant, is not within the statute of frauds, requiring contracts to be in writing, etc., though the bulk of the plant was made up of articles purchased as merchandise by the seller from other parties."

FROM the Transvaal comes a taunting tale that will not set well with any Anglo-Saxon in any quarter of the globe. Discussion among some Boers as to the color of the English flag, some claiming it was red caused an old Boer to rise, and with placid mien assert it was white. Being told that was an absurdity, he said he had seen it three times; once at Majuba, once at Brunkerspruit, once at Doornkop. Each time it was hoisted; each time it was white. Each time the old fellow had gone to fight English troops and each time the only flag he had seen them wave was a white one. It is possible, however, that some day the old Boer may have a cause to change his opinion, which, from past events is certainly based on a logical line of reasoning.

H. A. LEE, Colorado's Commissioner of Mines, has commenced a suit in El Paso county against the owners of the Dillon mine, to enforce the regulations regarding mining which he recently promulgated, and to determine the extent of his authority. The complaint states that L. N. White, a mine inspector, gave the defendants notice that they were not working the Dillon mine on Battle mountain in a proper manner. The complaint alleges that the shaft is down 375 feet and there are no drifts and no ladders and no way to reach the surface excepting by the buckets. They also have a quantity of powder stored in the mine house near the boilers and machinery. Complaint alleges that the defendants have paid no attention to the warning of the mine inspector. An injunction has been issued restraining the defendants from working their property until the defects complained of are remedied, and a satisfactory showing made to the court.

ACCORDING to a Salt Lake, Utah, dispatch, the Gold & Silver Extraction Co. of America, which means the MacArthur-Forrest Co. in this country, has made a point in its royalty claims that is of material benefit to it. It will be remembered that over a year ago the Mercur, Utah, people refused to recognize the claim for royalty, and suit was brought by the company, a commission having been appointed and testimony taken with general reference to the rights of the company, both here and in England. The case against the Mercur was to come up this week, but on Thursday a compromise was effected. The Mercur people agree to pay the MacArthur-Forrest Co. $30,000 for royalties delinquent, and to pay royalty for the process in the future. Cyanide is an important factor in the working of the Mercur ore. In this connection it is of interest to note that the case of the MacArthur-Forrest Co. vs. some users of their cyanide process in Johannesburg, South Africa, is now in progress. It is understood that in this latter instance the company has partially withdrawn its claim to a patent on the use of zinc in the precipitation of the gold in solution.

COL. CHAS. SUTER, MAJ. C. L. B. DAVIS AND CAPT. C. E. GILLETTE last Monday received official notification from Gen. Craighill of their confirmation as members of the U. S. Debris Commission. Col. Suter succeeds Col. Mendell, Maj. Davis succeeds Lieut.-Col. Benyaurd, and Capt. Gillette, who has long been an active member of the commission, continues to perform the duties originally assigned to Maj. Heuer. Since the recent change in the personnel of the commission there has been an accumulation of applications, reports and other business. Capt. Gillette has been attending, so far as possible, to the routine duties of the office during the interregnum. Now that the commission has received formal notice of its appointment, there will be an immediate meeting of the board to pass upon applications, etc. The funds of the commission are very low, the original and only appropriation, made at the inception of the commission, having dwindled to about $200. However, Congress is in session, the regular appropriation bills are under way, and it is hoped that the important matter of appropriating requisite funds for the continuance of the commission will not be neglected.

## The Effect of Washing With Water Upon the Silver Chloride in Roasted Ore.*

[A Discussion of the Paper of Mr. WILLARD S. MORSE by L. D. GODSHALL, Everett, Wash.]

In Mr. Morse's interesting paper several statements occur which seem to require correction and comment. This is the more appropriate, since Mr. Morse has mentioned me by name, and has cited my "Review of the Russell Process," so that silence on part might be taken as indicating an assent which I cannot give.

On the first page of his paper Mr. Morse says that the "going-back" of chlorination was "the only difficulty encountered at Aspen," and adds that he has "never seen any explanation" of the cause. The plain inference is that he now fills this complete lack of an explanation by the hypothesis which he advances. I propose first to correct the statement of fact, and then to examine Mr. Morse's hypothesis and proofs.

An explanation on this point is advanced in Mr. Stetefeldt's book on "The Lixiviation of Silver Ores by Hyposulphite Solutions," to the effect that steam, generated by wetting the hot ore, might decompose the silver chloride, and leave as a result metallic silver, insoluble in hyposulphite of soda, but slowly soluble in Russell's solution.

Another explanation, suggested by Mr. Croasdale, the chemist of the company, and mentioned by me in my "Review," etc., cited by Mr. Morse, was, that the trouble was caused by the presence of ferrous sulphate. This was for a long time, I believe, the view of Mr. Morse himself.

Still another explanation was advanced by me in the paper referred to, and this is in fact mentioned by Mr. Morse, though he does me injustice by omitting from his summary of it the word "partly." My theory being that the variations noted are partly (not wholly, as Mr. Morse would lead the reader to infer) occasioned by the fact that there is present in the roasted ore a reducing agent, in the form of sulphurous acid, either free or combined, and that this agent, acting on the silver chloride, reduces it to metallic silver, insoluble in sodium hyposulphite, but slowly soluble in Russell's extra-solution.

It must be concluded that Mr. Morse meant to say that he had "seen no explanation" which was in his opinion satisfactory. That, of course, he had a right to say.

Mr. Morse further asserts that, while superintendent of the works, I "could devise no method to overcome the difficulty" which he declares to have been the only one encountered. On the contrary, I did devise and earnestly recommend a remedy, and I think I shall be able to show from Mr. Morse's own words that the failure to adopt this suggested remedy was the cause of the complete disaster which subsequently overtook the company after scarcely a year and a half of operation.

I must observe in passing, however, that the efficacy of a remedy is not necessarily dependent upon precise accuracy of theory as to the cause of trouble. For instance, the effect of reducing agents might be successfully counteracted even though those agents were not all correctly recognized.

Mr. Morse declares that, in his opinion, "the cause of the 'going-back' of chlorination is principally the presence in the roasted ore of sulphides of the base metals which have escaped oxidation in roasting; and in the case of the Aspen ores this result was due to the zinc sulphide, which, during the rapid roasting in the Stetefeldt furnace, did not have sufficient time to decompose." In other words, he lays the whole trouble to the Stetefeldt furnace; and it follows that if some other furnace had been used, which could have been so controlled as to continue the roasting until the zinc-blende had been decomposed, the remedy would have been at hand. This suggestion is advanced as novel, two years after the closing of the works. But while they were still in operation, I made in my "Review of the Russell Process" the following statement of the case:

> About the time the Aspen works were first started, the writer was informed by one of the leachers who had previously been connected with the leaching department of the Blue Bird mill in Montana, that much trouble had been experienced there on account of the water rendering a considerable portion of the silver chloride insoluble in the sodium hyposulphite solution. This water is used to dissolve and wash out the soluble chlorides of the base metals, and is called the first wash-water. The information was received with a smile of incredulity, but in a very short time it changed from a matter of amusement to a stern reality, as it was discovered that this same trouble existed to an alarming extent with the Aspen ores, as then mixed and roasted. A sample of the roasted ore charged into the vat would show a high extraction in the assay office with "hypo" or "ordinary" solution, as it is generally termed. At times the extraction by the "ordinary" would be almost as high as with the "extra" or Russell solution. But after washing the charge thoroughly with water and removing all soluble salts, and then again taking and leaching a sample, a vast difference would be found between the assay office "ordinary" and "extra" extraction. The "extra" extraction on the washed ore, as compared with the tests made on the dry ore, differed somewhat; but the "ordinary" extraction on the washed chloridized ore would sometimes fall as low as the "ordinary" extraction on the raw ore. Innumerable experiments were made to overcome this difficulty, and various theories were suggested as to the cause of it. Ferrous sulphate was at one time supposed to be responsible for the trouble, but repeated tests failed to show the presence of either soluble ferrous or ferric compounds. The theory proposed and still adhered to by the writer is that the variations noted are partly occasioned by the fact that there is present in the roasted ore a reducing agent in the form of sulphurous acid, either free or combined. This reducing agent, acting on the silver chloride, reduces it to metallic silver, insoluble in sodium hyposulphite, but slowly soluble in Russell's "extra" solution. This theory is strengthened by the fact that when a maximum amount of air was admitted into the furnace, thus oxidizing more of the sulphur in the furnace and allowing less sulphurous acid to be formed in the lower heat on the cooling floor, the difference between the "ordinary" extraction on the dry and washed ore samples was not so great as before. The difference in the extraction on the two samples by the "extra" solution was also less.
>
> As the pyrites used at this time contained quite a large percentage of zinc and lead in the form of blende and galena, it was thought possible that all the trouble might be traced to these impurities. This supposition seemed to be confirmed when, after the introduction of a purer pyrite, results were obtained which proved much more satisfactory; however, while the zinc and lead were responsible for the trouble to a great extent, they were so only in an indirect manner. It is a well-known fact that it is far more difficult to roast zinc-blende and galena than iron pyrites; consequently, when a large percentage of these minerals is present in the pyrites, more sulphur remains unoxidized in the ore after it has passed through the furnace, and the subsequent chloridizing action on the cooling floor, under a limited supply of air, necessarily produces a larger quantity of sulphurous acid.
>
> The irregularities mentioned are also indirectly due to the conditions that obtain in the Stetefeldt furnace. If it were possible to obtain a perfect chloridizing atmosphere, or oxidize all of the available sulphur in the ore while in the furnace, the difficulty with the washed ore would undoubtedly be overcome, as there would then be no reducing agent present to affect the silver chloride. Such a condition it is impossible to obtain in the Stetefeldt furnace when roasting ores carrying as much lime as the average ores of Aspen do. The question then arises whether such ores can be roasted better with any other furnace. Metallurgically, the answer is "Yes." The proof of the above assertion with regard to Aspen ores has been demonstrated by the writer by roasting in a reverberatory furnace ten lots of ore containing twenty-five per cent of CaO (MgO not determined, but probably amounting to ten to twelve per cent) with less than two per cent of sulphur, and using practically the same amount of salt as in the Stetefeldt furnace. The chloridization was all that could be desired, and no trouble was experienced with the washed ore.

It is evident that Mr. Morse agrees with my earlier statement in the following particulars: (1) That the trouble was caused by an incomplete roasting; (2) that this incomplete roasting was due to the action of the Stetefeldt furnace; (3) that it is impossible, with the Stetefeldt furnace, to roast properly such ores as were treated at Aspen; and I presume Mr. Morse will agree (4) that one remedy is to roast such ores in a furnace in which the sulphur can be thoroughly oxidized.

On the other hand, I do not admit that undecomposed zinc sulphide is the sole source of trouble; that sulphurous acid has nothing to do with it; or that Mr. Morse is the discoverer either of the cause or the remedy.

It will be observed that in my statement I mentioned zinc-blende (together with galena) as responsible for the trouble to a great extent; Mr. Morse, in support of his view that zinc-blende alone was the cause, says:

> No difficulty was experienced in roasting in the Stetefeldt furnace charges of ore containing from sixteen to eighteen per cent of iron pyrites (eight to nine per cent of sulphur), and completely oxidizing the sulphur.

This is not strictly accurate, even when the roasting in the Stetefeldt furnace is considered as including the subsequent heap roasting of from three to four days on the cooling floor; since, after such subsequent roasting, upon digging into the hot ore the smell of $SO_2$ was almost always noticeable, and frequently so strong as to annoy the workmen.

Mr. Morse says:

> The fact that the final apparent extraction of silver in the roasted ore was, by the use of the Russell solution, brought up to 86.74 per cent, or 7.82 per cent more than the amount shown to have been present in the roasted ore as chloride, proved conclusively that, whatever form the chloride had been converted into during the process of washing, it was soluble in the cuprous hyposulphite solutions of the Russell process. This led the writer to the conclusion that the silver chloride had been converted to a sulphide, which is really soluble in the Russell solution.

The force of this reasoning is not apparent. Assuming that this extra 7.82 per cent of silver was in the state of sulphide when dissolved (though there seems to be no proof of that except the fact that the sulphide is soluble in Russell solution) what is there to show that it had previously been a chloride? Mr. Morse's statement (confirmed by his tables) is that this silver was *not* present as chloride in the roasted ore before washing. How, then, can he suppose it to have been a chloride, and to have been altered to a sulphide by the reaction he describes? Why may it not have been a sulphide, or some one of the many other compounds of silver soluble in the Russell solution? In short, Mr. Morse's theory is clearly not applicable to this silver, which was not shown as chloride in the roasted ore. In other words the excess of 7.82 per cent, to which he refers, is not a result of any "going-back" of chlorination, and therefore, cannot offer any proof as to the cause of such "going-back." On the other hand, the figures which are pertinent to that discussion are those of the final column of his Table I, which it is therefore of interest to examine.

It will be noticed at a glance that a marked change occurs in the last column of this table, with the treatment of mixture No. 9. (Mixture No. 9, representing 2687 tons of ore, was the work of August. I left Aspen the first day of September.) In fact, the change should be evident in the line above, where, by a typographical error, the decrease of silver chloride by roasting is stated as 13.70 per cent, whereas, the subtraction performed upon the figures in the two preceding columns shows it to have been only 8.6 per cent. From this point down the column, ending with No. 19 (a period of nearly twelve months), the improvement and the uniformity of the results are (with two prominent and two lesser exceptions) quite out of proportion to the record preceding No. 8, and vastly greater than can be accounted for by the difference in the zinc sulphide of the ore. The explanation is simple, and will be given later. The fact is merely noted here, as throwing doubt at the beginning upon Mr. Morse's theory of the chief cause of "going-back."

A similar doubt is raised by a study of separate groups of the mixtures of Table I.*

I.—GROUP SHOWING PRACTICALLY THE SAME AMOUNT OF ZINC AS SULPHIDE IN THE ROASTED ORE.

| No. | Raw Ore in Mixture—Tons. | Total Ore in Group—Tons. | Zinc Sulphide in Roasted Ore. Per cent. | Decrease of Silver Chloride by Washing. Per cent. |
|---|---|---|---|---|
| 13 | 2380 | 6101 | 1.14 | 9.18 |
| 10 | 2656 | | 1.15 | 0.51 |
| 18 | 1065 | | 1.25 | 12.58 |
| 1 | 1309 | 5020 | 2.00 | 22.30 |
| 5 | 1276 | | 2.04 | 16.14 |
| 6 | 2435 | | 2.07 | 19.58 |
| 8 | 2123 | 4566 | 0.82 | 8.6 |
| 17 | 410 | | 0.89 | 4.0 |
| 24 | 2033 | | 0.97 | 0.24 |

Total amount of raw ore represented in the above set of groups, 15,687 tons.

II.—GROUP SHOWING PRACTICALLY NO VARIATION IN DECREASE OF SILVER CHLORIDE BY WASHING.

| No. | Raw Ore in Mixture—Tons. | Total Ore in Group—Tons. | Zinc Sulphide in Roasted Ore. Per cent. | Decrease of Silver Chloride by Washing. Per cent. |
|---|---|---|---|---|
| 12 | 2602 | 4982 | 1.64 | 9.66 |
| 13 | 2380 | | 1.14 | 9.18 |
| 11 | 2860 | 5574 | 0.68 | 3.18 |
| 9 | 2687 | | 1.00 | 3.32 |

Total amount of raw ore represented in the above set of groups, 10,529 tons: total in both sets, 26,216 tons.

In the first set of groups we would naturally expect to find, on Mr. Morse's theory, a uniform decrease of silver chloride by washing. The reverse is the case.

In the second set of groups, the decrease of silver chloride by washing being very uniform, we ought to find equal uniformity in the amount of zinc present as sulphide in the roasted ore; but the reverse is again the case.

The groups showing these discrepancies comprise 26,216 tons, or deducting No. 13, which has been used twice, 23,836 tons out of the 35,144 tons covered by Table I. I think it clear, therefore, that Mr. Morse's data do not support his theory; that is, they indicate some other cause, besides the precentage of zinc-blende in the ore, for the "going-back" of chlorination. The particulars of Mr. Hoyt's laboratory-experiments not being given, it is impossible to examine them critically.

With regard to the experiments of Mr. Frank A. Bird, the accuracy of which is unquestioned, it should be observed that the conditions were totally different from those at Aspen. In his experiments, from 55 to 58 per cent of zinc was present; in the Aspen ore, from 1 to 3 per cent.

The difference in the strength of the brine solution between the two cases is equally great. Moreover, for the months of May, June and July at Aspen, represented by mixtures No. 7 and 8, the percentage of salt in the ore (12.7 and 12.0 per cent) was the highest for the year, while the amount of silver chloride dissolved and extracted in July was 20.9 per cent, being exceeded by only one month during the year. The results of these lots as to decrease in silver chloride by washing do not conform with those deduced from Mr. Bird's experiment.

Table IV does not at all establish Mr. Morse's contention, unless he first proves that the extra silver, insoluble in "hypo" but soluble in the Russell solution, was present in the washed ore as a sulphide. Any one of the many other compounds of silver soluble in the Russell solution would answer equally well.

The direct cause of the remarkable change shown in Table I and beginning, as I have explained, with mixture No. 8, was the admission into the Stetefeldt furnace of all the air possible, thus oxidizing the

* Read at the Atlanta meeting of the American Institute of Mining Engineers, October, 1895.

* For this purpose, I use only twelve of the nineteen mixtures; my object in the re-arrangement being, not to deduce a general law, but to inquire whether the discrepancies which Mr. Morse considers "slight," and hence not contradictory of his theory, are really insignificant.

sulphur more completely in the furnace, and leaving less work to be done on the cooling floor, where the formation of much sulphurous acid is otherwise unavoidable.

As a further proof that the cause of the above change was known to me while at Aspen, I quote from "A Review of the Russell Process" as follows:

It was also noticed at Aspen that some of the lowest losses in silver were experienced during the months when a heavy excess of sulphur had been used and only a limited supply of air allowed to enter the furnace. It was afterwards observed that additional air produced a higher chloridization of the silver, but that the losses by volatilization were also higher.

On the action of oxygen in chloridizing-roasting, I may have something further to say in a subsequent paper.

Speaking of the precipitation of the silver in the wash-water by means of precipitated base metal sulphides, Mr. Morse says, "The result of turning this reaction to practical account will be of interest." In this connection, I quote the following from my "Review of the Russell Process:"

In the precipitation of the wash-water a curious fact was noticed, which, while not new to chemistry, had probably never before been made use of in practice. The sulphides obtained from the wash-water containing the soluble salts were of a very low grade, frequently not extending 200 ounces of silver per ton. The writer, several years ago, made a few laboratory experiments with the precipitated sulphides of copper, lead and iron on chloride of gold solution, and found that all these precipitated the gold in the form of sulphide. Percy states that certain of the base metal sulphides act in a similar manner towards chloride of silver. With this idea in view, the tanks containing the wash-water sulphides were allowed to stand six or seven weeks before taking out any of the precipitates. All of the wash-water during this time was precipitated in these tanks. After each precipitation the sulphides were allowed to settle and the solution carefully decanted off. When the sulphides were finally taken out and dried, sampled and assayed, they were found to contain nearly 7000 ounces of silver to the ton, showing conclusively that a reaction had been going on by which part of the metals of base sulphides were gradually converted into soluble chlorides for which an equivalent amount of silver was precipitated.

The above precipitation, however carefully done, did not save all the silver, and the precipitation therefore was not complete. Considerable silver was saved from the decanted solution in a subsequent precipitation with scrap iron and other precipitants.

The mere questions of personal priority involved in the foregoing criticisms of Mr. Morse's paper have, of course, little importance. The real question, which we are both equally interested to answer, is, whether the theory he supports is sufficient to account for the facts, and whether the facts both sustain it and exclude any other. As to this question, I have frankly stated my dissent, and I do not feel that Mr. Morse has effectually either established his own view or overthrown mine.

### A Most Valuable Publication.

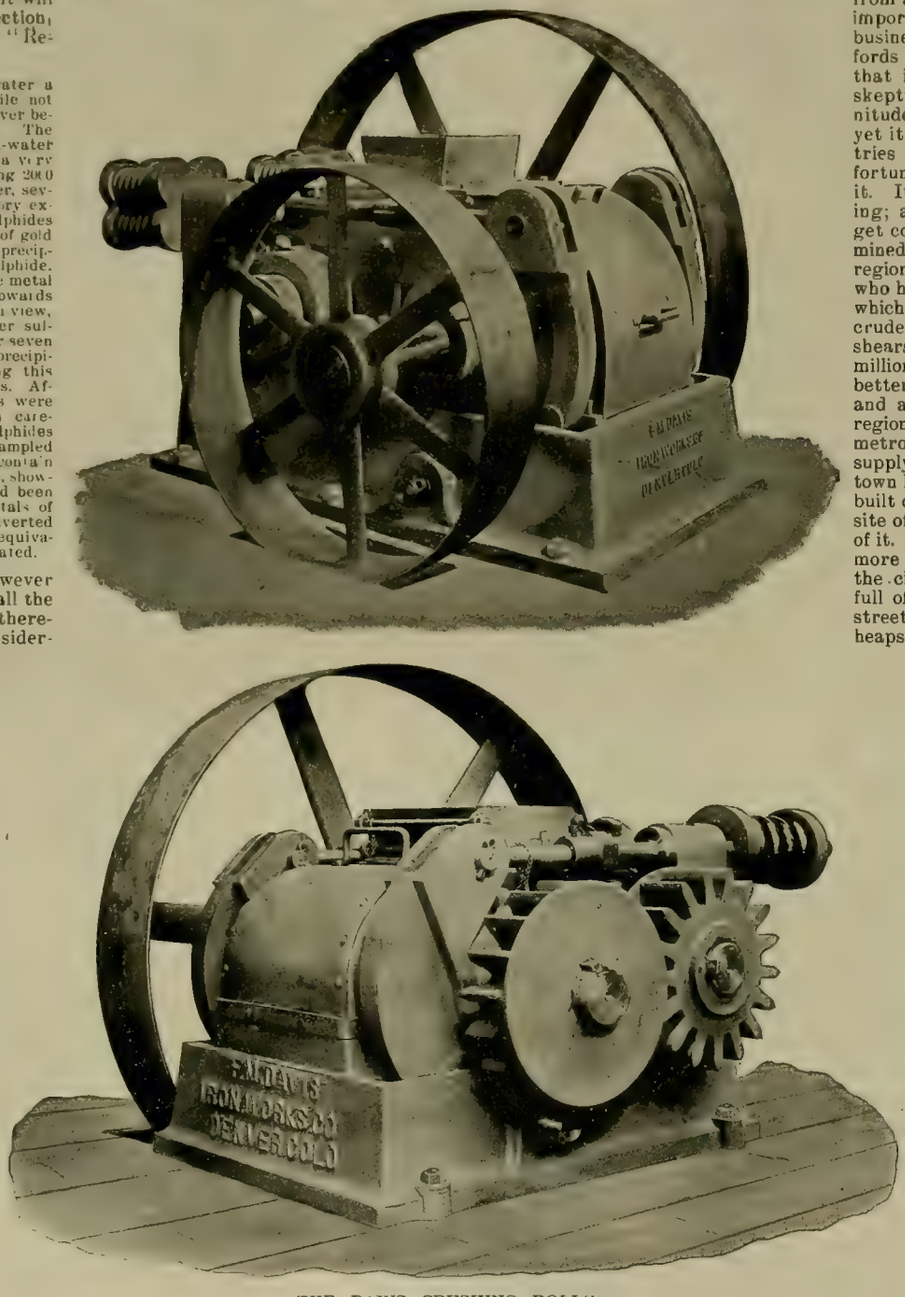
The following is a sample of several unsolicited and highly appreciated notices of this paper.

The MINING AND SCIENTIFIC PRESS is improving with age and the *Record* takes pleasure in saying that it to-day has the proud distinction of being by all odds the ablest newspaper representative of the mining interests published in the world. This is not flattery, but the plain, unvarnished truth. There are other mining journals in the country but none that in point of completeness and ability in every department can compare with the MINING AND SCIENTIFIC PRESS of San Francisco. People who reside in the mining districts should take this journal if they desire to keep posted on affairs transpiring in the mining world. The subscription is only $3 a year and we can truthfully say that it is worth many times that sum to any man who is seeking practical mining and scientific knowledge.—Amador, Cal., Record.

A NEW METAL composition, which is intended to serve as substitute for gold, has just been invented. It consists of ninety-four parts of copper and six parts of antimony. First the copper is melted and the antimony added afterwards. When the entire mass is in liquid condition some carbonate of magnesia and some carbonate of lime in equal parts are added, whereby the specific gravity is increased. The alloy thus produced has the color of gold and can be hammered and soldered like gold. Its color is not changed by nitric acid. This new metal can be produced for 25 cents a pound. Men in Oakland and elsewhere in the gold brick industry can find a probable profit therein.

### The Davis Crushing Rolls.

The two illustrations on this page are of the Davis Crushing Rolls, for which a patent has been applied, and which the inventor claims retain in their design all the good points of the original Cornish rolls, and embody improved details and new features. The frame of the rolls is of ample proportions, cast in one piece, this design being intended to insure perfect alignment of the journals, great strength and rigidity, require no separate foundation, and to dispense entirely with loose joints and their innumerable bolts and nuts. The bearings of the adjustable roll are carried by swinging arms, avoiding the excessive wear of the usual sliding bearings. The swinging arm is carried by and turns on a heavy steel eccentric pin, held firmly in its seat in the frame. The portion of the pin carrying the arm is eccentric with the part in the frame, and a partial revolution of the pin raises or lowers the swinging arm and bearing, providing a perfect vertical adjustment for the roll shaft—an important point in fine crushing rolls where it is absolutely necessary that the rolls should be exactly parallel to avoid side thrust in bearings and consequent loss of power. The shells are of open hearth steel. For longitudinal adjustment and wear there is placed on the roll shaft between each bearing and the center two or more steel rings. These can be changed from one side to the other, to shift roll as desired. The rolls are completely housed in, but are provided with covers, which can be taken off at any time. As usually constructed, the rolls are driven by a large, heavy band wheel on the stationary roll shaft, and a smaller wheel on the adjustable roll. When, however, from any local necessity, gears must be used, machines driven by gears are furnished. If desired, the rolls are built with feeder, which distributes the ore evenly over entire face of roll. These feeders are attached to the roll housing, as shown in engraving, and require no outside supports. These rolls are built in four sizes. The 12x12-inch rolls are generally used in sampling works and for this purpose are built with light steel housing, quickly removed by one man, giving free access to all parts of the machine for cleaning. It is also for the same reason provided with but one drive pulley, the adjustable roll being driven by small finger gears. These rolls are built by the F. M. Davis Iron Works, Denver, Col., who will answer all inquiries relative thereto.




THE DAVIS CRUSHING ROLLS.

### The Mining of Mica

Bakersville, western North Carolina, forty miles from any railroad, is the center of an important mining interest. The mica business is so commonplace and affords such small show of machinery that it is not unusual for one to be skeptical when told of its actual magnitude. It looks insignificant, and yet it is one of the greatest industries in that State, and has yielded fortunes to those engaged in running it. It requires no capital to set going; all that is needed is to own or get control of a deposit. It can be mined cheaply, as the labor of that region is low in price. The dealers who handle mica occupy little shacks, which are amply furnished with a crude work bench and a pair of shears. This is all that is needed; a million dollars would not secure a better outfit for the work. The wild and apparently worthless mountain region, of which Bakersville is the metropolis, is the main source of supply for the United States. The town looks as if it might have been built of mica, or else stands on the site of a ruined city that was erected of it. It can be seen scattered in more or less quantities all about the city and suburbs. The river is full of the shining particles, and the streets and alleys are strewn with heaps of the refuse. Its formation is like that of stone, and can be seen cropping out in cliffs.

In the granite, however, it seems to have taken great pride in making its fancied eternal home, but it has been disturbed by the volcanic eruptions of the earth in ages past, and now it is being surprised by the agencies of man. It can be found in all sorts of blocks of various thicknesses and shapes, and can be split and resplit almost ad infinitum, or until it becomes the thin, transparent, flexible wafer of commerce. It is imbedded in or scattered through the feldspar in blocks large and small, close together and far apart, and is blasted from the rocks with dynamite. The purer veins are found between walls of slate. It is taken from the mines to a little shop by means of various conveyances, from the shoulder of a native to the cart drawn by a bridled and harnessed steer. Here it is split into thin sheets, trimmed into regular shapes and is prepared for the market. The price varies with the size and color of the sheets. The Bakersville product is known to trade as rum mica. A two-by-four sheet, good, clear quality, is worth about 50 cents a pound, while ten-by-twelve will bring $4 to $6. Sheets of these dimensions are extra size, as the average is only about four-by-six. Rare sheets twenty-four by eighteen inches have been found. Occasionally a mine is found where the mica is too much scattered in the bedrock to make its operation profitable, hence there is a possibility of a man sinking a little money without the expected tenfold return; but generally the expert mountaineer can tell in a few shots whether there is any use of fooling with a bed or not. It is not an uncommon thing for a couple of natives to leave in the morning with a box of dynamite and return at night with $50 worth of mica. Blocks worth $200 have been found after a shot.

THE longest artificial water course in the world is the Bengal canal in India, nine hundred miles, the next is Erie, 363. Each cost nearly $10,000,000.

## Notes on Gold Milling in California.

NUMBER XVII.—CONCLUDED.

By E. B. PRESTON, M. E., Field Assistant State Mining Bureau.*

*Water Wheel Frames* are to be made of 12x12-inch lumber throughout, well anchored down to a stone foundation. That part of the frame which comes above the floor is to be dressed and painted the same as the battery frame.

The water wheels are to be housed with tongued and grooved lumber, 4 inches wide.

*Floors.*—Ore-house floors to be made of one thickness of 2-inch planks.

Battery, concentrator, and water wheel rooms floors are to be made of 1x8-inch lumber, double thickness, surfaced on top, to be supported on 3x6-inch joists 18 inches apart.

Sulphuret and cleanup rooms floors are to be made of concrete laid on top of a heavy wood floor, which is to be supported on foundations made of 8x8-inch timbers.

*Roofs.*—All roofs are to be made with 2x8-inch rafters 18 inches apart, with 1x6-inch board 4 inches apart, and covered with No. 26 standing seam, painted, iron roofing.

*Walls.*—All walls are to be covered with 1x10-inch rustic.

*Cornices.*—All cornices are to project 24 inches, measured horizontally from the walls of building, with a 12-inch frieze and a 5-inch facia made of dressed lumber.

*Windows.*—All windows, except those for sulphuret room, are to be made of twelve lights of 10x16-inch glass, and frames made to suit of dressed lumber, with casing outside 5 inches wide.

Twelve windows are to be put in the ore-house, seven windows in the battery room, six windows in the cleanup room, twelve windows in the sulphuret room, and five windows in the water wheel room.

*Skylights.*—Six skylights, made of twelve lights of 10x20-inch glass, to be put into the roof of the concentrator room.

*Doors.*—All doors, both sliding and swinging, to be 3x7 feet by 1¾ inches thick, with panels.

Two sliding doors are put in the orehouse, and one outside swinging door in the battery room; one swinging door leading from the battery room to the cleanup room; two sliding doors leading from the concentrator room to the sulphuret room; two outside sliding doors for the sulphuret room, and one outside swinging door for the water wheel room.

All doors to be set in good substantial casings, outside cased with surfaced lumber, and furnished with all trimmings and locks.

*Stairs.*—There is to be a flight of stairs at each end of the mill, one flight leading from the battery room floor to the floors above, and one flight of stairs from the battery room floor to the concentrator room floor.

All stair stringers to be made of 2x12-inch lumber, and treads of 2x10-inch lumber.

*Hand Rails* are to be put on to the outside of all stairs and around the landings of same, also in front of the battery room floor and all other floors and platforms where there is danger of falling. All to be made of dressed lumber, well painted.

*Retort House and Assay Office*, to be 20 feet wide by 48 feet long, with a retort and melting furnace room, a weighing room, and a storeroom; the two latter to be lath and plaster finished, and the whole building to be finished similar to the mill buildings, with iron roof, rustic, etc.

*Paint and Whitewash.*—All buildings are to be painted on the outside with a good coat of brown mineral paint, and the window and door casings and cornices to be painted with two coats of white lead paint.

The mill to be whitewashed throughout the inside, including the building frame, ore-bins, etc.

*Tanks.*—There are to be two 4,000-gallon redwood tanks, 3-inch stock, set up at the end of the mill upon strong timber foundation, and one tank 8 feet wide by 10 feet long by 4 feet high, inside measurements, to be made of 3-inch planks, with 8x8-inch frame; planking to be well fitted together, and properly caulked inside with oakum. The latter tank is to be set at the end of the last sluice-box coming out of the mill.

*Drain Boxes and Tailings Sluices.*—Battery sluices and aprons to be set on framework so arranged that the grade can be changed easily. This framework to be placed all over. Sluices and frames to be painted same as battery frame.

There will be a sluice in front of battery room floor, made of surfaced lumber; also to be painted and so arranged as to conduct any water away which drips from the floor.

There will be sluices put in under the concentrator room floor, two of which will be 6 inches wide by 8 inches deep, to run lengthwise to catch the tailings from the concentrators, and one to be 8 inches wide by 10 inches deep, to run crosswise and to take the tailings from the first two sluices, and conduct the same outside. All tailings sluices to have a fall of one in twelve, and to be made of 2-inch lumber, well fitted and nailed together. Proper sluices from the clean-up room, to conduct water and tailings therefrom, must be connected to tailings sluices under concentrator room.

All sulphuret boxes, and drain boxes for concentrators, to be made of good quality of redwood lumber, 1¼ inches thick, dressed on both sides, and well fitted and screwed together.

The weight of all parts is 240,000 lbs., and there are 325,000 feet of lumber in the building.

*Specifications for a Canvas Plant* are not considered necessary, as the construction is extremely simple and no standard has been adopted.

*Bulletin No. 6, California State Mining Bureau.

## Tersely and Truthfully Stated.

Two years ago, when six delegates were elected by the River Convention and instructed to proceed to Washington to work in the capacity of lobbyists for an appropriation for river improvement, other than that provided for in the Caminetti bill, the *Democrat* opposed their going.

Ex-Senator William Johnston of Sacramento and Hon. George Ohleyer were two of the delegates, and the sum of $300 was voted by the Sutter county Supervisors and a like sum by supervisors of this county to defray the expenses of the trip, but a protest was filed by a taxpayer of Yuba and the $300 was saved. They went to Washington and they came back, after having a good time at the expense of the people. Not one dollar of appropriation was received by the State as the result of the trip.

January 16th last, the River Convention again elected six delegates to go to Washington; at the same time a few members of the convention tried to commit the majority to the advocacy of the bill prepared by R. T. Devlin, known as the Sacramento River Commission bill. These delegates went to Washington, but Yuba and Sutter failed to respond to the call for $600 more for a junketing trip.

Delegate Johnston has returned to his home and Tuesday evening last he made a report to the Chamber of Commerce of Sacramento relative to his trip, they having paid $250 to defray his expenses. The gentleman frankly admitted that their trip had been a failure, in so far as obtaining an appropriation or a favorable consideration of the pet scheme of Mr. Devlin and the Anti-Debris Association. He was asked if the River Commission bill was favorably considered by the Committee on Rivers and Harbors, and he said it was not, because there already is one commission who have reported on the condition and requirements of the Sacramento and Feather rivers, and that the bill is dead. Thus we come back to the point for which the *Democrat* has contended from the first, and that is, money can only be obtained from the National treasury for river improvement on a report and recommendation of Government engineers appointed for that purpose.

And it will not be out of place to again remind readers of this journal that the report of the Biggs Commission, which was made nine years ago, is the only recommendation for an appropriation for the betterment of these rivers now before Congress.

Two years ago the *Democrat* said, if the bill of Congressman Caminetti then before Congress, based on that report, was defeated we would get nothing for river improvement, and now two years later we repeat that if the present bill asking for $250,000 and based on the report of the Biggs Commission is defeated we will get nothing for river improvements during this session.—Marysville Democrat.

COMPRESSED AIR as a power has displaced steam in three departments of the Pullman Palace Car Company's works, and the results have so far satisfied the officials that in all probability the new force will be used in all the great shops of the corporation. The change is radical and marks a revolution in the manufacturing system of the great Pullman plant. The argument advanced at Pullman in favor of a change from steam to compressed air, was, in short, a great saving in manual labor, economy, ability to transmit power long distances without loss of force, simplicity, safety and convenience. An official of the Pullman Company was sent to Omaha and Topeka to go through the shops of the Union Pacific and Santa Fe railroads and to make a report on the general efficiency and economy of compressed air as applied there in the department of car making. His report favors the adoption of the system throughout all the car shops at Pullman. With the air system it is claimed that the speed of the machinery in use may be graded, something that is impossible when a belt is used.

IN reviewing the German iron industry for 1895 a well known authority says: "The direct conversion of molten pig iron into steel, that is, the direct transmission of iron from the blast furnace to the converter without a second melting, was carried on everywhere with the best results. New plants have been erected which produce from the ores billets and slabs without using any other fuel in the steel making than the gases generated in the blast furnaces.

## Recent Additions to the State Mining Bureau Mineral Collection.

Mr. Henry S. Durden, of the State Mining Bureau Mineral Collection, reports the recent addition of the following specimens to the extensive collection. Visitors to this city will always find considerable of interest and value at the rooms of the State Mining Bureau, 24 Fourth street.

Gold quartz.—Said to assay $400 per ton. Golden Gate mine, near Sonora, Tuolumne county, California. Presented by the company.

Mine ladder.—Made and used about forty-five years ago by the Mexican miners in the New Almaden quicksilver mine, Santa Clara county, California. C. C. Derby.

Trona (native carbonate of sodium). Teel's Marsh, Esmeralda county, Nevada. F. M. Smith.

Auriferous arsenical pyrite, and auriferous vein matter.—"Soft Kidneys," largely clay, and usually rich in gold. Found in the Ackley vein of the Sierra Gold Company's mine, near Downieville, Sierra county, California. From the company

Gold quartz (Jaspery).—From the pay shoot of the Shenandoah mine, French Ravine, Plumas county, California. From the company. Assay sent with specimen: $15 per ton, free gold; sulphurets, $200 per ton.

Relief map of Sierra county, California.—Presented by the Sierra County Miners' Association, per H. W. Orear.

Macoma inquinata; Pisania fortis; Venericardia borealis; Crepidula grandis; Janira (vola) bella; Chrysodomus (siphonalia) kelleti.—All pliocene fossils. Rincon asphalt mine, Santa Barbara county, California.

Pectan expensus.—Dall. The first found north of San Diego.

Terrebratella occidentalis.—Dall. Pliocene fossils. Temescal canyon, near Santa Monica, Los Angeles county, California.

Shale.—Silicious; with small nodules of quartz and crystals of pyrite. Placerville, El Dorado county, California. Wm. Craddock.

Marble.—From the property of the Monterey Waterworks Company, near Monterey, Monterey county, California. Wm. Skinner, superintendent.

Auriferous argillaceous conglomerate, rich in free gold; showing gold in ferruginous seam; showing seam of copper ore occurring in the deposit, and which is rich in gold. Mt. Leyshon mine, Charters Towers, Queensland, Australia. From the company.

Feldspar (columnar).—Mt. St. Helena, near Kellogg, Napa county, California.

Aragonite (carbonate of calcium). — From near Healdsburg, Sonoma county, California. George Madeira.

Gold quartz, showing free gold.—Sandhurst, Victoria, Australia.

Gold quartz; silver ore; fluorite; auriferous gravel; tin ore (Cassiterite). Kinta, Perak. Perak Museum.

Ochre.—Yellow. From a deposit near Occidental, Sonoma county, California.

Copper ore.—Chalcopyrite. Bolinas mine, one mile east from Dogtown, on Bolinas bay, Marin county, California. J. W. Pierson.

Gold quartz.—Eclipse mine, one mile south from Alleghany, Sierra county, California. Appel & Grant.

Gold quartz.—Kosciusko mine, Consol., (formerly the original Quartz Hill mine), six miles northwest from Redding, on the road to Old Diggings, Shasta county, California.

Gold quartz.—Delta mine, Dog creek, five miles west of Delta, Shasta county, California. M. B. Butler.

Feldspar.—Orthoclase. Hildreth, Madera county, California.

Dihydrite (hydrous phosphate of copper).—Ehl, near Linz. Prussia, Germany; Eudidymite (silicate of glucinium and sodium).—Ovre-avo, Langesund Fiord, Norway; Forcherite (a variety of opal colored by orpiment).—Auvergne, France; Gahnite (zinc aluminate, zinc spinel).—Sterling Hill, Ogdensburg, New Jersey; Gigantolite (a variety of pinite, hydrous silicate of aluminum and potassium).—Tamela, Finland; Guaranite (silicate of titanium and calcium).—Monte Samma, Vesuvius, Italy; Hetaerolite (oxide of manganese and zinc).—Sterling Hill, Ogdensburg, New Jersey; Hiortdahlite (silicate of zirconium, calcium and sodium).—Mittelaro, Langesund Fiord, Norway; Inesite (hydrous silicate of manganese and calcium).—Jacobsberg, Sweden; Lillianite (sulphide of bismuth and lead).—Lillian mine, Printerboy Hill, Leadville, Colorado; Lithiophilite (phosphate of iron, manganese and lithium).—Branchville, Connecticut; Melanophlogite (silica and sulphur).—Giano mine, Racalmuto, Sicily; Nesquehonite (hydrous carbonate of magnesium).—Nesquehoning, near Landsford, Schuykill county, Pennsylvania; Rammelsbergite (diarsenide of nickel) —Freiberg, Saxony; Rectorite (silicate of alumina).—Garland county, Arkansas; Richterite (a variety of amphibole).—Langban, Sweden; Sarcolite (silicate of aluminum, calcium and sodium).—Monte Somma, Vesuvius, Italy; Seigenite (sulphide of nickel and cobalt).—Herz mountains, Germany; Strengite (hydrous phosphate of iron).—Eleonore mine, Geissen, Saxony; Turnerite (a variety of Monazite, phosphate of cerium, lanthanum, didymium, etc.).—Tavetsch, Switzerland; Vesbine, on lava of 1631.—Vesuvius, Italy; Uranothorite (silicate of uranium and thorium).—Brevig, Norway; Walpurgite (arsenate of bismuth and uranium).—Joachimsthal, Bohemia; Woodwardite (sulphate of copper and alumina).—Cornwall, England; Zunyite (silicate of aluminum).—Zuni mine, Anvil mountain, Silverton, Colorado; Gadolinite (silicate of yttrium, cerium and iron).—Bluffton, Llano county, Texas; Jordanite (sulph-arsenide of lead) in dolomite.—Imfeld, Bimenthal, Switzerland; Stilbite (hydrous silicate of aluminum and calcium).—Nova Scotia; Witherite and Bromlite (carbonate of barium and calcium).—Hexam, England; Erythrite (hydrous arsenate of cobalt).—Schneeberg, Saxony; Aragonite, crystallized (carbonate of calcium).—Frizington, Cumberland, England; Heulandite (hydrous silicate of aluminum and calcium).—Paterson, New Jersey; Chabazite and Heulandite (hydrous silicate of aluminum, calcium and potassium).—Nova Scotia; Apophyllite (hydrous silicate of calcium and potassium).—Guanajuato, Mexico; Gypsum (sulphate of calcium).—Grand Rapids, Michigan; Bowenite (a variety of serpentine).—Smithfield, Rhode Island. J. Z. Davis.

Gold quartz.—Tong mine, Clarksville, El Dorado county, California. Williams & Tong.

Gold quartz.—Lyons mine, Clarksville, El Dorado county, California. Charles Lyons.

Auriferous Steatite, assaying $39 per ton, free gold.—King Solomon mine, east fork of Trinity river, Trinity county, California. A. M. Delano.

Uraninite (oxide of uranium).—Portland, Connecticut.

Gold quartz, two specimens, extracted in 1895.—Doss mine, five miles south from Hornitos, Mariposa county, California.

Gold quartz, with traces of tellurium.—Old Judge mine, Pinon Blanco group, three miles north from Coulterville, Mariposa county, California.

Gold quartz, with arsenical pyrite.—Toledo mine, Tuttletown, Tuolumne county, California.

Gold quartz, two specimens, one from the surface and one from depth.—Caledonia mine, Potter ridge, five miles east from Gruh gulch, Madera county, California. The vein is in chlorite schist.

Talc Schist, with pyrite which shows the effect of a "shearing" movement in the vein, the crystals being displaced and contorted.—Gold Cliff mine, Angels, Calaveras county, California.

Slate.—Red. Willow Glen ranch, three miles northeast from Milton, Calaveras county, California.

Amphibole Rock.—Birney ranch, one and one-fourth miles northeast from Angels, Calaveras county, California.

Hornblende Porphyrite.—Birney ranch, one and one-fourth miles northeast from Angels, Calaveras county, California.

Quartzite.—St. Clair, Churchill county, Nevada. J. F. Halloran.

## Japanese Wages.

The following table, giving the average rate of wages obtained in different districts of Japan, as compiled by the Statistical Bureau of Japan, will afford the California workman much serious matter for reflection:

AVERAGE MONTHLY WAGES (WITHOUT FOOD).

| | Silver. | Approximate Value in U. S. Gold Coin. |
|---|---|---|
| Weavers, men | $4 83 | $2 56 |
| Weavers, women | 3 30 | 1 75 |
| Agriculturists, men | 2 31 | 1 22 |
| Agriculturists, women | 1 28 | 68 |
| Men servants | 2 12 | 1 12 |
| Woman servants | 1 16 | 61 |

# Electrical Progress.

## The Electric Locomotive.

The Westinghouse Electric and Manufacturing Company has received the first electric locomotive manufactured under the arrangement entered into some time ago between the Westinghouse Company and the Baldwin Locomotive Works of Philadelphia. In appearance the locomotive is much different from the steam locomotive, and it also shows radical departures in construction from every electric locomotive hitherto manufactured. It is 38 feet long and 9 feet across. All the operating parts of the locomotive have been placed on the truck and the body of the car will only contain the controlling apparatus, and can be utilized as a receptacle for such appliances as are usually carried by any train. It may also be used as a freight or baggage car.

One of the characteristic features of the locomotive is the truck, which has eight wheels and is constructed in a very substantial manner. The wheels are 42 inches in diameter. There will be four motors of 200 H. P. each connected to the axles of the locomotive. Thus the entire weight of the locomotive will be placed upon the truck, thereby becoming available for adhesion. This feature of construction will be recognized as a very advantageous one. The locomotive, completely equipped, will weigh 160,000 pounds. The motors are geared, which method has been decided upon so as to enable the company to use more efficient and durable motors, and also greatly reduce the cost of the locomotive. The Baldwin-Westinghouse combination is constructing engines for all kinds of purposes. The one described here is the regular passenger engine, rated at 1000 H. P. capacity. Then there will be locomotives made to be used in mines. The latter will have six driving wheels and the superstructure will consist of a sheet iron cab. The switching locomotives will also have a cab as a superstructure. There will also be manufactured locomotives for tunnel work, suburban traffic and rack locomotives, as well as for elevated railroads.

It is expected that within a few days the second locomotive, as completed by the Baldwin people, will be received at the East Pittsburg factory of the Westinghouse Electric and Manufacturing Company. This last one will be of the elevated railroad type and is an example of a motor car of the Manhattan Elevated Railroad of New York.

As far as the speed of these new locomotives is concerned, it may be stated that the motors have been geared to produce a speed of seventy-five miles an hour, although the builders think it may reach one hundred and twenty-five miles an hour, if it were demanded. All Westinghouse-Baldwin locomotives will be equipped with air brakes, which will be operated in the usual manner by an air pump, which is underneath the car, and which will be driven by an electric motor.

The Westinghouse-Baldwin locomotives have been designed so as to be utilized with any method of electric traction. They can be used with the trolley system, the third rail system, the Westinghouse electro-magnetic system, and they can also be utilized in connection with the Tesla polyphase system.

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A CINCINNATI clothing manufacturer has invented an electrical machine for cutting cloth, which is capable of cutting 200 to 250 suits a day. A man can cut only about twenty-five suits and then only about four thicknesses of cloth, while the machine easily cuts eight layers. The machine is handsomely constructed and very light, weighing only thirty pounds, and is but fourteen inches high. The base is made of bronze and the armature is supported by a forged steel standard. The knife which does the cutting is about four inches in diameter and revolves with the rapidity of a buzz saw. The knife is protected with a guard. The machine is self-oiling, self-sharpening and self-lighting. It has a strength of one-eighth-horse power and is of 110 voltage. It is operated by a handle in the rear, and glides as easily as a flatiron. Electricity.

## Electricity Operating Mining Apparatus.

The operation of mining apparatus by electricity is daily growing more widespread, it being a question of outlay and resultant profits.

The General Electric Company has largely contributed to the bringing about of this result. Since it first entered the field it has kept steadily in view the improvement of its electrically operated mining apparatus and its adaptation to the peculiar conditions of the mining industry. The accompanying illustrations show a few examples of apparatus produced at its works and now in successful operation.

Fig. 1 shows a 6½x8-inch horizontal triplex pump, directly driven by a 10 H. P. four-pole slow-speed motor through two reduction gears, the entire combination on the same base, being mounted on a truck for ready transportation from place to place in the mine. The motor is controlled by a rheostat set at the side, and, like the motor, housed in with a sheet iron cover. The illustration shows the truck mounted on wooden base for shipment.

Fig. 2 shows a No. 4 Root blower driven by a four-pole slow-speed motor of fifteen H. P. capacity and mounted on a common base frame. Fig. 3 is a 60-inch steel plate exhaust fan operated by a two and one-half H. P. four-pole motor. The fan makes 480 revolutions per minute, and has a capacity of 8300 cubic feet of air per minute at three-quarter ounce pressure.

Another combination, introducing the multiphase motor for use on alternating current circuits, whether monocyclic or multiphase, is shown in Fig. 4, illustrating a triplex vertical single acting pump, directly connected to a 220-volt, sixty-cycle, ten H. P. multiphase motor. This type of motor developed by the same company, aside from its compactness, which allows of its erection in a restricted space, has the additional advantage of being absolutely without brushes, commutator or moving wires. These motors are now in use on all the three-phase monocyclic power transmission circuits in this country, operating without attention and without accident and to the entire satisfaction of the user.



FIG. 1.—ELECTRIC MOTOR DRIVING HORIZONTAL PUMP.

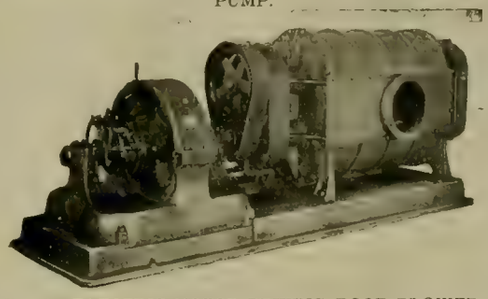


FIG. 2.—ELECTRIC MOTOR DRIVING ROOT BLOWER.



FIG. 3.—ELECTRIC MOTOR DRIVING 60-INCH EXHAUST FAN.

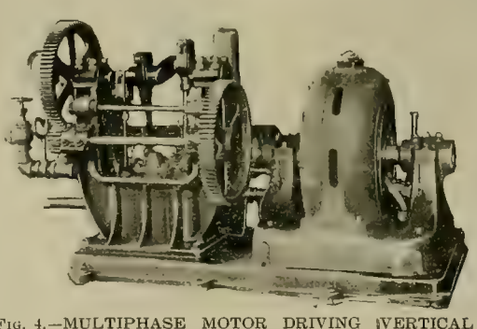


FIG. 4.—MULTIPHASE MOTOR DRIVING VERTICAL PUMP.

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A USEFUL and compact portable electric-light plant has been designed for ship use. The engine and dynamo are mounted on separate frames provided with wheels so that the plant can at any moment be run into position on board, where it can be bolted to form a complete bed. In addition to the necessary terminals and connections for the cables to the projector and distribution boxes, which can be placed upon flats alongside a steamer, the plant is equipped with cargo shades. These shades, each of which is fitted with five 16-candle power lamps, are used in the embarking and disembarking of cargo, which can be carried on uninterruptedly through the night. The projector, which is used for navigating rivers, has a mirror 30 inches in diameter, and is provided with a hand lamp and dispersion lens to give a flat beam. It can be instantly run up to the bows of the ship when wanted. The plant, which is light as well as portable, is provided with a tarpaulin cover so that in bad weather it can be covered up. It is designed to run for long periods without attention.

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A TROLLEY WHEEL which cannot jump off the wire has been invented by a Milwaukee street-car superintendent.

# Scientific Progress.

## Longitudinal Waves and the Roentgen Rays.

Dr. Oliver Lodge makes some interesting comments on the Roentgen rays. He is tentatively in favor of the theory that the Roentgen rays are longitudinal propagations of the ether. He thinks that what suggested longitudinal waves to Roentgen was the fact that crystalline properties were of no importance: *e. g.*, that Iceland spar and quartz were equally transparent or opaque whichever way one turns them. But it must be admitted that such a test as that is next door to none. "If tourmaline is transparent to Roentgen rays going along its axis, it would be a much better test; and this I have myself ascertained to be the fact. J. J. Thomson has also found that a pair of ordinary cut tourmalines are equally transparent whether their axes are "crossed" or parallel, which is an excellent test. Nothing suggestive of polarization in any form has yet been observed, a fact which tends against transverse and in favor of longitudinal waves. But the strongest argument in favor of longitudinal waves is derivable from the fact that the rays discharge electric bodies. Lenard found this, and J. J. Thomson and I have both obtained it easily under Roentgen-like conditions, but their peculiarity is that (unlike light) they discharge positive and negative about equally.

"Elster and Geitel showed that when polarized light discharges a really smooth surface it is most effective when the electric oscillation is partly normal, not tangential, to the surface; in other words, that it is what may be called the longitudinal or end-on component of ordinary light that is by far the most effective in discharging electricity.

"Mr. Robinson thinks he has observed that the same thing is true as regards the power of exciting fluorescence; an important observation, if true, but the examination is not complete yet. If it turns out so, then the two things that Roentgen rays are known to do are characteristic of end-on or normal vibration.

"As to photographic or radiographic action, it is so slow and inadequate at present that it hardly looks like a direct primary effect, but even there it seems as if thick films did better than thin.

"Another fact that gives a gravitational look to Roentgen's rays is the fact that they appear to pay more attention to specific gravity or ordinary density than to any other property of matter. This can be said without stating that opacity and density are strictly proportional. Any way, electrical properties of matter seem to be quite unimportant; polish or roughness, a coherent block or a powdered mass, are all the same to these waves, as they are to gravity.

"Direction of crystallization matters nothing, nor does shape; an aluminum prism cannot bend them; they cannot be bent, or even reflected to any considerable extent. If it be found that physical state is also unimportant, so that the same molecules obstruct equally, however they be aggregated, whether into solid, liquid or gas, that will be a further contribution to the evidence in the same direction.

"Lenard, Hertz, Goldstein, and the Germans generally (except Helmholtz—a notable exception!) have consistently urged that cathode rays were something more than a stream of particles; in case it should so turn out, Lenard urged this for his rays outside, in air. Hertz, I believe, urged it for rays inside the vacuum. It may be that the streaming particles are there, but the ethereal process may be also there. Outside in the Lenard rays both processes possibly coexist, one deflectible by a magnet, the other not. That both processes exist also inside the vacuum is not likely. J. J. Thomson has exposed a protected plate in the very rays themselves inside the vacuum and got no result. It looks as

if the streaming particles alone could not achieve it."

Dr. Lodge says, at the end of his comments: "If the sun emits any rays that can reach photographic plates through boxes or hand bags, even through black paper, every touring photographer should know; but if cathode rays alone have no direct action, without the intervention of a phosphorescent substance, then even the absence of direct solar action would constitute no valid and conclusive proof that the coronal rays are not electrical, though it would very much militate against a method of easily obtaining a photographic record of the corona, which has been suggested."

A YEAR ago attention was directed in this column to the prediction of an eminent authority that we were entering upon a period of scientific activity that would far transcend any previous experience. The most indifferent observer cannot fail to be amazed at the manner in which this prophecy is being fulfilled. Chemists are astonished to find that the long familiar atmosphere contains a large proportion of a substance hitherto unknown—the strange and inert argon; and helium, so long known in the spectrum of the sun, is discovered as a terrestrial element. With the liquefaction of air and hydrogen we are introduced to a new chemistry of cold. The development of the electric furnace brings great possibilities in the reduction of certain metals, and among its remarkable products yields calcium carbide, the source of acetylene, which is the first hydrocarbon to be produced artificially on a large scale, and a revolutionary achievement in chemical synthesis. Most surprising of all is the new form of radiant energy. Eager students everywhere have quickly begun experiments with the mysterious X rays, and the new art of "shadowgraphy" promises, among other things, that the sick can have their diseased organs brought to view, while the curious can have their skeletons photographed while they wait. Other epoch-making discoveries are almost grasped, and it is clear that, with so many roads opened to peaceful conquest, our end-of-the-century days leave no time for demoralizing wars over political boundaries. The war between Italy and Abyssinia and other conflicts have no such record of victories as those of science in the last year.

IF the total heat of the sun were valued at twenty million dollars, the proportion of its genial warmth utilized by the earth would be worth about one cent, says Sir Robert Ball, in *McClure's*. The balance of the sun's heat is wasted in space, so far as science knows. If all the coal in the earth were to be used for sun fuel, the heat produced would be only equal to that shed in the tenth part of a second by Old Sol. The great gaseous mass, which is larger than the moon's orbit, is burned up so that the great luminary is ten inches smaller each day than it was the day before.

THE "Roentgen waves" are still receiving universal attention. Prof. Sanford, of Leland Stanford Jr. University at Palo Alto, in this State, whose investigations on the same subject three years ago practically preceded the recent announcements, will lecture on the subject at the Academy of Sciences in this city on the evening of the 16th inst.

THE most recent observations and experiments go far toward justifying the belief that the light rays brought into prominence by Prof. Roentgen's experiments are longitudinal waves. If this be demonstrated, it will open a new department in natural physics of equal magnitude with sound or electricity.

THE article on calcium carbide and its manufacture in the issue of this paper of Feb. 1st has attracted considerable attention. Discussion on the commercial possibilities of acetylene is colored largely by the business standpoint. The statement of rivals who fear displacement of profits or the published opinions of those influenced thereby should have no weight with seekers after the facts, men who care more for the scientific progress and its practical dollars and cents results than the opposing claims of obsolete concerns who see their former profits fading.

## Mechanical Progress.

THESE estimates of the work obtained from one pound of coal at different epochs of steamship evolution are supplied by an address by Mr. A. J. McGinnis, as president of the Liverpool Engineering Society. In 1840 the consumption of fuel on an ocean steamer propelled a displacement weight of 0.578 ton eight knots, or an actual earning weight of 0.057 ton, the hull representing 40 per cent and the machinery and fuel 50 per cent of the displacement. In 1850, with iron vessels and the screw propeller, a displacement weight of 0.6 ton was propelled nine knots, but the earning weight was increased to 27 per cent, or 0.16 ton. In 1860, with higher boiler pressure and the surface condenser, a displacement weight of 0.82 ton was propelled ten knots, and the earning weight was 33 per cent, or 0.27 ton. In 1870 the compound engine so reduced the fuel carried that a displacement weight of 1.8 tons was propelled ten knots, the earning weight being 50 per cent, or 0.9 ton. In 1880, when passenger and cargo steamers had separated, the record of the purely cargo steamer was 2.1 displacement tons propelled ten knots, the net earning weight being 50 per cent, or 1.05 tons. In 1890, when steel hulls and triple expansion engines had become universal, the work on the cargo boat was 3.33 displacement tons, propelled ten knots, and the earning weight had risen to 58 per cent, or 1.93 tons. In 1895 there were two classes of cargo boats. The work on the ocean "tramp" was 3.4 displacement tons, propelled eight and one-half knots, with an earning weight of 60 per cent, or 2 tons; on the huge cargo vessels of the North Atlantic 3.14 tons propelled twelve knots, earning weight 55 per cent, or 1.7 tons. The express passenger steamers show more clearly the penalty of speed. On these the earning weight propelled for each pound of coal per hour was reduced from 0.16 ton in 1881 to 0.09 ton in 1895; while the increase of speed from nineteen to twenty-one and a quarter knots was obtained only by raising the daily coal consumption from 300 to 500 tons.

DISCUSSING the use of cyanide of potassium for steel-hardening purposes, T. R. Almond, Brooklyn, N. Y., suggests this salt assists the hardening process because of its powerful dioxidising properties, and also because it forms a liquid film on the surface of the steel, which causes a more perfect contact between the steel and the water, thereby permitting a more rapid abstraction of heat. The inevitable formation of a thin coat of oxide is unfavorable to the process of rapid cooling; and as rapid cooling seems to be the one thing necessary for success as to hardness, any means used for the removal of a bad conductor of heat, like the black oxide, will be of advantage, and more especially if this means also results in the formation of a liquid film on the steel surface having the affinity for water which, it is well known, is peculiar to potassium cyanide. Mr. Almond recommends the removal of all scale or oxide from the surfaces of steel to be hardened, either by pickling or by the cyanide. Steel, covered with a very thin film of oxide, will take the heat less quickly when immersed in hot lead than if the steel be bright before being immersed. This being the case, it would seem to follow that, because of a film of oxide, heat will leave steel more slowly when being cooled by water.

CITY ELECTRICIAN BARRETT has solved the question of new power for bridges spanning the Chicago river. An electrical plant is to be installed at a central point, and not only are the bridge circuits to be extended, but the generators will provide 400 additional sixteen-candle power lamps for municipal use.

ONE might be accused of romancing were he to assert that a gun is of several million H. P., and yet nothing is more exact. The 100-ton gun, with a 550-pound charge of powder, throws a projectile weighing 2020 pounds at an initial velocity of 1715 feet per second. It communicates to it, therefore, a live power or kinetic force of 92,597,000 foot pounds. The thrust exerted by the gases due to the ignition of the powder lasts less than a hundredth of a second. The result is that during the active period of the work of the powder in the gun the mean power is greater than 87,000,000 foot pounds per hundredth of a second, say 8,700,000,000 foot pounds per second. This represents a power of 12,000,000 kilowatts, or 17,000,000 H. P. There is, unfortunately, another side to this picture. Although large guns are extraordinarily powerful, their active life is essentially ephemeral, since, after a hundred shots, they are generally out of service. They have then worked actively one second! The same calculation applied to modern guns that throw 2200-pound projectiles, and communicate thereto an initial velocity of 1970 feet a second, demonstrates, further, that such guns, during less than a hundredth of a second each time, develop a formidable power of 13,050,000,000 foot pounds per second, say 24,000,000 H. P.


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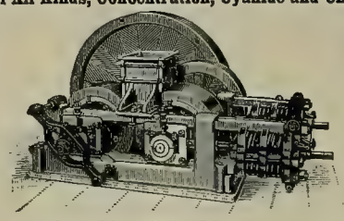
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# Practical Information.

### All-Round Work.

There is great advantage in division of labor; but this advantage has been overestimated. Specialties in employment have been pursued to such an extent that it is hard to find a man who is proficient in every branch of his business, or the business of his firm, shop or factory. The legitimate fruit of this exaggerated estimate is the crank, the dissipated workman, out of sorts with his work and hence with himself and everything else. To stand in one spot the whole day long, and day after day, tending a machine that does nothing but shape a tack or head a pin, narrows and dwarfs a man, till, like the crank of an engine, he is ready to elbow everyone that comes in his way. Such men are good subjects for communism and anarchy.

It takes all-round work to make an all-round man. Manual training, as a branch of education, is giving a new view of labor—each occupation valued according to the degree of discipline or education it will afford mind or eye. The symmetrical development of the muscular system is becoming a matter of much consideration, and is giving many valuable suggestions touching the development of mind. All-round work is seen to yield better results in character, as well as in constitution. God is not mocked. He never intended a man to be a mere machine, even if he can make a—so-called—living at it.

### A Chemical Detective.

A Budapest manufacturer has informed the police that he possesses a powder with which thieves can be caught. Having recently made the unpleasant discovery that his cash-box was plundered day after day, and failing in all his attempts to catch the thief, he applied in his dilemma to Mr. Telek, professor of chemistry at the Franzstadt Commercial Schools, and the latter gave him a powder which he sprinkled over his cash every night before leaving the office. This powder has the peculiar effect of dyeing the skin blue, the color being intensified by washing, while it resists the application of soap. On the very first day the manufacturer noticed a deficiency of eight crowns in the silver cash-box. He at once called his employes together and ordered them one by one to steep their hands in a basin full of water, got ready for the purpose. One of the men was very loth to follow the example of his comrades. At last he consented, when no sooner had he dipped his hands in the bowl than they turned dark blue. His employer stepped up to him and said, "You are the thief!" and the man confessed.

A CURIOUS FACT is the impossibility of moving your eye while examining the reflection of that organ in a mirror. It is really the most movable part of the face; yet if you hold your head fixed and try to move your eye while watching it, you cannot do it—even the one-thousandth of an inch. Of course, if you look at the reflection of the nose, or any other part of the face, your eye must move to see it. But the strange thing is that the moment you endeavor to perceive the motion the eye is fixed. This is one of the reasons why a person's expression as seen by himself in a glass is quite different from what it is when seen by others.

EXPERIMENTS are reported as having been made abroad lately on the self-ignition of cotton waste. A handful of cotton waste was dipped into linseed oil, squeezed out, placed in a wooden box, and the temperature observed closely by means of a thermometer introduced into the box; the temperature surrounding the box was kept at 70° C., and, in a short time after, the temperature in the box was found to have risen to the height of 173°, and smoke issued therefrom. Then, when opened to admit air, a flame burst out at once, while a box from which the air was perfectly excluded consumed after five or six hours. In another experiment, in which the cotton was saturated with rapeseed oil, the box burned after ten hours. With an outer temperature of 56°, gallipoli oil caused the spontaneous combustion of cotton wrapped in paper; castor oil required twenty-four hours; sperm oil, four hours; train oil, two hours, for a lively combustion.

A NEW DETERMINATION of the lowest temperature at which a hot body becomes visible is published by Signor Pettinelli, in the *Nuovo Cimento*. He heated a cast-iron cylinder 30 cm. long and 14 cm. broad, in a wrought-iron jacket over a bunsen burner to a temperature of 460° C., as indicated by an air thermometer, and then observed its flat end in a dark room from a point 60 cm. above it. When it had cooled to about 415° the red heat vanished and gave away to an indefinite hazy glow. This glow completely disappeared at 404° and repeated observations gave an error of only 3°. High emissive substances, such as the mantles made by Auer and others for incandescent gas lighting, became visible at the same temperature, but reflecting surfaces had to be heated 20° higher before they appeared to the eye, and glass still more. These low temperature rays were found to traverse glass and water like ordinary light rays, but they suffer a comparatively greater absorption. Different eyes differ slightly in their capacity for seeing them, the maximum divergence being about 6°. But the extent of surface must be the same. Signor Pettinelli found that if he screened off all but one-fortieth of the surface, the body had to be heated 6° higher than before to become visible.

THE word "fad" is a manufactured word, not given by Worcester. It has been in use only a short time, comparatively, and while it may be derived from the Welsh it is more probable that it is made from the initial letters of the words "for a day." The word "tip" originated in that way. In an old-time English tavern a receptacle for small coin was placed in a conspicuous place over which appeared the legend, "To insure promptness." Whatever was placed in the box was given to the servants. Other taverns followed the example, and soon the three words were written "T. I. P.," everybody knowing what they indicated. Then the punctuation marks were dropped, and the word "tip" was born. "Fad" and "tip" are of the same class and kind.

CLEMENS HERSCHEL, hydraulic engineer, isn't worrying about the "destruction" of Niagara Falls. The Niagara Power Company is now using enough water to make 30,000-horse power. Suppose in the next 65 years the drain of this company and of other compainies should equal 400,000-horse power, "then," says engineer Herschel, "the flow of the Niagara river in 1960 would be reduced from 265,000 cubic feet per second down to 238,334 cubic feet per second; the depth of the water on the American Fall from four feet down to 3.74, and the depth of the water on the Horseshoe Fall from 14 feet down to 13.08 feet." In other words, visitors wouldn't learn from their eyes that any water had been taken from the river at all.

IT often happens that destructive fires break out in great factories almost immediately after the night watchman has made his rounds. The general inspector of the Hartford Fire Insurance Company thinks that the fault is not so much with the men as the system. He proposes this change: He would have two watchmen, each employed part of the day at other work. One would serve from noon until midnight, and the other from midnight until noon. This would cost no more than the present plan, but would lessen the risk from sleepiness, he thinks.

*Printers' Ink* of New York recently gave a list of papers in the United States over fifty years old, and accredited to California the following papers, with the date of first publication:

| *Paper.* | *Year.* |
|---|---|
| Marysville *Appeal* | 1831 |
| Sacramento *Bee* | 1824 |
| Sacramento *Record-Union* | 1828 |
| San Francisco *Bulletin* | 1819 |
| San Jose *Herald* | 1844 |

The true dates of first publication of the above papers are:

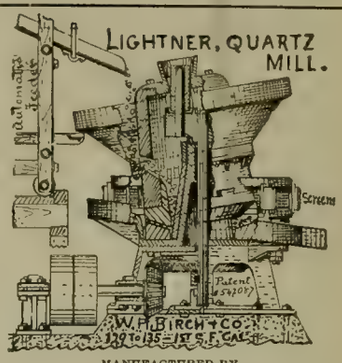
| *Paper.* | *Year.* |
|---|---|
| Marysville *Appeal* | 1860 |
| Sacramento *Bee* | 1857 |
| Sacramento *Record-Union* | 1851 |
| San Francisco *Bulletin* | 1855 |
| San Jose *Herald* | 1851 |

SOME interesting facts were developed by Prof. Ranke at the last meeting of the German Anthropological Society, in relation to the relative weights of the brain and spinal cord in man. It is well known that man has not the heaviest brain of any animal; the whale and the elephant have heavier. Nor has he the heaviest in proportion to his weight; some singing birds, various small apes and the mole have proportionately heavier brains. What Ranke brings out is that the weight of the human brain is much greater in proportion to the weight of the spinal cord than in any other vertebrate; and this, therefore, constitutes an anatomical distinction of man, strongly contrasting him with all other animal forms.


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# Mining Summary.

Judge McKenna's ruling in the U. S. District Court this week in the North Bloomfield case, which virtually upholds the constitutionality of the Caminetti act, is in effect a notice to the Anti-Debris Association that it has no excuse for existence, and that the money paid to its salaried officials is not for value received, as all authority in the matter vests in the U. S. Debris Commission and the U. S. Courts. This ought to be good news to the taxpayers in the counties whose Boards of Supervisors pay out county funds to gentlemen who alone find profit in maintaining the organization. Meanwhile, the officers of the California Miners' Association, with the real good of the miner and farmer at heart, work gratis for the cause, without pay or hope of reward beyond the approval of their fellow citizens—and defray their own expenses.

## CALIFORNIA.

### Amador.

*Record:* At the Gwin mine, when they pass through the ledge it is the intention of Superintendent F. F. Thomas to put in a charge of dynamite to break through the formation and secure a drainage for the whole works. The work of boring is done at the surface and no men are in the shaft while work is in progress, this precaution being taken to avoid the endangering of life in case the confined waters of the old works should break into the new. The depth of the bored hole at the present time is near where the surveys locate the old 1400-foot level, and if, according to the theories of many miners familiar with such matters, a large volume of water is confined in the old works, the condensed air held in many of the chambers would cause instant death to any living thing with which it came in contact, and the water, if freed by any operations in the new works, would instantly flood them.

At the Oneida the temporary plant has been completed and the work of sinking the shaft is now progressing with eight-hour shifts. They are employing eighteen men and pay miners $3 per day. The shaft is to be sunk 1000 feet with the present hoisting plant, and in the interim one will be erected which will sink to 3000 feet. They will then go down 800 feet more, making the shaft 1800 feet in depth, at which point their surveys give them the ledge. The work is being prosecuted under the management of E. Ross Browne for the English Exploration Company of London.

The *Republican* reports that the Lowry gravel claim at Aqueduct, which has been in shape for active working by Meehan & Mattly, has been bonded to McIntosh, a San Jose man. The price is $12,000; $2000 has been deposited as a forfeit, the purchaser to have the privilege of testing the mine by a run of sixty days. In the event of the output averaging $40 per day, he to pay the balance of the purchase price at the expiration of that period.

The new Oneida shaft is down about sixty feet.

The Kennedy chlorination works commenced roasting ore on the 1st instant, with six months' work ahead.

### Butte.

MINES ABOUT ENTERPRISE.—The North Star mine, owned by Bothwell, is working four or five men on two stamps.

At the Burroughs mine two arrastras are running. The tunnel is in 60 feet, and the ledge is 4 feet wide.

At the E. W. mine a tunnel is being run in to connect with their shaft, which is down over 100 feet on the ledge. Alm and Slater have run a tunnel 130 feet on the ledge which averages 5 feet in width. They are running two stamps at present and will put up five during the summer. They also own the Crystal Hill mine about two miles distant from the Crystal Peak. The tunnel is in about 264 feet and has tapped the ledge which at this point is about 2 feet in width, the shaft is down on the ledge 225 feet. They have a four-stamp mill on this mine, which will start up in about two weeks.

### Calaveras.

At Thorpe mine on the west side of the mother lode, one mile east of Fourth Crossing, at the 300-foot level crosscutting shows the chute about 14 feet wide: the shaft is over 440 feet deep. At 500 feet a crosscut will be run at the 400-foot level: if the ledge between the 300 and 500-foot levels proves to be as rich and permanent as at the 300-foot, a mill will be built.

P. E. Condit of Murphys, has bonded the Collier, Deer Lodge and West Extension mines, Stanislaus mining district, to T. C. Cox of Columbia for eighteen months for $28,000. By June 11, '96, $5000 must be paid on the Deer Lodge and West Extension, and $2500 on the Collier mine; on Nov. 28th, $6500 more must be paid on the two first named and $3750 on the Collier, on August 28th, 1897, the remaining $10,250 must be paid.

The Falcon near Murphys is again to start up. The 150-shaft will be sunk 200 feet deeper.

At the Rose Rock, on Indian creek, the shaft is 100 feet deep with a width of nearly 3 feet of quartz containing free gold.

### El Dorado.

(Special Correspondence).—The Grand Victory has opened a rich ore body on the 250 level.

In the Larkin the south drift has reached 90 feet, and the north drift 35 feet, showing a fair-sized ledge of satisfactory quality of ore. Steam pump and hoist are being placed this week.

The strike in the Lady Emma last week is of value. This property is six miles north of Placerville.

Bonding and incipient development work in various portions of the county are progressing to a degree indicating great prosperity in the mining interests of this county.

The Lone Star, four miles south of Placerville, under bond to D. H. Jackson and some San Francisco and Fresno people, has a tunnel 125 feet, showing a good ledge of fair ore. The tunnel will be extended 600 feet into the hill. Work was begun last week.

The Big tunnel is progressing through the hill toward the Gentle Annie at a fair pace.

The ore body struck on the 300 level of the Gentle Annie last week was an agreeable surprise to its owners. The vein measures 10 feet.

John Melton has bonded a drift mine to A. A. McDonald at Grizzly Flat. A tunnel 500 feet is yielding good profit.

Placerville, Cal., March 10.

### Madera.

*Gazette:* Grub Gulch is about thirty miles east of Mariposa.

The Mammoth mine is about half a mile from the town. It has a large electrical power plant, driven by the Fresno river, and a ten-stamp mill. The mill has been shut down for a year, after running steadily for six or eight months. The Starlight is also owned by the Mammoth Co. Charles Ward is manager. There is a shaft down about 340 feet, with an 8-foot vein in the bottom of it. The Riverside is another location of the same company, and next comes the Beaumont, with a tunnel in 250 feet. The Mammoth Co. is making preparations now to start work on its properties on a scale of considerable magnitude. The Spencer ten-stamp mill is now about starting up. It is driven by electrical power. In its immediate vicinity are Swain's locations, the Savannah, French Gulch and the Joe mines. The Savannah has two shafts down 150 and 180 feet, respectively.

The Caledonia & Ward mine is just starting to work. It is close to the Mammoth and is the property of a newly incorporated company, of which Mr. Hawke is the superintendent. There is a tunnel in about 140 feet and one of the owners is at present in San Francisco arranging for machinery. Six men men are at work here and the property ought soon to make a good showing.

The Victoria mine is about four miles from Grub Gulch, and Charles Ward, the superintendent, has a force of men at work. The ten-stamp mill and electrical power from the Mammoth are to be removed to the Victoria shortly.

The Sierra Butte mine was located four years ago by Louis Grosjean, and has four men at work on it. There is a shaft down 120 feet on a vein running from 20 inches to 2 feet. The work has hitherto been mostly done by parties doing the assessment, and they have done considerably better than making wages at it. Mr. Grosjean now contemplates work on a more extensive scale and has gone out to the property with that object.

Grub Gulch is a live little camp and everyone connected with it is very sanguine at present. Wages are $3 per day for miners and $2.50 for men on top.

### Mono.

THE ERIE TUNNEL.—Col. Dyer has organized a company to prosecute work in the Erie tunnel, at Lundy, and to run a tunnel to intersect the Bryant ledge, in Lake canyon, at considerable depth. It will be about 800 feet long.

### Nevada.

The Orient Gold Placer Mining Company of North San Juan has levied an assessment of 50 cents per share, delinquent March 31st.

The Bullion Consolidated Mining Company of Grass Valley has levied an assessment of 20 cents per share, delinquent April 13th.

The *Transcript* reports a strike at the Mt. George mine last Saturday, while making a crosscut from the main ledge about 50 feet below the surface. The main ledge is between 6 and 8 feet wide at a depth of 200 feet.

The *Tidings* hears that the Last Chance Company are again ready to start their mill. The Last Chance is the old IXL, up in God's country. At the California mine in the same district the new tunnel is in now about 600 feet. The company have averaged 22½ feet per day in this tunnel. The stockholders of the German mine, near Washington, have received $10,000 from parties who recently secured a bond on the property. The amount is the first installment of $30,000 to be paid for the property. Dana Harmon is at the head of the company which has the bond.

*Union:* A new three-compartment shaft will be sunk on the Williams ranch by the Providence company. The work will be begun soon.

### Placer.

*Sentinel:* The river claim of the Erie Mining Company is on Bear river, two miles from Colfax, and consists of 3000 feet of the channel of Bear river above the dam across the river which furnishes water for the South Yuba Water Company's lower canal. The dam holds back tailings of an average depth of twenty feet for several thousand feet up the channel of the river. The company will run a bedrock tunnel from below to tap the gravel at one side and under the dam and work its gravel through the tunnel under the dam. The gravel in this property came from the rich hydraulic mines of You Bet, Little York, Gold Run and Dutch Flat. Part of the gravel in those large claims was cemented, and the fact that it has lain exposed to the elements for many years would cause it to decompose and liberate the gold.

Chapman Bros. and Leary have bonded the Green mine, Ophir district, and have begun development work.

At Sailor Canyon gravel mine additional working force will be put on as soon as sufficient ground is put in order by crosscuts and gangways, now being run to make room for them. The company sent in 1000 feet of air pipe and a blower last week.

The Schippman Company has its tunnel going and expects to reach the channel in early spring.

Preparations are being made to start work in the Bald Mountain mine.

The Herman mine and mill are running full time. A shipment of $5200 was made for last month's run. The company intends placing an additional ten stamps in its mill this season.

### San Benito.

At the New Idra mines near Hollister, two fine furnaces, one for coarse ore and one for fine ore, will soon be built. Mr. Holmes is superintendent. To dispense with hauling ore from the mines to the reduction works a tramway has been built.

### Riverside.

At Perris the Santa Rosa mine was attached and the Good Hope closed down, forty men being thrown out of employment at one mine and thirty at another, with no assurance of an early resumption of work in either.

The Santa Rosa mine has filed a petition in insolvency. The liabilities amount to $18,904.53; the assets to $108,414.57. The assets consist of three mines and new machinery, valued at $25,000.

The closing of these mines is the outgrowth of litigation, and in no sense reflects upon their value.

### Shasta.

*Searchlight:* Four men are engaged on the Eureka Tellurium in getting out ore, which will be taken to the smelter at Keswick. The expensive works designed to treat tellurium ore have been idle for some time. Development work, however, has been continued on a small scale.

The first blast in the Keswick smelter has proved a success. Copper matte has been produced and considerable ore has been brought down from the mine for like treatment.

*Journal:* Culver & Co. are sinking a shaft at the mouth of Barkhouse creek. They will have to sink about forty feet before reaching bedrock.

The Distlehorst Mining Co. is getting its dredger ready and expects to revolutionize river mining in that section.

There have been an unusually large amount of location notices filed this year, and there is almost a certainty of trouble over some of them, as the same ground is covered in some instances by different locations.

The miners along the Klamath river have not started up yet, but they are busy making preparations and everything along the river will soon be booming.

The Seattle Mining Co., on Thompson creek near Seiad, has shipped a sawmill to Yreka. The company intends constructing a flume for conveying water to its hydraulic mine, and the mill will be used to saw the lumber required.

*Free Press:* The prospective litigation between owners of the Windy Camp or Balla Klallala group of mines on the Iron mountain range has been settled, and the mines are virtually sold to Colonel Cleary, representing Eastern and foreign capital.

At Keswick there is a quantity of ore for the smelter. The engine, with eight and ten cars, has made four trips altogether, but at present it is in Sacramento undergoing repairs. The furnace has been charged several times, and the managers appear well pleased with its work. Copper matte has been produced and the results are satisfactory.

### Sierra.

At Gibsonville 110 men are now working at the Thistle shaft.

NEAR SIERRA CITY.—*Enterprise:* Fourteen men are working in the Sierra Buttes mine. Quartz is run from No. 3 tunnel and sluiced down the ravine into the mill.

The Buttes Saddle Company employ seventeen men. No. 3 tunnel, when completed, will tap the ore chutes with 650 feet backing. One of the ore chutes is 95 feet long and the other 140. The pay chimney averages about five feet in thickness and is in contact with slate and porphyry—slate on the foot and porphyry on the hanging wall. A second ledge has been recently struck about fifteen feet in the hanging wall. An upraise was made of 140 feet above No. 2 tunnel and the ledge found to be nine feet thick. Quartz averages $5 to $8 a ton. The ten-stamp mill is run by a Pelton wheel, propelled by about 300 feet pressure of water. Samuel Miller, formerly of Port Wine, is superintendent.

### Siskiyou.

At French Creek, Supt. Dillon tells the *Reporter* at the Monarch mine they have run ninety feet on the pay chute, which varies from three to seven feet in width, and the rock averages from $6 to $9 per ton.

Mr. Atkinson, one of the owners, is here to buy an electric plant, a quartz mill and other machinery necessary to open up the property.

A gravity tramway one-half mile long will be built from the mine on the hill down to the stamp mill to be erected on French creek.

On the upper ledge, known as the French Creek mine, an incline has been sunk twenty-three feet. This ledge is four feet thick, and the assay value of the ore is $16.95 per ton.

### Tuolumne.

Sonora *Banner:* Laughlin and Poyger, of San Francisco, have bonded the Climax mine, near Jacksonville, and have begun operations upon it. They have held a bond on the Homestake, an adjoining property, for some time and the development done thereon has given satisfaction.

## NEVADA.

### WASHOE COUNTY.

The Seg. Belcher and Mides Consolidated Mining Company has levied an assessment of 10 cents per share, delinquent April 13th.

The Coon Mountain Consolidated Gold Mining Company has incorporated at Reno to mine in Del Norte county, Cal., capital stock $2,000,000. The incorporators are all Chicago men with one exception from Oakland, Cal.

### LINCOLN COUNTY.

The DeLamar *Lode* says the cable of the tramway from the De Lamar mill to the Jim Crow tunnel parted and the break necessitated the closing down of the mill.

## OREGON.

### BAKER COUNTY.

F. and E. Thompson and C. M. Foster have sold to the Exploring Syndicate of Mines and Mining in the United States—head office, Paris; N. E. Inhaus, manager, E. L. Giroux of Baker City, resident agent,—several placer claims on Burnt river, below Bridgeport.

### JOSEPHINE COUNTY.

The difficulties that have embarrassed the management of the Black Channel Company to develop in the placer mines on Foot's creek, near Gold Hill, have been settled as far as Manager Bouse and the miners are concerned, by the former turning over to the latter who are represented by Hammersley, Neff and Walroth the lease of the property. By the terms of the agreement the miners are to continue work on the property until they shall have paid off, in addition to the current working expenses, the back amounts due which aggregate about $35,000. Nearly $10,000 has been spent in developing the property by the Bouse company and the claim is said to be rich and in such a condition that it can be quickly realized from.

THE WALDO SMELTER. — *Mining Journal:* Capt. Geo. F. Wheeler has returned from the Waldo copper mines and the blowing-in of the smelter. The results of the preliminary run were satisfactory. About 300 pounds of copper, 96 per cent fine, were run through, and he brought back with him and now has in the office of the Elmer-Brown Company, in this city, 150 pounds of the product as a testimonial to the value of the ore and the success of the smelter. He regards all uncertain factors in the problem, if there ever were any, as eliminated, and within a week the copper bars will be coming into Grant's Pass in a steady stream for shipment East. The only obstacle met in this preliminary run was the lack of iron for fluxing. Near to the chief copper ledge lies an immense deposit of what has heretofore been considered iron, and it was from this deposit that the company expected to get its iron for fluxing; but, on trial in the smelter, it was found that the deposit contained, in fact, more copper than iron and was unfit for flux. Of course, the company does not regret this discovery, as the deposit thus becomes very valuable; but iron for fluxing will have to be obtained elsewhere.

## BRITISH COLUMBIA.

PILOT BAY. — The Kootenay Mining & Smelting Co. is about to erect works to refine its own bullion.

The Cariboo Hydraulic Company have decided to increase their capitalization from $300,000 to $500,000. A new ditch to cost $60,000 will be made this season. This mine will make a good showing this season, probably, an output of $200,000, but the output will be more than doubled evey year for some years yet to come.

Ashcroft *Journal:* The Quesnelle River Hydraulic Gold Mining Company will be worked on a large scale the coming season. J. B. McLaren, the principal owner, has, it is reported, raised $60,000 of English capital to develop the property and put a proper supply of water on the ground.

The Le Roi Mining and Smelting Co. paid a dividend of 5 cents a share, $25,000, on the 4th, being the third dividend of the company, the first for $25,000, the second for $50,000, and the present one of $25,000, making a total of $100,000 paid within the past few months.

## ALASKA.

The Silver Queen mine, on Sheep creek, in the Berner bay district, is thought to be a continuation of the vein on which is located the Comet mine, which, during February, with but ten stamps running, yielded $38,000. A tunnel 280 feet long has been run, and two ore veins have been encountered.

IMPROVED MAIL SERVICE. — The Alaska Steamship Company has been notified that the Government has awarded to it the contract for carrying closed mails two round trips a month between Seattle and Mary Island, Fort Wrangel and Juneau, Alaska. This service will begin with the next sailing of the Willapa, and with two trips by the Pacific Coast Steamship Company's boats, provides for four round trips a month under contract, besides additional trips by the extra boats run by the Pacific Coast Steamship Company. Early last fall Second Assistant Postmaster-General Wilson foresaw the necessity for increased facilities this season, and he gave instructions that the railway mail service give especial attention to the needs of that section. Already substantial improvements have been made. Proposals have been asked for carrying additional mails between Sitka and Juneau, giving four trips a month each way between those points. Service has already been agranged between Nutchek and the portage, to take effect when a postoffice shall have been established at Cook's Inlet, and there is no doubt that as soon as a postoffice shall have been authorized at Circle City Mr. Wilson will take prompt measures to provide a supply for it.

The Juneau *Mining Record* says: It will be a stand-off between the Yukon and Cook's Inlet this spring as to which receives the largest rush. The Yukon is an old stand-by and a country of known wealth in yellow nuggets; Cook's Inlet is a new field, with its wealth in placer ground yet undetermined. The inlet is more easy of access than the Yukon and living is cheaper and the working

season longer, hence cheaper gravel can be worked at the same profits

### IDAHO.

(Special Correspondence.) Winter is past for this section, and placer mining operations are resumed. Some of the mines are now in full operation Men are arriving daily who own placer properties in the camp. Quartz mining operations are proceeding as usual. The Idaho mine is improving as development proceeds. Ore from the face of drifts assays $30 per ton; but the majority of it is refractory, concentrating 7.40 per cent to the ton. Owing to the change in the ore, the mill has been closed down till the necessary alterations can be made The ore roasts very easily, and heap roasting frees the majority of its contents. The mill on the Idaho is unique, inasmuch as it was built on the property from the raw material iron and wood, and consequently it is more adapted to strictly free milling ore than to ore having as large a percentage of concentrates as the Idaho at present carries, but as it is, it is a monument to the industry of the owners who built it, being as they were without capital.

The Crescent Gold Mining and Milling Company are running as usual with two shifts in the mine. A recent strike in the camp is the richest yet found, pan tests showing as high as $1 a pound. The ledge is about three feet wide, with an ore streak about eight inches wide, which runs at least $500 a ton The owners are not desirous of making the the location of this bonanza public till they make further locations, and ascertain the true trend of the vein. At present the vein runs northeast and southwest, dipping to the east. Work is being rapidly pushed ahead with a force of four men. Gold is visible all over the rock, and the ledge appears to be well defined. It is located under the name of the Golden Reward, and it is owned by men who are well known in the camp, and it will either be made a producer or a hole in the ground.

Pierce City, March 1, '96.

COEUR D'ALENE OUTPUT.—At present the amount of concentrates being produced monthly is approximately as follows: Bunker Hill and Sullivan, 2100 tons; Standard, 2000; Hunter, 800; Morning, 1100; Helena and Frisco, 1500; Emma and Last Chance, 1200; Tiger and Poorman, 1100; Stemwinder, 250; Gem, 1000; total, 11,050 tons.

F. W. Bradley, superintendent of the Bunker Hill and Sullivan mine, says: "There is no longer any talk of labor troubles in the Cœur d'Alenes. The day has gone. Times are getting better all the time, the men appear to be well satisfied, and the feeling of unrest that for so long a time pervaded the country has given place to one of confidence in the affairs of the country. Affairs are looking brighter in the Cœur d'Alenes than they have for a long time before."

A Boise dispatch reports a rich strike in the Black Hornet mine. Work was recently started up on the property, with a view of furnishing ore to fill a 2000-ton contract, disclosing a body of high-grade ore over the tunnel level, near the point where the tunnel intersected the vein, which is five feet thick.

### UTAH.

*Tribune*: If an option was obtained by an English syndicate on the stock of the Centennial-Eureka last Saturday was successfully carried out, the property will, on or before the expiration of four months, change hands, the purchasers paying for it $3,000,000. The deal was manipulated by a St. Louisan, his contract obligates him to pay $100 for every one of the 30,000 shares, that have to date earned $1,580,000 and which are now earning at the rate of $2 a month per share.

Taylor and Brunton of Salt Lake will build a sampler at Park City. The capacity will be 400 tons daily. At present the firm is constructing a sampler at Cripple Creek, Col., with a capacity of 400 tons.

PARK CITY.—*Patriot*: Saturday is pay-day at the Silver King. On that date about $25,000 of the needful will be distributed among as clever an army of miners as ever worked underneath the ground. The poor stockholders will be kindly remembered on that day also. Their rations amount to $37,500.

### MONTANA.

Shipments from the Anaconda for 1895 aggregate 99,775,294 pounds fine copper, 5,470,860 ounces fine silver and 20,229 ounces fine gold. Of this there was of electrolytically refined copper to a total of 21,052,994 pounds.

All the property of the Butte & Boston Mining Company was attached last week on a suit for $406,516.43 brought against the company by Edward C. Perkins of Boston, the company's Eastern attorney and assignee of parties holding the company's floating indebtedness. The claims assigned to Perkins are as follows: Lewisohn Bros., of New York, $174,000; Boston and Montana Mining Company, $104,000; Lewisohn Bros. $40,000; Massachusetts Loan and Trust Company, $33,700; Globe National Bank of Boston, $10,000; A. S. Bigelow, $44,816.43. The property attached consists of thirty-eight mining claims, town lots, water rights, etc. It is claimed the attachments will consume the entire property, and that the bondholders and stockholders will receive nothing. The company's stock possesses a nominal value of $3.25 a share. Last July it sold at $28, the value in the aggregate has shrunk from $5,600,000 to $650,000. At the same time the value of the bonds must have shrunk fully 50 per cent, or from $2,500,000 to $1,250,000. There have recently been but forty men at work in the Butte & Boston mines, as it was found impracticable with the means at hand to hoist ore and do development work at the same time. There is perhaps three months' supply of ore in the east end of the Silver Bow mine, but the 9th, 10th and 11th levels running to the west in the long part of the mine are all in ironstone. On the 9th level the drift has gone 1,400 feet through a mass of rock assaying about 50 to 60 per cent in iron, and practically nothing in copper Similar iron stone has been gone through before in the Montana mines, but never has an iron horse of such size been encountered before.

It is believed by the Butte & Boston people, says the *Inter-Mountain*, that it is only a question of time when the Butte & Boston mining property will show up better, but it will take money to make the development work. The Butte & Boston is very largely in the condition of a man who has purchased a palace, exhausted all his means, and hasn't a cent left to buy a door mat. The Butte & Boston has a valuable smelting plant, but has never had the proper amount of money for mineral development work, as the floating debt has pressed the company ever since its organization

Although about 300 miners have been discharged the men left will keep the pumps at work, and the smelter will run for some time as formerly. The experiment will be tried of putting the Butte & Boston smelter upon Boston & Montana Colusa tailings.

The Butte & Boston has more than thirty mining claims, and in mineral ground has superficial area of about twice the area of Boston & Montana, but scarcely one-tenth of it has has ever been opened.

It is possible that a plan of reorganization assessing Butte & Boston stock may be devised to relieve the company of its embarrassment and the heavier the assessment the greater will be the future value of the property. At least $1,000,000 must be raised, and if $2,000,000 should be raised it would be far better; and there is no reason why every dollar expended upon this property, if the amount raised is sufficiently large, should not yield many more dollars in the future.

One thing is clearly certain from a study of the Butte & Boston property; and that is, that the mineral lands, aside from a smelter costing $750,000 are worth more than the debt of the company.

The Bozeman mine at Pony, Madison county, is bonded to J. M. Merell of Oakland, Cal., J. F. Cowan and P. A. Gamer of Butte, and J. S. Rooney of Pony for $30,000. A cash payment of $5000 has been made.

The Iron Mountain Company of Clancy has paid its thirty-third regular dividend. The report is as follows: Delayed ore sales for shipments in December, $7044.43; ore sales for January to date, $19,155.19; electric light sales, $16; eight cars shipped in January, unpaid for Feb. 13th, $26,215.62; current expenses for January, $17,623.76; net profit, $8591.91; balance on hand, $14,158.89.

### SOUTH DAKOTA.

Keystone *Miner*: The Keystone and Bullion mines are now closely associated, having been connected by a tramway between the lower tunnel on the Bullion and the Keystone hoist. This tramway is now completed and ten stamps of the Keystone mill will be dropping on Bullion ore. This ore, mined from the open cut on the summit of Bullion Hill, is not touched by hand or shovel and is put in the mill with as little expense as any ore ever mined; two miners supplying ore for both the Keystone and custom mills. Seventeen men are now employed in reopening the Keystone mine, and the mill is being supplied with perhaps as good ore as ever came out of the mine.

The new machinery for the Holy Terror arrived last week and has been put in place. The lot included a safety steel cage, a mortar and battery of stamps, two jigs, a slime table, a wagon scale and four ore cars. The stamps and concentrators have been placed in position in the mill; the cage was placed in the shaft and the work of sinking was begun. The men work three eight-hour shifts and employ two machine drills; the rock is hoisted in large iron buckets attached to the bottom of the cage. As the shaft is not on the ledge, of course nothing can be known of the new developments until the ledge is tapped at the 275-foot level and drifts started, but the indications above are that the rich ore chutes are larger than those above.

### MICHIGAN.

At the Calumet and Hecla copper mine, which has paid in dividends $44,850,000, the average thickness of the vein is about sixteen feet. It is made up of water-worn pebbles of all sizes, between which are angular rock fragments, the whole being cemented together by silica and calc. The copper occupies the places between these pebbles, and has replaced material that has decomposed. In point of richness, an average of something like 4½ per cent is obtained. There is a great variance in the percentage held from one level to another. They have opened many levels from which mining is being done, the work of development being well ahead, but they are taking the upper levels as fast as convenient, and are letting the hanging come down, for come down it will no matter what pains or means are taken to support it, and then there is no use in keeping it up after the copper-bearing rock has been extracted. The heaviest timbers are crushed, as the hanging is loose and treacherous, and shows great weight soon after a level has been finished.

### COLORADO.

The Newhouse tunnel, in the Cripple Creek district, has reached about 4750 feet. It is being driven to reach the mines of Seaton mountain, Russell gulch and Nevadaville at a greater depth, and giving them drainage and transportation, thus saving hoisting and hauling. The tunnel is 12 feet square.

The Victor *Review* says: The Nellie V, on Squaw mountain, recently shipped a car of ore that returned $128 per ton. The Lucky Gus was sold yesterday by Furman & Ferris for $15,000. This property is located on Squaw mountain and consists of one shaft of 25 feet. The ore assays $12.50 per ton. The shipments of the Portland Co. are again being brought up the average, having been reduced of late owing to the Anna Lee disaster and the many improvements being made. The big machinery, amounting to seven carloads, has arrived. The engine alone weighs 22,000 pounds, the largest ever brought into the State, and is accompanied with a guarantee to hoist 10,000 pounds 4000 feet in one minute. The Burns will be sunk 4000 feet or deeper, and will cut seven already known veins.

Denver *News*: The most important sale made in Gilpin county for some time past was that just consummated by Forbes Ricard of Central City and W. W. Williams of Russell Gulch to James McKay of Pittsburg, Pa. They sold him the Niagara mine. The consideration was $75,000, of which $25,000 was paid in cash for possession. The Niagara has been worked for the past twenty years, and has a record of many thousand dollars of production with comparatively small tonnage. It has in the past few months produced ore of a remarkably high grade, and shipments have averaged from two and two thirds to nine ounces in gold to the ton in carload lots.

Cripple Creek *Times*: The Mt. Rosa & Battle Mountain Tunnel Co. has started work on its big tunnel scheme, which is to bore under the townsite of Victor. The company is a strong one and shows its good faith by putting one-half of its two million capitalization into the treasury for development purposes. The tunnel course is direct toward the richest portions of Battle mountain.

### ARIZONA.

Miss Jennie Hilton of Pomona, Cal., has sold her share in the Kansas mine, in the Harqua Hala region, for $35,000, and has got $20,000 cash down, with promissory notes and mortgage for the remaining $15,000, payable in sixty days. Miss Hilton is a perfect type of the new woman in modern affairs. She is probably the only woman engaged in active mining operations in the United States, and it is likely there is no other woman anywhere who is a mining prospector in the full sense of the word.

The Phœnix *Republican* declares that Messrs. E. B. Gage, F. M. Murphy and N. K. Fairbank, owners of the Congress gold mine, have recently refused $2,000,000 cash offered by an English syndicate for their property. "Preparations are being made to supplement the present forty-stamp mill with another forty-stamp outfit. A cyanide plant will also be added to have a capacity of 200 tons daily to handle the total output of both mills. Work in the lower levels is being pushed as far as practicable to make connections with upper workings for a complete new ventilator." Work is now carried on at the 1400 foot level.

The Pearce mines near Tombstone are being developed. The superintendent talks of putting in a short railroad to connect with the Southern Pacific railroad to facilitate transportation of supplies and material to be used in the new mill, which will have a capacity of 150 tons daily.

A Scotch syndicate says it will in the next ninety days build a smelter at or near Benson to compete with the El Paso smelter, and for local customers, the capacity to be 500 tons daily.

A Chicago and Cleveland company will this week accept or reject several copper properties near Wickenburg. If accepted, a smelter having a capacity of 100 tons daily will be erected.

The *Republican* says that S. D. Kempton is in Phœnix from Vulture, where he is running ten of the stamps of the mill and working forty men. There is 150 feet of water in the shafts, which will supply batteries till summer. He has diverted channels of dry watercourses to fill up old workings of the mine when rain comes, and thus create a water storage.

THE FORTUNA MINE.—O. C. Perkins has been helping build a twenty-stamp mill at the La Fortuna, on the desert, thirty miles east of Yuma, sixteen miles from water, making that liquid worth $3 a barrel at the mine. A pipe line will soon extend from a well and near the Gila to the mine. Eight wells were dug before a satisfactory supply of water was found. The pipe line is extended now to within six miles of the camp. There will then be enough to supply the camp and stamp mill. The lead is from twenty to twenty-five feet wide, regular in its size. Those familiar with the claim say it will average $35 the entire width of free-milling gold ore. Much work has already been done. The shaft is 203 feet deep with crosscuts, showing the deposit of mineral is uniform.

### LOWER CALIFORNIA.

JACALITOS MINES.—F. K. McNamara, has gone to Jacalitos, Lower California, where he will assume charge of the Piedad group of mines, recently purchased by G. H. Hayes and H. A. Howard. A five-stamp mill is being sent to the mines, with facilities for easily enlarging the battery to ten stamps, which it is expected will be done within a few weeks. E. Ibarra is putting in a Bryan mill. At Zaragoza, a few miles from Jacalitos, G. Lombard is putting in a stamp mill.

### SOUTH AMERICA.

PLAYA DE ORO MINING COMPANY.—Under date of Feb. 27th J. D. Baucus, treasurer of the company, says R. F. Lord, formerly manager and chief engineer, has no longer any official connection with the company. A partial cleanup at Boqueron mine was made on February 12th and 221 ounces of gold obtained —a cleanup from the sluice boxes, no attempt being made to cleanup the bedrock, as the gravel bank on which they are washing at the Boqueron mine is now over eighty feet high, and caves or slides easily. "These slides, which are frequent and extend forward from 50 to 100 feet, almost entirely cover the exposed bedrock, making it dangerous for the workmen to cleanup until the bank has been washed back for a considerable distance beyond the present line. When this is done, a cleanup of the bedrock can be made and the heavier gold which it contains will then be obtained. The miners estimate that at least three times as much gold will be found on the bedrock as has been obtained from the sluice boxes. With the money on hand and the bullion in transit we will have sufficient funds to complete the improvements and changes in the plant recommended by Mr. Petty, which will secure a permanent supply of water, according to his statement, at the Boqueron mine of 1500 inches, as against 250 inches, which has been the average amount available up to this time, and the head of the water will be increased from 70 to 165 feet, which will largely increase the efficiency of the giants and enable at least 30 per cent more gravel to be washed with the same amount of water. It is estimated by Mr. Petty that this additional water will be available in from sixty to nine days –in fact, from February 22nd, on which date the 'feeder' canal was to be completed, he states we can count upon having a permanent supply of water of 700 miners' inches, and this amount will be gradually increased by the 'feeders' and storage reservoirs which are in progress of construction."

Mr. Blodgett, acting superintendent, in his last report states: "The most noticeable thing about the bank (Boqueron) during the week was that a large number of the ancient Incas tunnels were exposed. The greater part of these tunnels were driven close to the bedrock, but some have been encountered as much as twenty-five feet above it, well up in the main body of gravel. Several of these high tunnels were in perfect condition, while most of those lower down were filled or partly filled with rock. Those that are entirely filled up are perfectly distinct, as the gravel with which they are filled is thoroughly oxidized and of a bright red color, while the surrounding gravel is of a deep blue. Since beginning operations here, probably not less than 100 of these ancient tunnels have been encountered and though they will no doubt materially affect the cleanup, until the work has been advanced beyond their primitive operations, I regard the presence of these tunnels as the best proof in the world of the richness of the bank, for even in the old days of fabulous wealth and splendor of the Incas, the mine now known as Boqueron was deemed well worth working."

## Commercial Paragraphs.

THE new drilling plant on the 750-foot level of the Occidental mine, at Virginia, Nevada, is a Phœnix drill, a Rix air compressor, and a Daniel Best 14 H. P. crude oil engine.

THE Krogh M'f'g Co. is completing one of the largest drainage plants in the State on Sutter island, in the Sacramento river. The island is entirely surrounded by a levee, and will be kept dry by a Krogh centrifugal pump with a capacity of 30,000 gallons per minute.

UNDER date of Feb. 20th, the Vulcan Iron Works of this city is in receipt of a letter from Secretary A. T. Cerbus of the Alaska Treadwell Gold Mining Co., which says: "Our double circular sawmill, of about 20,000 feet daily capacity, for which you made plans and built the machinery complete, including a set of three 6-inch beam Vulcan head blocks, 60-inch opening, has given us complete satisfaction in every respect;" illustrative of the general satisfaction expressed by all who use the sawmills built by the Vulcan Iron Works.

THE Denver Engineering Works are devoting considerable attention to electrical mining machinery. They are now working on a large electric hoist for Aspen, Col., three electric hoists and complete lighting plant for Mexico and two electric pumps with a capacity of 1000 gallons per minute. They are also working on orders for several high-speed automatic steam engines, as their new "'96" design is considered equal to anything manufactured in this line for workmanship, style and duty, and is being recognized as a high-class, economical engine.

TWO CARLOADS OF MACHINERY for a ten stamp gold mill plant complete have just been shipped by the Colorado Iron Works to the Negociacion Minera y Beneficiadora de Santiago y Anexas, in the district of Tlalpiyahua, old Mexico. One 100 H. P. stationary boiler, together with several tons of wrought-iron pump bob straps for Cornish pump goes to Negociacion de Minas San Rafael, in Zacatecas, Mexico. They are about to ship the machinery for a ten to twenty ton cyanide plant for the April Fool Mining Co., Ferguson, Nevada. A carload of machinery consisting of pans and settlers has just been shipped to Idaho for the Idaho and Pittsburg Mining Co. at Silver City. Two carloads of water-jacket furnaces have been shipped for the Arkansas Valley smelter at Leadville and for the Great National smelter at Monterey, Mexico.

## Recent Mining Dividends.

The Utah mine, Juab county, Utah, on the 9th declared its regular monthly dividend of $2000, or 2 cents per share. The mine has paid $150,000 in dividends. At the same time the Galena declared a dividend of 3 cents per share, or $3000, payable on the 10th. The mine has paid $18,000 in dividends since September, 1895.

## Recent Mining Incorporations.

The Oro Camino Gold Mining Company, San Francisco; capital stock, $100,000; W. and N. G. Butterfield, A. N. Hungerford, E. C. Rigney, W. S. O'Brien; to operate in Pine Peak, Calaveras county, Cal.

Ford G. M. Co., San Andreas, Cal.; capital stock, $1,000,000; directors, F. J. Solinsky, J. Raggio, M. C. Simans, G. C. Graves, W. S. Coulter.

## Coast Industrial Notes.

—At the Mare Island navy yard the Government employs at present 704 men.

—San Francisco painters have struck for $3 per day; $2.50 has been the ruling rate.

—The Pacific Mail Steamship Co., announces a 30c rate through to New York on some goods.

—At Knight's Landing, Cal., 78,000 acres of land will this season be drained and reclaimed.

—The Puget Sound, Mount Tacoma and Eastern Railroad Company has been incorporated at Tacoma, Wash.

—Negotiations are in progress looking to a consolidation of the San Francisco Gaslight Co., and the Edison L. & P. Co.

—A California company is now making steel prismatic dies for the manufacture of powder, instead of the brass dies in general use.

—The Redwood City, Cal., Electric Company has incorporated, to furnish light, heat and power in Santa Clara and San Mateo counties.

—Work is being pushed on the railway from Mill Valley, Marin Co., to the summit of Mount Tamalpais. The first locomotive for use on the new road is already on the ground.

—Competition between the old and new lighting companies at Fresno, Cal., gives that town the unusually low rate of $6.45 per month for all-night 2000-candle power arc lights.

—Los Angeles oil has jumped to 70 cents, and some Los Angelenos say it will go to $1. The oil steamer George Loomis is at Rodeo from Ventura with 8400 bbls. of oil for the Union Oil Company.

—The organizers of the coast lumber trust now claim to have ninety mills in the combine, and expect to advance the price of lumber next Monday. Their plans may be temporarily successful.

—The Chamber of Commerce of Tucson, Arizona, is urging Delegate Murphy to secure the passage of a bill in Congress authorizing Tucson to issue bonds amounting to $100,000 for water works and a sewage system.

—This week a bill was introduced in the Senate for the establishment of a department of Government to be known as the Department of Commerce and Manufactures, the head of which is to be a member of the President's cabinet.

—The Pacific Coast Steamship Company cut rates to Alaska so that the fare from here to Juneau, Alaska, is now $13 cabin and $7.50 second class. It's a good thing for the company, but many a poor fellow will be cursing the low rates next fall.

—The defense monitor Monadnock made her first trial trip last Monday. Her keel was laid at Mare Island Government navy yard twenty-one years ago. It was a fight to the finish to get her completed. No undue haste can be averred regarding her construction.

—Nearly $1,000,000 has been subscribed by the projectors of the Alameda and San Joaquin or "Corral Hollow" railroad, which is expected to be in operation by June 1st. It will be built between Stockton and the Corral Hollow coal mines, 36 miles, and may extend through Livermore to Oakland.

—C. F. Meek of New York has purchased the Mexico City street railway lines, comprising about 160 miles, and resold the same to Henry Butters of this city. The price is understood to be seven and a half million dollars. Butters is backed by London capitalists. The road is to be changed to an electric line.

—The Manufacturers' and Producers' Association are going ahead with their plans for a building of their own construction on a large lot between Market and Mission streets, on Twelfth street, this city. The contemplated structure is 175 feet front, 450 feet deep, and supplies nearly 13,000 square feet floor space for exhibits.

—The Murphy family have about concluded arrangements for the sale to an English syndicate of the Santa Marguerita ranch of 53,000 acres in San Luis Obispo county for a sum approximating $2,500,000. It will be subdivided and colonized by English settlers. H. F. Allen, who represents the purchasers, is now in San Jose concluding the negotiations.

—Messrs. Stetson, Spreckels, et al, have incorporated the Yosemite Valley and Merced Railway Co.; capital stock, $1,500,000, and will build a railroad from Merced through Mariposa county to the Yosemite Valley through a rich farming and mining country to one of California's grandest scenic centers. Surveys are almost completed and the work of grading will soon begin. The road will be a great thing for Merced and Mariposa counties.

—The Northern Pacific railroad has completed at its own shops a number of box cars designed for carrying grain, which have a capacity of 70,000 pounds. These are supposed to be the largest cars ever built for this purpose, and their carrying capacity is only equaled by a few specially constructed cars for particular uses. These cars are 42 feet long on the outside and 41 feet inside, 9 feet and 11 inches wide, and stand 12 feet 5½ inches from the rail to the top of the roof. They have a cubic capacity of 3157 feet, and each weighs about 32,000 pounds.

—The Dunsmuir *News* says the large mill formerly controlled by the Sisson Mill and Lumber Co. has been sold, and will hereafter be under the management of Messrs. Leland, Wood & Sheldon. The large body of timber four miles west of Sisson, on the Sacramento river, has been purchased by the same firm, and a party of surveyors are now at work surveying for a railroad to that point. The engine has already been bought for use on this road, and another will be purchased soon. There is sufficient timber in the purchase made to supply the mill for ten or twelve years to come. One hundred and fifty men will be employed at once.

—The Reno *Gazette* estimates that there are but 17,500 head of beef cattle on that side of the mountains. It is said that Shasta valley is about cleaned up, and if California must depend upon that section for three months' beef supply, when they use about 1,200 head a day, it looks as if they would be compelled to pay a little more for them than they have been paying.

—The plan for the reorganization of the Oregon Short Line & Utah Northern Railroad Company, as agreed to by all contending interests, calls for a foreclosure and a new company to be known as the Oregon Short Line Railroad Company. It preserves the entire system, and also the control of a block of Oregon Railway & Navigation stock, which is secured by $13,000,000 collateral trust bonds, the new Short Line Company paying the assessment upon the navigation stock. There ore 1480 miles in the Short Line system. Prior liens of $21,775,000 upon about 1180 miles will remain undisturbed, but the total indebtedness will be only about $25,000 per mile. The annual fixed charges of the company will be $1,853,270, as compared with $2,788,575 for the old company.

—The Chino *Champion* gives the following as the basis of agreement reached between the beet growers at Chino and the factory for 1896: First—A horizontal raise of 25 cents a ton for all beets, making the basic price $3.25 per ton, and a scale of 25 cents for each per centage of sugar above 12, as announced by Mr. Cottman last week. Second—All payments to be made from the office of the sugar company on rates as heretofore. Third—All beets above 12 per cent in sugar to be accepted regardless of purity. Fourth—The payment of the 5 per cent, retained until the land is cleared, to be made on the first regular pay day after any piece of land is cleared. Fifth—The check chemist, weighmaster and tare man to be selected by the farmers, and not to be discharged without the consent of the farmers' representatives or a fair hearing of any grievance.

## Personal.

F. A. HUNTINGTON has returned from a trip to Denver and Chicago.

R. L. POWELL is the new superintendent of the Standard Gold Mining Company at Gold Hill, N. M.

THEODORE ALLEN, late superintendent Big Canyon mine, now takes charge at the Utica, Calaveras Co.

W. F. ELMER, president of the Elmer-Brown Copper and Smelting Company, Waldo, Or., is at Grant's Pass, Or.

F. GUERRA, formerly of the Cargo Muchacho, will superintend Senator Dorsey's Picacho, San Diego Co., gold properties.

H. C. STILLMAN this week assumes the superintendency of the Santa Rosalia mine, Arizepe district, Sonora, Mexico.

J. W. NESMITH, president of the Colorado Iron Works, has returned to Denver after a pleasant visit to the Pacific coast.

JOHN W. PROUDFIT, the mining operator of Denver and Colorado Springs, has returned to Denver, after an extended trip through the Eastern States.

J. B. HOBSON, who has been superintending extensive hydrauiic mining operations at Quesnelle, B. C., is at his old home in Auburn, Placer Co.

AS LORD KELVIN reaches this year his jubilee as professor of natural philosophy in the University of Glasgow, the event will be celebrated in that city on June 6th.

WM. B. ROOT, president of the Colorado Mining Stock Exchange, is visiting the leading cities of the East in the interest of the exchange and legitimate stock investments.

GEO. H. EVANS, recently of the Golden Feather, Oroville, Cal., has been employed by the Horsefly G. M. Co., Cariboo, B. C., to superintend the construction of its hydraulic elevators.

LOUIS B. WALKER, late assistant superintendent of the Old Dominion Copper Mining and Smelting Company, has been appointed manager of the New Jersey Metal Refining Works at Elizabethtown, N. J.

ON May 1st, George H. Robinson retires from the management of the Golden Gate mine at Mercur, Utah, to give his attention to other personal interests. It is understood that H. A. Cohen, of De Lamar, Nev., will assume most of the duties formerly discharged by Mr. Robinson.

THOS. B. EVERETT, the well-known mining man, has returned to Denver from California, where he has been renewing old acquaintances among the scenes of his former triumphs. While on the coast he interested many Californians in Cripple Creek and Gilpin county mining properties.

SIR AUDLEY COOTE, who is pushing the transpacific cable project is in the city. He expresses confidence in his ability to get the matter on a substantial basis, and thinks that before the close of the century San Francisco will have telegraphic connection with Honolulu, New Zealand and Australia.

THOMAS W. GOAD, manager for the MacArthur-Forrest process in this country, is at Salt Lake City, Utah, with Hugh Butler, the attorney for D. H. Moffatt and others who have procured the rights under the patent in this country, to attend the case in which the Mercur Mining Company and the patentees are the principals.

GARDNER WILLIAMS, the well-known California miner, now manager of the De Beers, South Africa, mine, was last week arrested on a charge of supplying arms to the Uitlanders, but nothing serious is likely to result therefrom.

A. S. HALLIDIE, who for so many years was the efficient president of the Mechanics' Institute, has resigned. The office, which is purely an honorary one, involves considerable personal effort, and for some time Mr. Hallidie has been desirous of having some other gentleman assume the duties of the position. The directors having reluctantly accepted his positive request to be relieved, and declination of further consideration of his name in connection with the position, after three meetings, at which Messrs. Oscar Lewis and Jos. Leggett each received seven votes for president, last Wednesday elected E. A. Denicke president; Rodeny Kendrick, vice-president; E. P. Heald, recording secretary; and Joseph M. Cumming, corresponding secretary.

## Obituary.

VICTOR LAWRENCE, an American mining superintendent, was recently murdered and robbed in Mexico. He had been employed at the Lorenzo mine, near Sierra Mojada.

LAST Tuesday Robert J. Tomas, foreman at the Pioneer mine, above Iowa Hill, Placer Co., fell down a 200-foot shaft and was instantly killed. His skull was fractured, and his neck, arm and one leg were broken. Mr. Tomas was a shareholder in the Mountain Gate and Hidden Treasure mines.

EX-MAYOR N. A. RIDEOUT, of Marysville, Cal., was almost instantly killed last Sunday afternoon in the Pershbacker mine, Magalia, Butte Co., by being struck on the head by a large rock from the roof of a stoping station at the bottom of the shaft, where an engine and pump were being put in. Deceased was in the 35th year of his age, a son of N. D. Rideout of this city, owner of the mine, and deservedly popular with a large number of people, who learn with sincere regret of his sad death.


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FOR THE WEEK ENDING MARCH 3, '96.

555,681.—HANDHOOK—H. F. Dalton, Azusa, Cal.
555,805.—BRICK MACHINE—W. E. Damon, Pomona. Cal.
555,569.—AMALGAMATOR—Daniel Feit, S. F.
555,775.—SPEED MEASURE—G. E. Kastengren, S. F.
555,563.—COPYING PRESS—E. B. Millert, Portland, Or.
555,830.—PRESERVING GRAPE JUICE—C. Stanbes San Jose, Cal.
555,537.—LEATHER DRESSING—Stevens & Shroeder, Arago, Or.
555,797.—WRENCH—J. D. Wilson, San Diego, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates. and in the shortest possible time.


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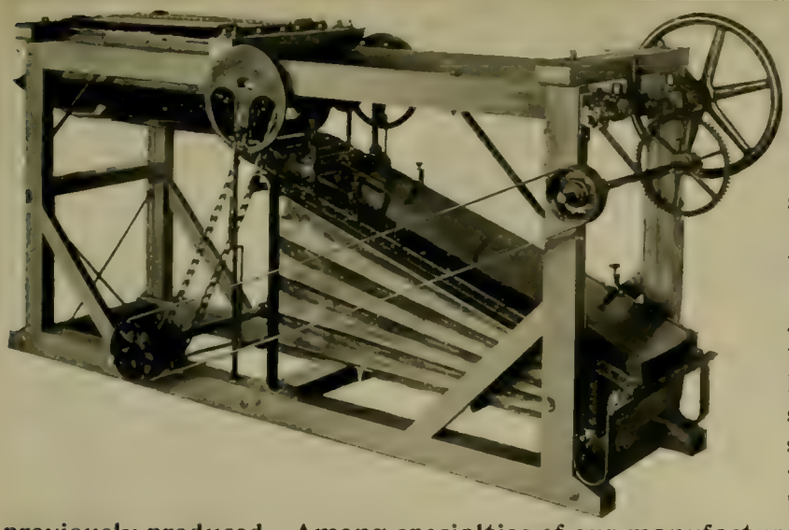
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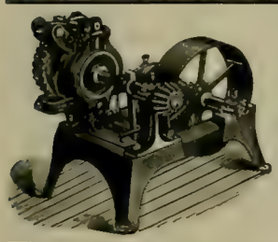
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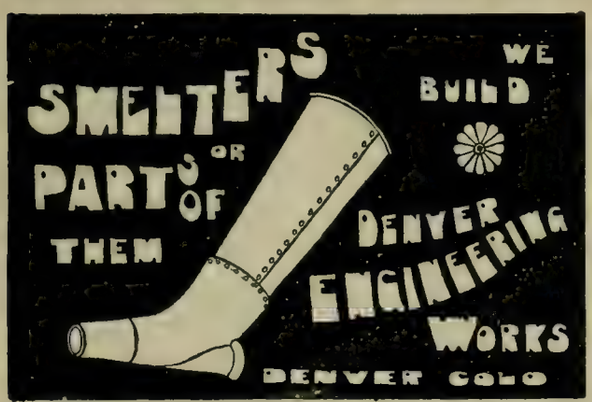


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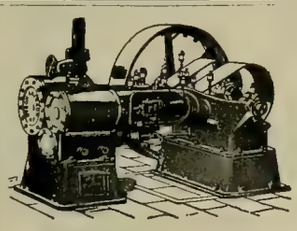
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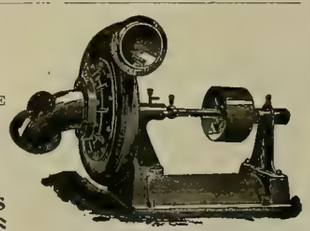
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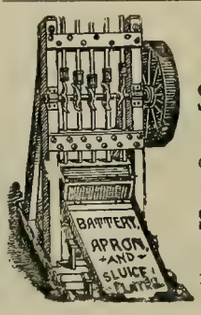
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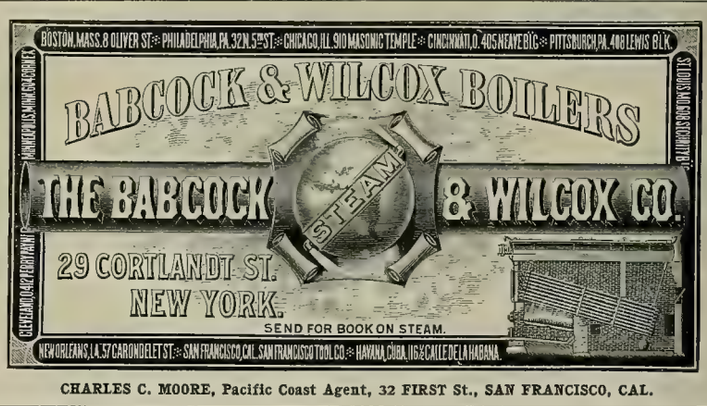
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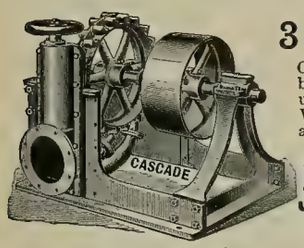
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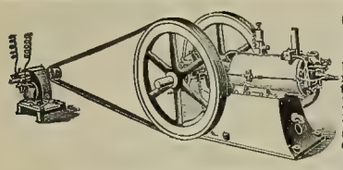

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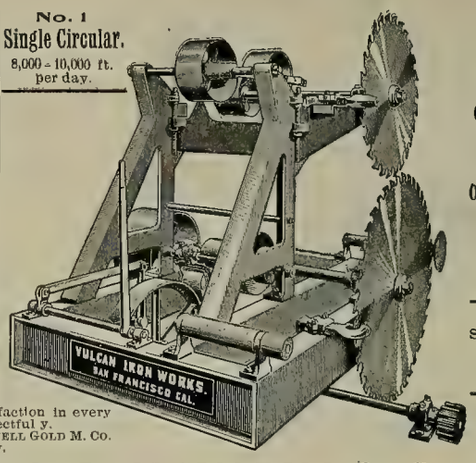
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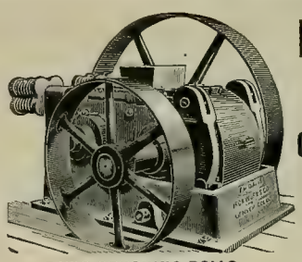
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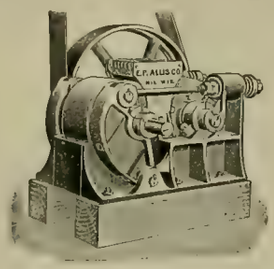
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Can be seen in operation at the Company's works, 132 Main Street, San Francisco.

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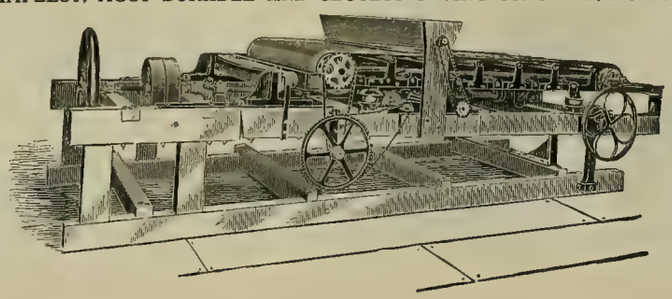
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A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.

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CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
Including prepared canvas belt 4 ft. 6 ins. wide.



FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.

THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,

E. L. BALLOU, Propr. Ballou Reduction Works.

# Market Reports.

## The Markets.

SAN FRANCISCO, March 12, 1896.

While general trade is reported quiet, yet it shows a larger volume of goods going out than at this time last year. Crop prospects are of a most encouraging nature for both cereals and fruits. The larger handlers of wheat are not disposed to operate on present prospects, knowing by experience that on the April and May weather depends the making of good crops, while in fruits frosts are liable to occur at an inopportune time; but at this writing everything points to a good outturn. From the mining districts good news continues to come to hand. It is conceded that there will be more activity in gold mines than even marked 1895. Capital, it is said, is still seeking profitable investment. Manufacturers of mining machinery report an active demand for late and better improved. Strikes in the building trades in this city have a temporarily bad effect. Until these are well over contractors will fear to make bids on new work. In railroad machine works more men are being put to work so as to make cars conform to the new law of Congress, besides which more rolling stock is being built so as to be prepared to move any increase in the crops.

**New York Silver Prices.**

NEW YORK, March 12.—Following are the closing prices for the week:

| | Silver in London. | N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 31 5-16 | 68⅜ | 11 | 3 15 |
| Saturday | 31 5-16 | 68⅜ | 11 | 3 15 |
| Monday | 31⅜ | 68½ | 11 | 3 15 |
| Tuesday | 31 7-16 | 68⅝ | 11 | 3 12½ |
| Wednesday | 31 7-16 | 68⅝ | 11 | 3 10 |
| Thursday | 31 7-16 | 68⅝ | 11 | 3 10 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.87 |
| London Merchants | $4.85 |
| London Sight Bankers | $4.88½ |
| Refined Silver, peroz., 1000 fine | 68⅞c |
| Mexican Dollars | 55½@56c |

SILVER.—There has been a stronger tone to the market at home and abroad. This is quite significant in the absence of any increase call from the demand markets and also a decided falling off in the shipments to China, India and the Straits. The debates in regard to bi-metallism in the German Reichstag have attracted attention. These debates have brought out the fact that at present the English Government is opposed to opening the Indian mints to silver. In our market there is nothing new to report, last week's review covers this week's information regarding the general situation.

MEXICAN DOLLARS.—The market, as usual to the season of the year is quiet. The demand seems to be improving in a small way but it is still light. Dealers quote 55½ to 56 cents.

COPPER.—The markets at the East and abroad are reported strong, with a good consumption but no speculative inquiry. It is conceded that the consumption will be quite heavy for some time to come owing to the active military and naval operations and more doing for electrical purposes. The output on this coast shows an increase, particularly in Arizona.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 11@12 |
| Sheet copper | 17 |

LEAD.—The market is weaker at the East under free supplies and no improvement in the demand. In our market pig is easier with quotations shaded. Unless there is a change for the better at the East, lower quotations will be made for our next week's issue.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 90 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—There is nothing new to report in the general situation.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and larger sizes, | " | " | 1 65 |
| Buck, Balls and Chilled, do, | " | " | 1 65 |

QUICKSILVER.—The stock in all supply markets is said to be in excess of wants, but the combination does not quote lower prices. The depression in silver mining is against quicksilver.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 40 00 |
| West Coast of Mexico, for Export | 35 00 |

BORAX.—The market is reported steady at unchanged quotations. Shipments East are fair for the season.

The market is quoted as follows:

| | |
|---|---|
| Refined, in car lots | 6⅛ |
| Refined, in sacks | 5⅞ |
| Powdered, in car lots | 6¼ |
| Concentrated, " | 5⅝ |

TIN.—Heavy stocks at the East and abroad are against the market for pig in the absence of any increased consumption demand. Fruit canners are not anticipating their expected wants to any extent either on this coast or at the East. The large production of American plate is against foreign.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14⅝c@14¾c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

IRON.—Eastern advices report unsettled markets with a strong selling competition between Western and Southern furnacemen. In our market prices fluctuate, but the general tone is easier. The consumption is expected to be larger this year than it was in 1895.

ANTIMONY.—A fair movement for the season is reported on the basis of 9 to 10c.

COAL.—For cargoes to arrive and shipment the market is reported unchanged, but it is stated that for some varieties a shading can be secured. For spot there is nothing new to report. It is thought that there will be an increase output of domestic.

The market is quoted as follows:

SPOT FROM YARD—PER TON.

| | |
|---|---|
| Wellington | $7 50@ 8 00 |
| Greta | 6 00@ 6 50 |
| Nanaimo | 6 50@ 7 00 |
| Gilman | 5 50@ 6 00 |
| Seattle | 5 00@ 5 50 |
| Coos Bay | —@ 4 50 |
| Cannel | —@ 8 00 |
| Egg, hard | —@13 00 |
| Wallsend | —@ 6 50 |
| Scotch Splint | —@ 7 50 |
| Brymbo | —@ 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 25 |
| Liverpool Steam | 6 25 |
| Scotch Splint | — — |
| Cardiff | 6 25 |
| Lehigh Lump | 9 00 |
| Cumberland | 13 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

COKE.—The market for spot continues against sellers, which have an unfavorable influence on to arrive and for shipment. The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 8 50 |
| " in sacks | — — | @ | 9 50 |
| Cumberland | — — | @ | — — |

LUMBER.—Advices from lumbering camps state that the outlook is favorable for a continued free export movement. For home purposes the impression prevails that there will be a larger consumption.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

NAILS.—Dealers state that sales so far aggregate larger in volume than at this time for fully two years past. The market is quoted as follows:

| | |
|---|---|
| Wire, carloads, basis per keg | $3 07½ |
| " jobbing, " " | 3 20 |
| Cut, carloads, " " | 2 82½ |
| " jobbing, " " | 2 95 |

## Mining Share Market.

SAN FRANCISCO, March 12, 1896.

The market held to fairly firm prices at a slight advance on last Friday and Saturday. The most strength seemed to be in Con. Virginia and Hale & Norcross, the former owing to connection on the 1000-foot level having been made with Ophir, and that in Hale & Norcross owing to the impression that the contest for the control of the mine would cause higher prices before election. On Monday the market opened weaker, which was followed by easier prices on Tuesday and a still further shading off on Wednesday. In the shading off Con. Virginia and Hale & Norcross took the lead, with the latter selling yesterday at 20 per cent below Friday's highest prices. Of course, the rest of the market moved up and down in sympathy with the leaders. The contest for the control of Hale & Norcross absorbed the attention of the trading public, and now that it is over and with the Jerry Lynch-M. W. Fox crowd in control, it is not at all unlikely but more attention will be given to the general market. Of Ex-Senator Lynch's ability as a mine manager the writer has no knowledge, but in R. V. Collins, who has been elected secretary of the company, he will find a person well informed and, so far as can be learned, one who will act for the interest of all stockholders. While holding strong views against the way in which the mines have been managed, yet the writer hazards the opinion that he will not allow his opinions to swerve him in the discharge of his duty to all interests concerned, and it is safe to affirm that this course will be followed by the other officials. The new superintendent, Mr. Tangerman, has had large experience as a practical miner, and it is quite safe to affirm that he will do all in his power to develop the mine, but unless there is a big body of ore in it, it will be quite impossible for him to find one. Time alone will tell the wisdom of the change. The new officials have started out in the right direction by reducing expenses, which will be followed by cutting off all sinecure positions. It is to be hoped that other companies will follow in this reform movement, which, if done, will make fewer assessments and put them more on business propositions than on lines heretofore carried on. At this writing it is too soon to judge the effect on the market, but it should not cause surprise if more life will be given the market and slightly higher prices rule; but if expectations of an ore strike are not realized the market cannot be sustained, for there does not seem to be any speculative movement. Prices seem to be regulated by the prospects in sight, and when this is the case they will rule more on a legitimate basis.

The news from the Comstock mines is essentially unchanged and nothing of importance looked for yet a while. In the Alta group the work appears to be largely of a kill-time character. In Alta they are still playing hide-and-seek with the Keystone ledge, with nothing, apparently, in sight but another assessment, probably in six months, for even ore cannot be found without work, and this eats up money. The output of ore by Overman the past week shows an increase, but the quantity is still insignificant compared with the expense. Exploiting work on a limited scale is still the order. In Belcher the work ought to show up better before long, also that under way in Crown Point. That under way in the latter mine is at several points, but it seems to be in the nature of laying the foundation for active exploiting later on, which means another assessment, at any rate, before many weeks pass. From Yellow Jacket reliable news is hard to get. Several rumors are current, but so far as can be learned they are not deserving of credence. In the other Gold Hill mines, Confidence, Challenge, Con. Imperial, the work under way points to the west lode, but how much longer time will be required to show up the west side is, as yet, an open question. In prosecuting the work ore ought to be run into in one or two of these mines which, while not large, should create a riffle in the shares. In the middle group of mines active work still continues, with each company reporting ore extracting as it is being prosecuted. It seems to an outsider as if the managers follow up favorable indications and veins in the hope that they will lead up to something much better. What change will be made in the character of the work in Hale & Norcross is as yet hard to say, but it is reasonable to assert that when the new superintendent and officials become more familiar with the situation a change will be made, and it is hoped for the better. It may be they will ascertain if reports of a big body of ore in the mine are true, or if they were put out for speculative purposes. Very little attention is given to the work under way in both Gould & Curry and Best & Belcher. It seems as if dealers' interests lie with the work going on in Con. Virginia, and it would appear from all advices at hand they are justified in looking to that old stand-by. On several levels active work is under way, and if a body of ore is to be found it would seem as if the managers will find it. The connection with Ophir on the 1000-foot level will admit of this level being exploited, but time and large sums of money will be required for the work. In Ophir, Union and Sierra Nevada there is nothing new at hand regarding the work being done. It seems as if the foundation is being laid for more activity within the next nine or twelve months.

From the Brunswick lode our advices are of a similar character to that heretofore reported in this department. The work in Occidental is still of an active dead-work nature. The managers appear determined to let nothing be undone which is calculated to lead up to ore, but as yet results have been disappointing. The work at other points on the lode is being done in a kind of half-hearted way. The managers seem to be waiting for results from that under way in Occidental.

From the Bodie district nothing of interest is at hand. The official letters continue to report distances run, but no ore found. Bodie levied a 15-cent assessment the past week. This mine is very economically managed, for assessments are few and far between. It seems singular the shares owned by the company are not sold so as to help secure working funds.

The following illustrates the changes of the week:

| MINES. | Mar. 5. | Mar. 12. |
|---|---|---|
| Alpha | ..... | ..... |
| Alta Consolidated | $ 14 | $ 14 |
| Andes | 27 | ..... |
| Belcher | ..... | 20 |
| Best & Belcher | 70 | 66 |
| Bodie | 17 | ..... |
| Bullion | ..... | 12 |
| Challenge | ..... | 31 |
| Chollar | 51 | 46 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 1 65 | 1 55 |
| Consolidated New York | ..... | ..... |
| Crown Point | ..... | 32 |
| Exchequer | ..... | ..... |
| Gould & Curry | 33 | 30 |
| Hale & Norcross | 1 40 | 1 10 |
| Justice | ..... | ..... |
| Mexican | 56 | 51 |
| Ophir | 1 25 | 1 15 |
| Overman | 13 | ..... |
| Potosi | 45 | ..... |
| Savage | 33 | 32 |
| Sierra Nevada | 65 | 60 |
| Union | 56 | 55 |
| Utah | ..... | ..... |
| Yellow Jacket | 35 | ..... |

## San Francisco Stock Board Sales.

SAN FRANCISCO, March 12, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 100 Alta | 14 | 20 Crown Point | 29 |
| 200 Belcher | 20 | 300 Gould & Curry | 30 |
| 400 Best & Belcher | 66 | 600 Hale & Norcross | 1 10 |
| 100 Bullion | 12 | 200 Lady Washington | 05 |
| 200 Buiwer Con | 22 | 100 Savage | 32 |
| 250 C. C. & Va | 1 55 | 200 Union Con | 55 |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 100 Ophir | 1 15 | 200 Belcher | 20 |
| 200 Mexican | 51 | 200 Sierra Nevada | 60 |
| 200 Best & Belcher | 65 | 200 Union | 55 |
| 100 Chollar | 46 | 50 | 54 |
| 100 | 45 | 100 Challenge | 31 |
| 500 H. & N. | 10 | 100 Occidental | 96 |
| 200 Crown Point | 32 | 100 | 97 |
| 600 | 31 | | |

# MINING SHAREHOLDERS' DIRECTORY.

**ASSESSMENTS.**

| Company and Location. | No. | Amt. | Levied. | Delin't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Andes Silver M Co, Nev | 42 | 15c | Jan 30. | Mar 6. Mar 28. | J W Twiggs, Nevada Block |
| Bay State M & D Co, Cal | 30 | 2c | Feb 1. | Mar 9. Mar 28. | F E Luty, 330 Pine |
| Belcher S M Co, Nev | 52 | 25c | Mar 3. | Apr 7. Apr 28. | C L Perkins, Mills Building |
| Bulwer Con M Co, Cal | 12 | 5c | Feb 5. | Mar 11. Apr 3. | J E Jacobus, 309 Montgomery |
| Con Cal & Va M Co, Nev | 6 | 30c | Mar 4. | Apr 8. Apr 28. | A W Havens, 309 Montgomery |
| Gold Bar Con M Co, Cal | 3 | 5c | Feb 10. | Mar 19. Apr 10. | E C Godfrey, 38 Crocker Building |
| Lady Emma M Co, Cal | 1 | 15c | Feb 26. | Apr 6. Apr 27. | W W Boughton, Mills Building |
| Orleans Mining Co, Cal | 1 | 10c | Jan 21. | Feb 29. Mar 24. | W Olney, 101 Sansome |
| Osceola Con M Co, Cal | 5 | 1c | Feb 11. | Mar 14. Apr 8. | H Smith, 307 Montgomery |
| Sierra Nev S M Co, Nev | 110 | 25c | Feb 3. | Mar 7. Mar 27. | E L Parker, 309 Montgomery |
| Silver King M Co, Arizona | 13 | 25c | Jan 28. | Mar 9. Apr 6. | J W Pew, 310 Pine |
| Union Con M Co, Nev | 52 | 20c | Jan 14. | Feb 17. Mar 17. | A P Swain, 309 Montgomery |

**MEETINGS.**

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Pyramid Mining and Mill Co, Cal | C A Hare, S F | Mar 14 |
| South Eureka M Co | A Halsey, 530 Cal | Mar 18 |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., March 11, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| CALIFORNIA STATIONS. | Total Rainfall for the Week. | Total Seasonal Rainfall to Date. | Total Seasonal Rainfall Last Year to Same Date. | Average Seasonal Rainfall to Date. | Maximum Temperature for the Week. | Minimum Temperature for the Week. |
|---|---|---|---|---|---|---|
| Eureka | 1.64 | 32.01 | 32.33 | 31.28 | 64 | 36 |
| Red Bluff | .10 | 14.53 | 25 13 | 19.47 | 76 | 38 |
| Sacramento | .28 | * | 21.54 | 12.78 | * | 38 |
| San Franc'co | .30 | 13.89 | 21.97 | 18.72 | 70 | 42 |
| Fresno | .04 | 4.93 | 11.32 | 7.00 | 72 | 38 |
| S. L. Obispo | .10 | 14.61 | 22.46 | * | 72 | 34 |
| Los Angeles | .40 | 7.82 | 11.68 | 14.20 | 74 | 36 |
| San Diego | .32 | 4.44 | 10 23 | 4.57 | 72 | 42 |
| Yuma | .02 | .88 | 3.01 | 2.97 | 78 | 38 |

* Indicates no record.

# Assessment Notices.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, Cal.; location of works, Auburn, Placer county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of February, 1896, an assessment (No. 2) of 10 cents per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 237 Twelfth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of April, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made be before, will be sold on THURSDAY, the 30th day of April, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. WINTERS, Secretary.

Office—237 Twelfth street, San Francisco, California. Office hours from 8 to 10 P. M.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 10th day of February, 1896, an assessment (No. 3) of 5 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 38 Crocker Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 19th day of March, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 10th day of April, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

E. C. GODFREY, Secretary.

Office, 38 Crocker Building, San Francisco, California.

CON. CALIFORNIA AND VIRGINIA MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of March, 1896, an assessment (No. 6), of 30 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 47 Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of April, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 28th day of April, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room No. 47 Nevada Block, No. 309 Montgomery street, San Francisco, California.

FAIRFAX VILLA COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Fairfax, Marin county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 6th day of March, 1896, an assessment (No. 5) of Fifty Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 56, No 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of April, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 4th day of May, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. STADTFELD, JR., Secretary.

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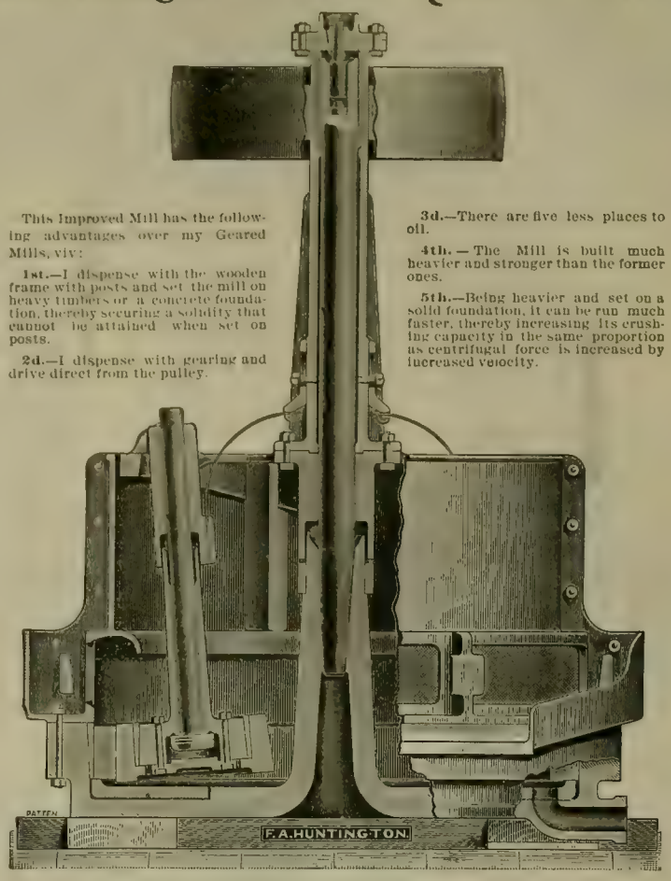
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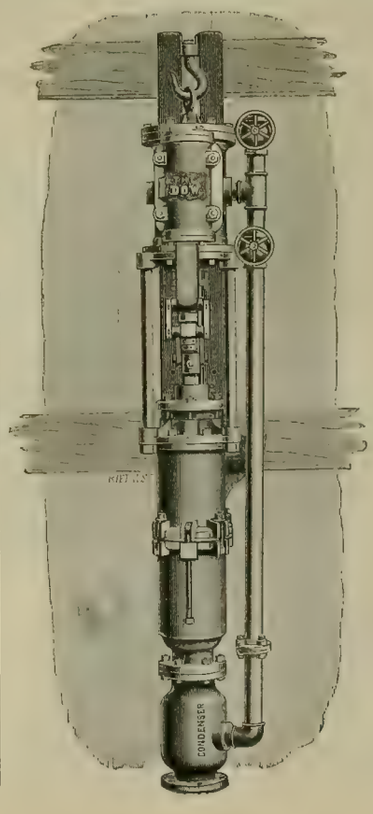
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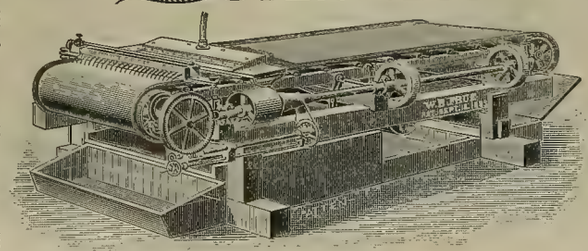
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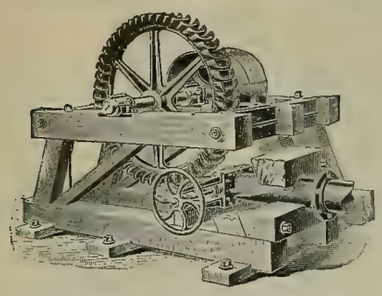
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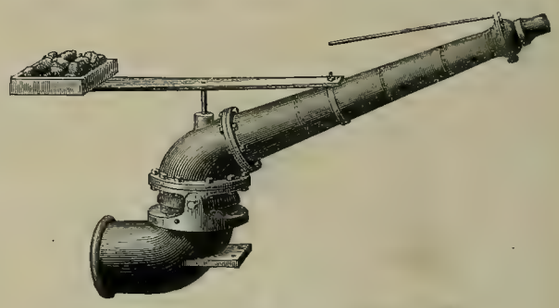


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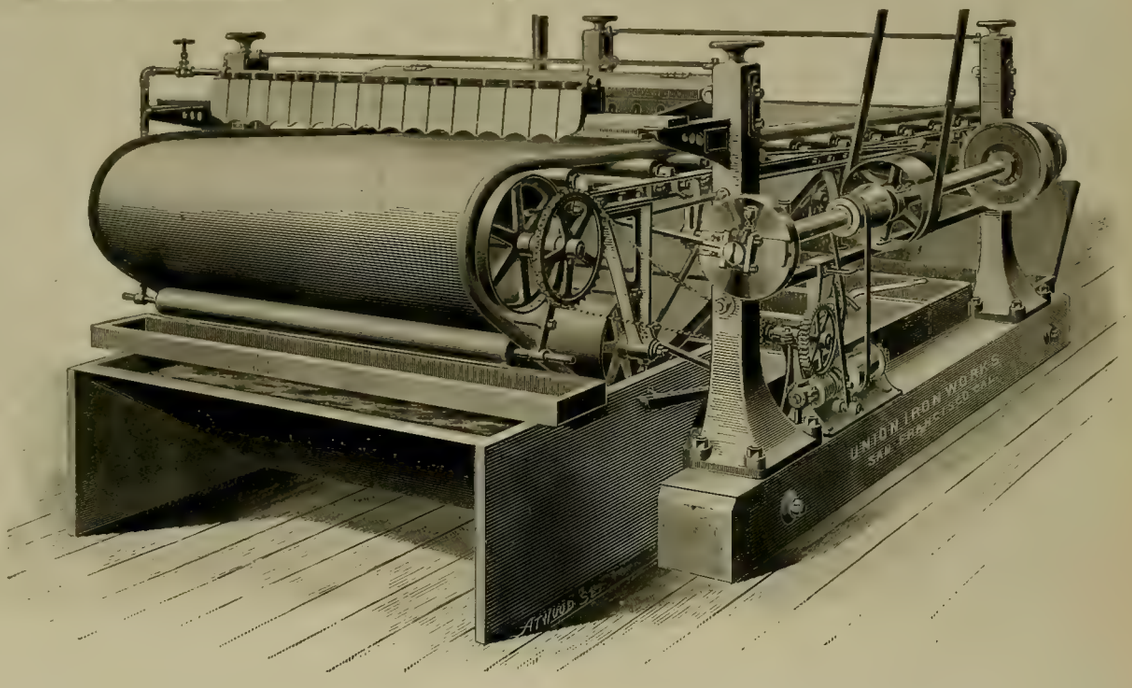

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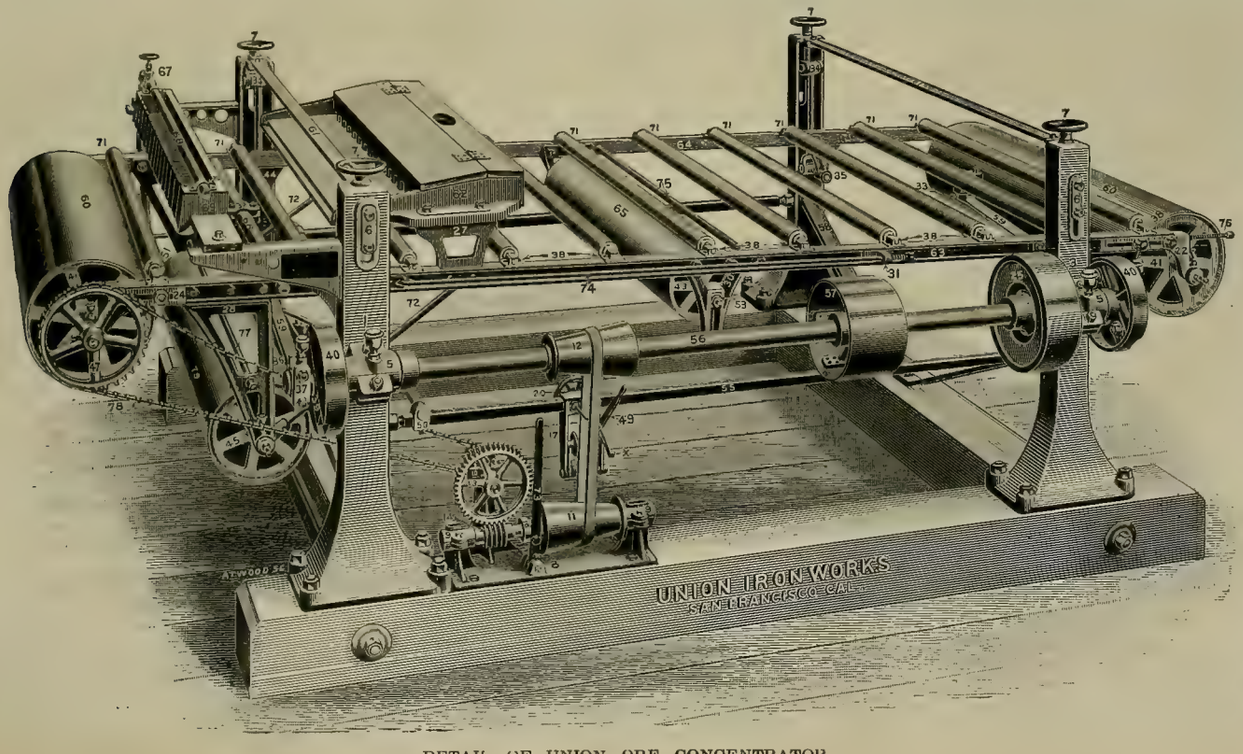
No. 1868.—VOLUME LXXII. Number 12. SAN FRANCISCO, SATURDAY, MARCH 21, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

## The Union Ore Concentrator.

So large a percentage of ore value lies in the sulphurets that the matter of concentration is of prime importance in nearly every mill. For twenty years practical miners and builders of mining machinery have given the manufacture of concentrators the closest attention, with the result that in no branch of the mining industry have scientific skill and economy been more successful in producing the best results. Herewith is illustrated the latest, the Union, for which a patent was last week issued to Willis G. Dodd of the Union Iron Works of this city. There is no departure from the general type of concentrating machine, and it does not require any detailed description, the illustrations portraying its principal points to those familiar with this class of mining appliances. It is constructed entirely of iron and brass, and consists of an inclined shaking frame or table, suspended by hangers or links from the four iron posts or columns shown. A side shake or lateral motion is imparted to the frame by means of steel connecting rods, attached to adjustable cranks, keyed to main driving shaft. Upon the shaking frame is mounted or stretched an endless rubber belt, with raised or flanged edges, forming the bed or plane upon which the dressing of the ore is effected. This belt or bed is caused to travel continuously up hill by rotating the head roll or drum, the power for which is transmitted by means of a link-chain belt and sprocket wheels, driven from the worm and gear shown. The travel of the belt is under full control, and can be regulated to any speed required. The operation of the machine is as follows: The pulp or crushed ore from the battery is conveyed to the distributor located on top of the shaking frame above the belt. This distributor spreads the pulp evenly over the surface of the bed or belt, which is moving continuously up hill or toward the head of the machine. The side shake or lateral motion given the bed causes the sulphurets and valuable metallic portions of the ore to settle and lay upon the surface of the belt, and, as they pass up hill or toward the head of the machine, they come under the water-box, delivering clear water in fine streams upon the belt; and, as the pulp passes through these streams, the worthless or lighter portion of the ore is "winnowed" out or washed from the valuable portions, and passes down the belt into the tailing sluice. The valuable portions of the ore, which still adhere to the belt, pass on over the head roll until they come in contact with the small wooden automatic discharge roller shown. Here the moisture, still clinging to the belt, forms a water cushion, which causes the concentrates to leave the belt and deposit themselves in the small box resting upon the water tank, into which the belt is depressed for the purpose of washing off any fine sulphurets that may have escaped the automatic discharge. When filled the box is removed and another substituted, thus making the process of concentration continuous and automatic.




UNION ORE CONCENTRATOR, WITH SULPHURET DISCHARGE.




DETAIL OF UNION ORE CONCENTRATOR.

# MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

San Francisco, March 21, 1896.


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WHILE determined discoverers justly maintain as a fundamental principle that nothing is impossible, yet it is difficult at times to reconcile the present state of an art with all that is claimed for it by enthusiastic experimenters, even though they have considerable scientific prominence. The best that can be done is to maintain a suspension of judgment. "Nothing is impossible," but proof in exact scientific work is essential. These things are not matters of belief. Dr. Pratt, of the Chicago College, inventor of the Pratt Telephone, and for many years prominently connected with the Bell Telephone Co., now announces as a result of some experiments regarding the "Roentgen rays" that, so far as results are concerned, there is no difference between a Crooke's tube and a horseshoe magnet, and claims positively to have secured with the use of a magnet the same results now so universally produced by cathode rays. If these unknown rays are proved to be lines of electrical force, applicable in a variety of ways, the horizon of science perceptibly broadens and a great advance will be made in organized knowledge. In this connection it is to be noted that sufficient experiment has now been made to establish the fact that all substances through which the Roentgen rays pass become for the time conductors of electricity.

THE frantic efforts of Commissioner Lamoureux of the General Land Office to head off the Mineral Land bill were justly treated with contemptuous indifference by the Senate committee which unanimously recommended the bill. It still has to run the gauntlet and is far from safe. Formidable opposition is now encountered in the person of Senator Stewart of Nevada, who objects to the bill. His motives are well understood and are no more creditable to him now than similar action of his on former occasions. Less easy to understand is the attitude of Senator Mitchell of Oregon, who is also reported in opposition to the measure, as the bill applies solely to California and does not affect the rights of the Northern Pacific Company in any way. The fact that the bill is purely a California measure and that the nine gentlemen composing the California Congressional delegation solidly favor it is of decided advantage, and it is to be hoped that the effort so long and determinedly made will eventually succeed, but the friends of the measure feel anxiety as to results. The merits of the movement have been so thoroughly discussed that nothing now remains to do but await final action on the part of our national legislature. It were unfortunate if corporation attorneys should be able by the possession of seats in Congress to thwart a measure of such justice to the commonwealth.

## Some Proposed Mining Legislation.

Nearly every State in the Union where mining is carried on finds the present mining laws unsatisfactory. So much has been said on this subject in these columns regarding California's requirements that any discussion of the matter would largely be a repetition. Since Senator Stewart got the first definite piece of U. S. mining legislation through in May, '72, there has been a steady comment on the unfavorable and unsatisfactory nature of some of the Federal statutes. Several years ago the Nevada Senator prepared a bill which he has since presented at various times and which has passed the Senate, and on some other occasion passed the House, fortunately, however, these occurrences never taking place during the same session of Congress. This pet perennial measure was promptly introduced by Senator Stewart on the first day of the session of the present Congress and referred to the Committee on Mines and Mining, where it slumbers. On Dec. 26th, '95, Senator Perkins of this State introduced a bill which is believed to be in accordance with the needs and wishes of the miners of this State, and is in harmony with the wants of the mining industry of this coast in general. On the same day Congressman Johnson introduced the same bill in the lower House. The full text of the Perkins-Johnson bill is as follows:

A BILL TO AMEND CHAPTER SIX OF TITLE THIRTY-TWO OF THE REVISED STATUTES, RELATING TO MINERAL LANDS AND MINING RESOURCES.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That section twenty-three hundred and twenty-four of the Revised Statutes be amended so that the same shall read as follows:

"SEC. 2324. Miners of each mining district may make regulations, not in conflict with the laws of the United States or with the laws of the State or Territory in which it is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground, so that its boundaries can be readily traced, *such marking to include one post or monument at each corner of the claim.* All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location and such description of the claim or claims located, by reference to some natural object or permanent monument, as will identify the claim. On each claim located, *and until payment of the purchase money and a certificate of entry has been issued therefor*, not less than one hundred dollars worth of labor shall be performed or improvements made during each year.

"Where such claims are held in common, such expenditure may be made upon any one claim *by any work or improvements tending to develop any of such claims.* The period within which the work required to be done annually on mineral claims is to be performed shall commence at twelve o'clock *meridian on the first day of January* succeeding the day of location of such claim.

"When the labor required by this Act shall have been performed, or the improvements made, an affidavit may be filed within thirty days after the time limited for the performance of such labor, or making of such improvements, with the recorder of deeds in the county in which the claim or mine is situated, particularly describing the labor performed and the improvements made, and the value thereof, which affidavit shall be prima facie evidence of the facts therein stated; and upon failure to comply with the conditions of this Act, in the performance of labor or the making of improvements, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location had ever been made: *Provided*, That the original locators, their heirs, assigns or legal representatives do not resume work upon the claim after such failure and before such relocation, and continue the same with reasonable diligence until the required amount of labor shall have been performed or improvements made. Upon the failure of any one of several co-owners to contribute his proportion of the expenditure required hereby, the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent co-owner personal notice in writing, or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days; and if at the expiration of ninety days after such notice in writing, or by publication, such delinquent shall fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners who have made the required expenditure. A copy of such notice, together with an affidavit showing personal service or publication, as the case may be, of such notice, when filed and recorded with the recorder of deeds in the county in which such mining claim is situated, shall be prima facie evidence of the acquisition of title of such co-owners. Where a person or company has run or may run a tunnel, or constructed roads or trails, for the purpose of developing a claim or claims owned by said person or company, the money so expended in running said tunnel or constructing said roads or trails shall be taken and considered as expended on said claim or claims: *Provided further*, That said claim or claims shall be distinctly marked on the surface as provided in this Act."

SEC. 2. That section twenty-three hundred and twenty-four of the Revised Statutes be amended by adding thereto the following:

"And the surveyors appointed under the provisions of this section shall have power to administer oaths to their assistants."

SEC. 3. That section twenty-three hundred and thirty-five of the Revised Statutes be amended so as to read as follows:

"SEC. 2335. All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths in the State or Territory where the claims may be situated having an official seal, and all testimony and proofs may be taken before any such officer, and when duly certified by the officer taking the same, attested by his seal of office, shall have the same force and effect as if taken before the register and receiver of the land office. Whenever any contest shall arise as to the mineral character of any land claimed to be subject to entry or sale under an Act of Congress, all proceedings shall be stayed until the controversy shall have been settled or determined by a court of competent jurisdiction in the county where such land is situated, or the contest withdrawn; and it shall be the duty of the register of the land office in which such contest is made to immediately certify such contest to such court, and to immediately notify the contestant and contestee thereof.

"Within thirty days after filing such contest the contestant shall file in such court a verified statement of the facts upon which he bases his contest, in plain and concise language, and shall serve the same upon the contestee; and thereafter, and within the time provided by the laws of the State or Territory where such land is situated, for answering in any civil action, the contestee shall file his verified answer to such statement, and thereupon the contest shall be tried and determined as are ordinary actions in such court; and when determined, such determination shall be certified to the register, and such determination shall be binding upon him, and shall be forever conclusive as to the character of the land in question: *Provided*, That the presence of rock, earth or gravel, bearing gold, silver, cinnabar, petroleum or other valuable mineral, shall be regarded as prima facie evidence that the land containing the same is mineral in character: *And provided further*, That in investigating the character of land with a view to ascertaining whether it is more valuable for mineral than for agricultural purposes, evidence may be taken of the mineral discovered or developed adjacent to such land, proof of which shall be taken as presumptive evidence that the land in question is mineral in character: *And provided further*, That wherever land is proven to be within a well-defined mineral belt, such land shall be deemed, presumed and taken to be mineral land, unless the contrary is proven: *And provided further*, That the provisions of this chapter shall be liberally construed, with a view to aid the applicant in procuring title to the mineral lands of the United States, and that the rules and regulations prescribed by the land department for its government and that of its officers in disposing of said lands shall be so formulated and administered as to assist the Government in disposing of said lands to bona fide applicants: *And provided further*, That all applicants for patent for lands upon which exists a valid mining location, the notice of location of which, designating the section and township in which such location is situated, shall have been recorded in the office of the recorder of deeds of the county wherein the land in question is situated, must, except when otherwise in this Act provided, give to such mineral claimant notice of such application in writing, or by publication in the newspaper published nearest such mining location at least once a week for sixty days."

SEC. 4. That section twenty-three hundred and thirty-seven of the Revised Statutes be amended so as to read:

"SEC. 2337. Where non-mineral land not included in a lode claim is used or occupied, or is intended to be used or occupied, by the proprietor of such vein or lode claim for mining or mineral purposes, such non-mineral surface ground may be embraced and included in an application for a patent for such vein or lode claim, and the same may be patented therewith or separately, subject to the same preliminary requirements as to survey and notice as are applicable to vein or lode claims; but no location hereafter made of such non-mineral land shall exceed ten acres, and payment for the same must be made at the same rate as fixed by this chapter for the superfices of the lode claim. The owner of a quartz mill or reduction works, not owning a mine in connection therewith, may also receive a patent for his mill site as provided in this chapter."

The bill is printed in full, as it is of considerable importance. The Stewart bill was printed twice in this column during the last session of the 53rd Congress. It is the same old bill. Those who have kept the run of these matters will note that the Stewart bill differs materially from the Perkins-Johnson bill in many respects. For instance, as to the amount of work to be done on a mining claim; the time when the labor shall be performed and so on; and the Stewart bill omits many valuable provisions in the Perkins-Johnson bill. One of the principal objections to the Stewart bill is as to the amount of labor required to be performed on placer claims, which many think is altogether too high, and the provision allowing affidavits to be made in any part of the United States. The Perkins-Johnson bill is the result of much thought upon the part of the Committee on Legislation of the California Miners' Association, after consultation with some of the best mining lawyers in California. The plan was to make as few changes as possible, and those in the direction of clearness and with a view to aid in the development of our mineral resources. The first change occurs in the last words in the first sentence in the first paragraph of Sec. 2324, by the addition of the italicized words in that sentence. In the same paragraph in the last sentence the provision for the performance of labor until patent issues is stricken out, and the italicized words inserted in its stead. In the next paragraph are added the italicized words. In the concluding sentence of that paragraph the time for commencing the annual work is made 12 o'clock noon on Jan. 1, instead of midnight preceding. In the next paragraph beginning "a copy of such notice" is a provision for the filing of an affidavit which shall be prima facie evidence of the accession of title through the steps required by the preceding provision. In the second sentence of the first paragraph in the proposed revision of Sec. 2335, ending with the words "in question," in the second paragraph of that proposed revision is what is believed to be the most important feature of the Perkins-Johnson bill. This relates to the transfer of contests from the land offices to the local courts. This provision is most important to the California miner. Senator Stewart agrees that

it may go in. Beginning with the italicized word "*Provided*," and ending with the last word in that paragraph, occur other provisions that are deemed of importance and which are but briefly contained in the Stewart bill. These should also be held to tenaciously. In section 2337 the word "ten" is used in place of the word "five," so that a mill site may consist of ten acres instead of five as previously. Further comment is hardly necessary, for with the two bills before the intelligent reader he can readily see the difference, and by consulting the old law, which will be found in the Revised Statutes, can understand the changes sought to be made.

Some objection has been raised as to the transfer of contests concerning the character of land to the local courts, some lawyers claiming that the United States has no power to confer the needed jurisdiction upon the State courts. In arguing the matter State Senator Ford has made the point that there is a precedent for this character of proceedings in the manner of determining adverse claims under applications for mineral patents. This proceeding is provided for in section 2326 of the Revised Statutes. This section, in effect, provides that where an adverse claim is filed against an application for a mineral patent, the question of right of possession, or, in other words, the right to purchase, shall be referred to the proper local court, whose judgment or decree shall be binding on the land office authorities. This is the same principle which miners have applied to contests as to the character of land sought to be purchased. The decision or judgment in either case determines who has the right to purchase, there being no perceptible distinction between the two cases.

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NEW YORK papers are stricken with a sudden spasm of virtue and are shocked at the sad sight of men buying mining stocks; singular, the difference between tweedle-dum and tweedle-dee. 'Tis all right, and perfectly business (according to the New York press), for those men to deal in puts, calls, futures, straddles, railroad, oil, electric and other stocks, the greater part of which represents only a possible, intangible value, but all wrong and deeply deplored to buy mining stocks. Without endorsing the purchase of mining stocks in general or particular, ability is not vouchsafed to the ordinary Western mind to discriminate between the different phases of the gamble. If anything, the odds are in favor of the man who buys the mining stocks. Of course, dabbling in mining stocks is not mining, no more than dealing in wheat futures is cultivating that useful cereal, but why the New York papers should sermonize about the purchase of mining stocks and be silent on other manifestations of the gambling spirit is as much a mystery as their inability to see that the silver question affects their part of the country more than it does any other, and that prosperity cannot come to them till the remonetization of silver, the resumption of the old time demand for supplies of all kinds on the part of the silver miners, and the restoration of the necessary equilibrium in the nation's supply of precious metals and sound money.

## Concentrates.

CRIPPLE CREEK, COLO., district has eight daily papers.

FOUR FEET of snow was reported in Bodie, Cal., last week

SUPT. TREADWELL of the Red Hill mine, Grass Valley, is making arrangements to build a mill.

AT Circle City, Alaska, coal oil is quoted at $13 per case. Dressed lumber is worth $130 per M. feet.

SUPT. DAVID JOHNSTON will shortly resume work on the Spanish mine, near Washington, Nevada Co.

IT is expected in Grass Valley that work at the Allison Ranch mine, Nevada Co., will begin next week.

YOLO COUNTY'S SUPERVISORS have refused the plea of the salaried officials of the Anti-Debris Association to help pay their wages.

THERE were 100 pages in the February issues of this paper—the first time in the thirty-six years of this journal's existence that 100 pages of it appeared in February.

AT Rossland, B. C., last Saturday, an explosion of two boxes of giant powder at the Center Star mine resulted in the instant killing of four men and the fatal injury of four others.

THE United Smelting and Refining Company and the Puget Sound Reduction Company have recently advanced their treatment charges, the former $3 a ton and the latter making a still greater advance.

AT the annual meeting of the Chollar Mining Company last Wednesday 84,433 shares were represented. A. K. P. Harmon, C. Hirschfield, H. Zadig, E. P. Barrett and A. Krauss were elected directors. C. E. Elliot was re-elected secretary and H. M. Gorham superintendent. The company has $13,981 in the treasury.

AN Ogden, Utah, woman announces the finding of a $5 nugget in a chicken. Josephine Co., Oregon, fowls prospect well in flake gold, and Olympia, Wash., hemlock trees are locally credited with fine free gold.

DURING the ninety days ending on the 1st inst., the Napa Consolidated Quicksilver Mining Company show: Gross, $46,029; expense, $24,733; net, $21,255; dividend No. 73, payable April 1, $10,000; surplus, $11,255.

EVERY industry but one is at a standstill. That one is mining. 'Twould be better were other industries in other than a comatose condition, but it is well that even one legitimate industry is in so flourishing a condition.

DURING January and February quicksilver receipts at this port aggregated 5316 flasks, against 3755 in the same time last year. The exports by sea were 4504 flasks, valued at $166,040, against 1573 flasks at $55,789 in 1895.

THE Utica mine at Ward, Colo., claims to have cleared $26,000 in January. It is a close corporation, the same as the ownership of the Utica mine, Calaveras Co., this State, which never makes any claims, but is understood to yield a monthly average profit of $500,000.

AT Perris, Riverside Co., the St. Louis Co., who own the Menefee mine, has put men to work pumping out the shaft preparatory to resuming development work. The main shaft has been sunk over 100 feet and has two drifts, the first at 60 and the second at 30 feet.

THE New Gold Mining Exchange of this city opened its call board last Monday. The first sales were: Grant Mining Co., 3000 shares at 50 cents to 40 cents; Keystone, 200 at $300; Champion, 200 at $12.50 to $12; Thorpe, 400 at 50 cents to 20 cents; Amalie, 100 at $1.75; Providence, 300 at $8; Kennedy, 200 at $12.50 to $12.

THE powder house of the Standard mine, near Burke, in the Cœur d'Alene district, Idaho, blew up late last Sunday night. It contained nearly a ton of giant powder. The shock was felt for a distance of three miles. The immense compressor, one hundred yards from the mine, was badly racked. Fortunately there was no loss of life.

HALE & NORCROSS, Virginia, Nev., miners objected to having Superintendent Ryan superseded by T. W. Tangerman under the new management, and the underground force—twenty in number—quit work. Their action is upheld by the Miners' Union. The new management has ordered that the mine be shut down temporarily.

OFFICIAL statistics of the zinc production in the United States for the year 1895 are given in the report of Special Agent Charles Kirchoff of the Geological Survey. These show the total production to be 89,686 short tons, against 75,328 in 1894. The report says that the year 1895 breaks the record for great product, the maximum in any previous year having been 87,260 short tons in 1892. The increase is particularly evident in the Illinois-Indiana region.

THE present daily number of new mining incorporations at Salt Lake City, Utah, rival the similar Cripple Creek aggregate. The Utah Legislature is now willing to recognize protection to the industry by lowering the proposed tax to 25 cents on each $1000 of the stated capitalization. The Colorado revenue from this source is a handsome one, but unless Utah hurries up it will lose considerable by its proposed revenue measure not being retroactive.

IN the absence of a State mineralogist or mine statistician, State Superintendent of Public Instruction Cutting of Nevada has taken on himself the task of sending blanks to the mine owners and the different county assessors in a laudable effort to get a report of the bullion yield of the State. In this Supt. Cutting deserves the co-operation of every resident of Nevada Nothing attracts more attention from investing capital than reliable official data of that nature.

TIME will develop anything, a mine or a prospect or a competitor to the gold-producing chickens of Josephine County, Or., the eucalyptus trees of Los Angeles, the fir bark of Olympia, or the coal at Rock Springs, Wyoming. Everett, Wash., now announces that last week a calf was killed there in whose stomach was found a gold watch. It is to be observed further that the watch was "ticking time accurately and in good repair," thus differing somewhat from the normal condition of watches unenveloped by bovine digestive apparatus.

THE Virginia, Nev., Miners' Union is the oldest association of the kind in existence, having maintained its organization since the discovery of the Comstock lode nearly thirty-five years ago. When the union was formed Abraham Lincoln was President of the United States, and during his time and for years thereafter the miners of the West were regarded by their co-laborers throughout the country as the most valuable contributors to the general prosperity of the United States by furnishing gold and silver for standard money to maintain the credit and advance the prosperity of the country.

THE first meeting of the new U. S. Debris Commission, as at presented constituted, was held in this city last Monday afternoon, when organization was effected, Col. Chas. R. Suter being chosen president and Capt. Cassius E. Gillette secretary. On Tuesday the Commission again met and granted permits to the Coney mine, near Igo, Shasta county, and the Proper mine at Murphys, Calaveras county. Mine owners of the Gorman and No Chunk, Michigan Bluff, Placer county, and Princess, near Redding, Shasta county, were authorized to build dams, and the owners of the Lone Star mine at Cromberg were authorized to resume work.

A WASHINGTON PRESS DISPATCH of the 19th says: "It has been discovered just what the opposition of the railroad people is to the Mineral Land bill which the California miners desire put through Congress. They want the bill amended so as to except from its operations the land, amounting to some 266,000 acres, which has already been listed, advertised and approved by the Secretary of the Interior, but not yet patented. Senators Stewart and Mitchell will have charge of the fight of the railroad to secure the adoption of this amendment, while both White and Perkins will make the fight in opposition. Senator White will force the issue at the earliest opportunity."

THE following is one of the delightfully exaggerated romances that are floating through the daily press: "W. A. Clark of Butte, Mont., principal owner of the United Verde Copper Co., whose copper mines are located at Jerome, Ariz., is now on a visit to Paris to complete a deal whereby a Paris syndicate will soon own the mines and the properties of the United Verde Copper Co. Mr. Clark has recently, on the part of the company, refused $50,000,000 for this property. This same Paris syndicate has recently bought secretly the big copper mines in Montana controlled by James B. Haggin of San Francisco and Marcus Daly of Anaconda. The price paid was $125,000,000 United States gold coin."

THE report of the operations of the Montana Mining Co. at the Drum Lummon, Montana, mine for the six months ending Dec. 31, 1895, shows that during that time the mills reduced 37,790 tons of ore, yielding in bullion bars and concentrates (assay coinage value) $496,662, equivalent to $13.14 per ton. The actual realized value amounted to $381,401, the difference on the coinage value being $115,261, or 2.33 per cent on the gold, and 52.14 per cent on the silver produced, the average net realized value of the ore treated being $10.09 per ton. The proportionate money value of the precious metals contained in the ore was: Gold 73.87, and silver 26.13 per cent. The total expenditure at the mine amounted to $288,694.

SILVER BULLION produced at the De Lamar, Idaho, mine costs 50 cents per ounce. But it is the only paying mine in the camp, and doubtless every ounce of silver produced in De Lamar, Idaho, costs close on to $1. This is equally true of every silver mining camp in the country and is an eternal answer to those who ask why, at present prices, silver is produced at all. Another answer is because, in a great many instances, considerable work was blocked out in many big mines at the time of the slump, and at considerable expense, and now to realize some value the ore must be got out and treated. Then, too, in other cases, as at Butte, Mont., silver is a bye-product and is profitable at a price that would preclude its production were the ore that contains it mined for silver alone.

WRITING of the South African mining and political troubles, under date of January 27, a Kimberly man says: "The detention of the Reform Committee, for they really are detained, although out on bail, is a serious check to business. The Boer Government knows this, and glories in the fact, and they have put off their trial until April just to cause greater annoyance. There is no reason on earth why they should not be tried next week, but for the fact that Paul Kruger really does not know what to do with them now that he has got them in his power. He knows very well that a Boer jury will convict every one of them, and he knows very well that they will be liable to a long term of imprisonment. But the question with him is whether he dare allow them to be consigned to jail. On the other hand, it is well known that a large section of his burghers are loud in their anger against him, because he did not have Dr. Jameson court martialed and shot. And now that he has allowed the doctor to escape, they are clamoring for the lives of the ringleaders in the Reform Committee. As you are aware, by this time, measures have been taken to confiscate all the property of these gentlemen, but it would appear that they cannot confiscate their movable property, and, therefore, their shares are safe, and have probably by this time been transferred. But the majority of them have valuable immovable property, such as claims, stands and houses, and if these are confiscated many of them will be absolutely ruined."

AN important case, wherein the Carson City G. & S. M. Co. were plaintiffs and the North Star M. Co. were defendants, was decided by Judge Beatty of Idaho in the U. S. Circuit Court in this city last Monday, the decision being read by Judge McKenna. Judgment was for defendants. The properties adjoin each other in Nevada Co., Cal. Plaintiffs claimed that as owners of the Irish-American mining claim they should be paid $800,000 for ore alleged to have been illegally extracted from their ground by defendants, and that defendants be restrained from working therein. The old question of "apex" and "lateral rights" was prominent, plaintiffs claiming that the North Star owners had no right to pass beyond a vertical plane down through surface lines, defendants claiming that the apex of the ledge ran east and west, continuing westward of the crossing. The judge decided that "the defendant may follow its ledge on its descent under the Irish-American claim and to any depth between the perpendicular plane drawn through the east line of its claim and another similar parallel plane crossing such claim at the point fixed as the western terminus of the ledge and westerly from the east end line 2200 feet measured along the straight central line upon the plat, and along the like line upon defendant's exhibit 8; provided that defendant shall in no event pursue its ledge west of a perpendicular plane extended through the west line of its claim." Incidentally, the decision was to the effect that a company could not be called upon to go behind a U. S. patent or its purchases of original claims. The case will doubtless be appealed.

THE following is clipped from the Virginia, Nev., *Enterprise* of the 18th: "The Hale & Norcross situation is unchanged. Superintendent Tangerman is as obnoxious to the miners of Virginia as he was on the day they passed the resolution refusing to recognize him as superintendent of the Hale & Norcross mine. So far Mr. Lynch and his party have not been down the mine. They went on a long drive down the river yesterday and inspected some of the mills. They traveled as far as Carson and it is reported that Mr. Lynch and Mr. Tangerman paid a lengthy visit to Acting-Governor Sadler. The presumable object of their visit was to request Sadler to call out the militia in case any trouble should occur on the Comstock. No trouble is likely to occur, but the officers of the Virginia Union say that the Union will refuse to allow any one to go down to work under Tangerman. They say that the choice of Tangerman was a direct insult directed at the Comstock, as his reputation had been declared unsavory by a whole carload of the most reputable citizens of the Comstock taken down to impeach his testimony during the Hale & Norcross trial. These officers say that if the management were sincere in their expressions, and if they actually wanted to inform themselves as to the character of their superintendent, that all they need do is to examine the files of the *Enterprise* to find damaging evidence. They say that Tangerman was only given the situation to bolster up his tottering character until the Hale & Norcross cases should be finally settled. The Union, in its action with regard to Tangerman, has the support of the mining superintendents of the Comstock, as well as the people generally. Comstock mining superintendents have refused to let Tangerman go down into the mines under their charge and in other ways have refused to have anything to do with him."

## Assaying at Mines and Works in Colorado.*

By H. VAN F. FURMAN of Denver.

In the past ten or twelve years a great advance has been made in the United States in the art of assaying and technical chemical analysis. The assayer or chemist of a decade since would be utterly unable "to hold up his end of the line" in a modern metallurgical works. While rapidity and the ability to execute a large amount of work in a given time have been the points which have seen the greatest development, accuracy has not been overlooked. There has probably never been a period in the history of the business when margins were so small and competition was so great, and hence when greater accuracy was required. In the early days of smelting in the United States the margins on ores purchased were generally large. In those days the shipper did not exercise the same care to check the returns made by the purchasers as at present. Frequently there was no competition, and the seller was compelled to accept what the purchaser would give for a lot. Under the fierce competition and improved methods of the present day all this has been changed.

While it is true that a majority of our best assayers and chemists received their preliminary training in a technical school, the courses of instruction in these schools have hardly kept up with practical progress and the requirements of the times. A graduate of one of our technical schools who obtains a position at a modern works will first have to forget a great deal of that which he has been taught. This lesson having been learned, and habits of precision having been acquired, he will probably become an excellent workman. Should the student in the laboratory of one of our schools be presented with some thirty or forty samples of ore in the morning, with the request that the gold and silver contents of each be accurately determined—the report to be made the same afternoon—he would probably regard the task as impossible. Should the task be undertaken, he would probably become so hopelessly mixed and nervous that his results would have but little value. Such, however, is not an unusual day's work in a modern establishment, and at many mines from one hundred to one hundred and fifty determinations of gold and silver are frequently required in the course of a day. Thirty control samples for gold and silver, each sample requiring at least duplicate determinations of both the gold and silver, are often received in a modern metallurgical works. Seventy-five determinations in the analytical laboratory will not be considered unusual for a modern chemist.

The young graduate, upon assuming a position at a mine or reduction works, will have straightway to acquire system, rapidity and accuracy. The first is absolutely essential, and, until a proper system is adopted and carefully carried out, good results can not be expected. Herein lies a dividing line between the school and shop-work. In the school the student will be given two or three samples, and ample time to obtain his results; in the shop the operator will be given a large number of samples, and required to furnish the results in a limited time. This can be accomplished only by having the work so systematically arranged that a large number of determinations can be carried on simultaneously. In a well-conducted office twenty-five to thirty-five fusions or scorifications will be carried out together. In the same manner a large number of cupellations—from fifty to seventy-five—are usually run simultaneously. In this way the different determinations are carried through the separate steps in series, thus saving a great deal of time and labor.

Rapidity is frequently of the utmost importance. At a mine the miners and ore sorters will frequently have to wait for the assayer's results before proceeding with their work. At a metallurgical works the working of the plant and the quality of the product will often be largely dependent upon the result of an analysis, which must be rapidly performed to be of value.

Accuracy within narrow limits is absolutely essential. When it is considered that over $100,000 may be paid out for ore, etc., as the result of one day's assays at a modern plant, the importance of accuracy becomes apparent. The results obtained in commercial gold and silver assaying, while not scientifically accurate, are probably much nearer the truth than those obtained by any other commercial industry. There is a mistaken idea in the mind of the uninitiated that the fire assay for gold and silver invariably yields results far below the actual contents. This idea is not without foundation, as there must be a loss of precious metals under fire processes. However, in a series of experiments recently conducted by the writer to demonstrate that which had frequently been demonstrated—that these losses were not as great as generally supposed—the loss of silver in the scorification assay was found to be 2.54 per cent, and the loss in the crucible assay was found to be 2.58 per cent. The loss of gold was nominal (scorification 0.8 per cent and crucible 0.3 per cent). In another series of experiments on the assay of base (lead) bullion the silver loss was found to be 1.55 per cent, while the gold loss was trifling. In the fire assay of silver bullion a great number of experiments show the average loss to be about 1 per cent. However, when silver bullion is assayed by the fire method, the losses are always corrected by running a proof assay with each set of determinations. The average loss of gold in the assay of gold bullion is about one part in one thousand, or 0.1 per cent. This loss is invariably allowed for, and corrected, by running a proof assay with each set of bullion assays. As the losses in ore assaying are well known, and allowed for in the purchase of ores by our modern works, they cannot be considered as of serious moment.

The limits of accuracy to be attained will depend largely upon the character of the work. Mine samples do not require as much care as control samples upon which the ore is sold. One determination for gold or silver on each mine sample is usually all that is required. The assayer at a reduction works will frequently receive samples in handling which speed is of more importance than extreme accuracy. As to the allowable limits of variation on control samples, it may be considered as 0.5 ounce silver and 0.1 ounce gold on ores assaying up to 100 ounces silver and 3 ounces gold per ton. However, no exact rule can be given as to the allowable variation. Many samples of high-grade ore will be encountered with which the only safe rule, on account of the variations in individual assays which may be expected, is to run a large number of assays and then average the results. The modern assayer must be a man of judgment as well as of skill.

The sampling of ores and metallurgical products, while not properly coming within the scope of the assayer's work, is a subject which should be thoroughly familiar to the practical assayer. Unless the samples truly represent the mass or lot from which they were taken, the subsequent assays will be valueless. The assayer at a mine or works generally receives the samples already prepared, but there are occasions when he is called upon to take his own sample. Hence the art of sampling should be thoroughly understood by the assayer. As it is not within the scope of this article to take up the subject of sampling, we will begin with the point at which the sample is delivered to the assayer.

The ore sample is usually delivered to the assay office in a sealed bottle, or paper sack, with the assay number plainly marked upon it. The works generally make three samples; one to be delivered to the shipper, one to the works' assayer and one to be held in reserve for delivery to an independent assayer, as umpire, in case of a disagreement between the works and the shipper. Each of these samples has been carefully and indiscriminately cut out of the general sample of the lot, and passed through an 80 or 100-mesh (the latter is now the Colorado practice on gold ores) sieve.

The assayer, on commencing work in the morning, usually has a number of samples on hand. Each sample is taken up by itself, spread upon a piece of rubber cloth, and thoroughly mixed by means of a steel spatula, the pile being finally spread out into a flat layer of about one-eighth inch in thickness. From this layer the assay samples are taken with a small steel spatula, going over the layer and taking a portion on the point of a knife from each part. Care should be exercised here to always dip the knife down to the bottom of the layer, so that each portion will represent the layer from top to bottom. The portion usually taken in Colorado for each gold assay is one-half assay ton.† This is introduced into a twenty-gram crucible, together with the proper fluxes, which consist of litharge, sodium bicarbonate, borax glass, a reducing agent (as flour or argols), or an oxidizing agent (as nitre), according to the requirements, and such other fluxes as may be necessary. The necessary fluxes have to be added according to the mineralogical composition of the ore. It is largely here that the assayer's skill and experience enable him to obtain correct results. According to the method taught in many technical schools, when the assayer is in doubt as to the proper charge, he should run a preliminary assay. The practical assayer has no time for preliminary assays, but must judge the character of the ore simply by eye-inspection; when in doubt, the writer has found that, by placing about half a gram of the ore on a watch glass and vanning with a little water to separate the lighter and heavier minerals, and then by inspection judging as to the minerals present and their approximate amounts, the character of the sample could be determined sufficiently for assay purposes, and with a small expenditure of time. According to the Colorado practice, most gold assays are run by the crucible method and most silver assays by the scorification method. It is hardly within the scope of this article to discuss the reasons for the adoption of these methods, but it is sufficient to say that they appear to give the best results.

After weighing out the gold charges, the silver assays are weighed out, one-tenth assay ton being the general charge. On control samples three or more charges will be weighed out and introduced into a scorifier, together with the proper amount of pure granulated test lead, half of which is mixed with the ore and half of which is added as a cover to the charge. In addition, a little borax glass, and occasionally other fluxes, are added to the charge. In this manner the assayer proceeds with each sample, a convenient system being that adopted by the writer, as follows: The assay number of the first sample weighed out is entered in the assayer's memorandum-book at the top of the page for the day. This becomes Number 1, and, should a duplicate be run, the assay number will appear twice, the duplicate becoming Number 2 of the day's work. In this manner the weighing out is proceeded with, the charges being arranged somewhat as follows:

| | | | |
|---|---|---|---|
| 1, | 2, | 3, | 4, |
| 5, | 6, | 7, | 8, |
| 9, | 10, | 11, | 12, etc. |

According to this system, we always begin at the upper left hand and read exactly as a page of a book is read. Provided the same relative order is always retained, it is immaterial how many changes are introduced into the furnace at a time; they cannot be interchanged, and any charge can at any time be picked out and separated from the others, if necessary.

When a sufficient number of charges are prepared, they are introduced into the furnace for fusion or scorification. When the fusion or scorification is finished, the charges are removed from the furnace and poured into conical iron moulds, the same relative order being retained. As soon as the slags and buttons have cooled, which generally requires about fifteen minutes, the lead buttons are removed from the slag and pounded on the anvil into cubes. Each cube of lead is now introduced into a hot cupel in the muffle furnace, and the door is closed until all begin to cupel, when it is opened, and cupellation is continued until the buttons brighten, thus showing the elimination of the base metals.

As has been remarked, the Colorado practice is to run the gold assays by the crucible method, the fusions being performed in the muffle furnace, and the silver assays by the scorification process. When this method is adopted, it is customary to add a small piece of pure silver to the gold crucible assays, in order to insure the parting of the button. The gold-silver beads, resulting from the gold assays, are flattened by a few blows of a hammer on a steel anvil, and are then parted for their gold contents. The method of parting generally adopted consists in introducing the flattened button into a small porcelain crucible, adding dilute nitric acid, and heating until action of the acid apparently ceases. The solution of silver nitrate is poured off, strong nitric acid is added, and the buttons are boiled for four minutes. This solution is then decanted off, and the gold is washed twice with distilled water, and, after drying and annealing, is weighed. The balance used for this purpose will weigh to at least 0.01 milligram, and should be used only for this purpose. The silver-gold buttons resulting from the scorification assay are removed from the cupel, brushed with a stiff bristle brush to remove adhering particles of bone-ash, etc., and weighed, the gold as obtained in the crucible assay being deducted, and the difference being the silver assay of the ore.

Such, briefly, is the work required of the assayer, although, if employed at a smelting and refining establishment, he will be required, in addition to the ore assays, to make assays of base bullion, mattes, slags, dore bullion, silver and gold bullion, by-products, etc. Each of these assays requires special methods, which it is unnecessary to discuss further than to say that the same accuracy and care are essential throughout.

The form of report to be handed in by the assayer will depend largely upon the system adopted by the works. An admirable system adopted by one of our prominent reduction works is this: The samples delivered to the assayer are marked simply with the assay number of the lot, and each afternoon the assayer fills out his report containing the assay, or works' lot number, together with the results on each number. Under this system the assayer does not know, nor has he any interest in, one sample above another. This system also enables the management to check the assay returns at all times and without the knowledge of the assayer. At another establishment, where a number of men are employed in the assay office and laboratory, a different system is adopted. Here all samples are delivered to a head assayer, who examines each, marks it with the constituents to be determined, and remarks as to the general character of the sample. The samples are then turned over to the assayers for the proper determinations.

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THE metric system is the legal standard for weights and measures all over the world, except in the United States, Great Britain, Turkey, Denmark, Russia and Japan. We annually lose considerable trade with the other countries through the persistent use of the English weights and measures by our manufacturers and merchants in their circulars, catalogues and price lists. These catalogues and price lists are unintelligible and useless to foreign buyers.

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* By permission from *The Engineering Magazine*.

† The Assay-Ton System of Weights was devised by Prof. Chas. F. Chandler of Columbia College. As there are 29,166.6 troy ounces in one ton avoirdupois (2000 pounds), the assay ton contains 29,166.6 grams; hence, if one assay ton of ore is taken for assay, and the resulting button weighs 10 milligrams, the assay value of the ore will be 10 ounces per ton. One ounce per ton is 0.00343 per cent.

## Tributary to Yuma.

**Present Conditions in Southwestern Arizona and Southeastern California.**

To THE EDITOR:—The mining interests of the section tributary to Yuma are receiving considerable attention, not only from local capitalists, but from Eastern States. There are several promising fields for the investor both in southwestern Arizona and in California. One of the latest transactions in this section is the purchase of the Thomas mines by C. D. Lane and others of Angels, California. This mine is one of the most promising in the southwest. It is twenty-five miles southeast of Yuma.

There are some other enterprises hereabouts of less prominence, but the field of greatest activity is on the California side of the river. The Duncan mine at the Pot Holes is being developed. An inclined shaft is now down 150 feet in a vein the width of which is not really known, the shaft being all in ore, and sunk on the footwall. No mill will be built until the development of the mine warrants it.

In Picacho district a score or more of Mexicans are "dry washing." From a responsible person I learn that the average earnings are about $1 per day per man. As a rule, they work only five or six hours and spend much of their time resting. It was here that a pumping plant was installed two or three years ago. It proved a dismal failure. The pumps were unsuited to the work. It would be a much better plan to screen the gravel and haul it to the river.

Several lode locations are being developed by Hon. S. W. Dorsey of Denver, who has purchased a group of claims surrounding the old Jayne mines. The latter were worked several years ago, some of them being over 200 feet deep. The rock was all hauled to the fifteen-stamp mill on the Colorado river, five miles from the mine and crushed. It is said that the rock returned about $9 per ton. The mill is still in fair repair and could be put in shape to run at small cost. There is, however, no immediate prospect of a resumption of operations on the Jayne mines. Senator Dorsey will develop his newly acquired mines; and if the result is satisfactory, Picacho will become a lively camp. The gold-bearing ledges occur here in altered country rock (mica schist, hornblende schist and diorite), vein quartz being rarely found, and, where encountered, almost destitute of gold. The ore is heavily stained with red, brown and yellow iron oxides. Some of the ore bodies are very large, though low grade.

About three miles east of Picacho basin is what is called White Gold basin. There are numerous veins in this section also; but, like those in the Picacho basin, are zones and lenses of crushed country rock, which here are diorite, felsite and other intrusive rocks. These zones lie in a system of parallel fissures joined by cross fissures similar in character. In one of the lodes the mineralization on the surface is more than 100 feet wide, and can be followed several thousand feet along its strike. The gold in this zone is alloyed with silver to such an extent as to give it a silver-white color. A great deal has been said about the rarity of this metal, its enhanced value, etc., but merchants and others in Yuma pay about $12 to $13 per ounce for it. The lode is known as the Oro Blanco (White Gold), and is one of the strongest in the district. Another zone of great width and continuity is the Golden Sunshine. The gold in this lode and in fact in all the others, except the Oro Blanco, is higher grade and consequently yellow.

The region is a very interesting one. The hills are almost entirely destitute of vegetation, and the rock exposures are all that one could ask. The older crystalline schists have at one time been overlaid by masses of rhyolite and tufa to a depth of several hundred feet. Of the vast field only a few outlying remnants are left. No mineral deposits of value have as yet been found in the rhyolites or tufa. They resemble the liparites of Calico somewhat. Further southward the rhyolites are overlaid by a later formation of andesites and black eruptives ranging from augite andesite to true basalt.

In the Cargo Muchacho mountains there is considerable activity in the neighborhood of the Golden Cross mine. Colorado capital has been interested and several vertical shafts are being sunk in the hanging wall country of the Golden Cross Company's deposits, with a view apparently of depriving that company of the right to follow their ore shoots beyond their side lines. The prospect for lengthy and expensive litigation is excellent. No suits have been commenced, but they will surely result if the newcomers attempt to extract ore from any of the deposits now being operated by the Golden Cross Company.

The gold-bearing deposits occur as impregnated masses in the country rock, which is normally hornblende and micaceous schist. These rocks have become very silicious, as a rule; the hornblende has altered into chloritic scales and epidote.

A slight incrustation of copper carbonate and chrysocolla is noticed at many points, particularly near the surface. The whole formation has been cut by a perfect network of coarse granite (pegmatite) dykes, which in some parts of the mine are gold-bearing.

These zones lie parallel, or nearly so, conforming as far as known with the dip and strike of the country rock. The shoots, however, lie in a series of swells, which make up into the hanging wall, being thickest at the middle and thinning out in either direction along the strike of the lodes. They occur at varying distances of 100 or 200 to 1000 feet, so that a line drawn at a right angle to the strike of the formation may pass through several of these shoots. The Golden Cross Company has two stamp mills, the old one of forty stamps, weighing 850 pounds each, and a new mill of one hundred stamps, weighing 1000 pounds each.

Claims are staked out all over the hills of the vicinity, and hundreds of acres have been taken up on the desert wash. Only one company is in operation besides the Golden Cross, and that is a Colorado concern, sinking a vertical shaft in the hope of finding the Golden Queen shoot within the lines of their own claim. The result will be watched by Californians with much interest. CALIFORNIA MINER.

Yuma, Ariz., March 16, '96.

## An Argument for an Appropriation.

On the 4th inst. Hon. Tirey L. Ford appeared in Washington, D. C., before the Committee on Rivers and Harbors of the House of Representatives in an appeal to them to recommend the $250,000 asked for by the California Miners' Association. Mr. Ford said:

GENTLEMEN:—In compliance with the request of your honorable chairman, I wish to submit a brief statement relative to the wishes of the people of the State of California concerning an appropriation to be expended in accordance with the provisions of the so-called Caminetti act, and to meet an appropriation of $250,000 made by the State of California for the purposes referred to in the act.

The act of October 1, 1888, entitled "An act for the investigation of the mining debris question in the State of California," authorized an examination of that question by three officers of the Engineer Corps of the United States Army, acting as a commission for the purpose indicated. This commission made the required examination, and filed its report in February, 1891. This report was in due course transmitted to Congress, and on February 21, 1891, was referred to the Committee on Mines and Mining of the House of Representatives, and is known as Ex. Doc. No. 267 (H. R.), 51st Congress, second session. This report sets forth the points at which storage basins can be constructed and gives detailed information in that regard.

One of the sites designated by this commission for the construction of a restraining barrier is at De Guerre Point, on the Yuba river, several miles above its junction with the Feather river, which latter is a navigable stream. The recommendation in this regard will be found on pp. 17 and 18 of the above Ex. Doc. 267.

Following this report, which is quite exhaustive in its nature, came the passage of an act entitled "An act to create the California Debris Commission and regulate hydraulic mining in the State of California," approved March 1, 1893, and commonly known as the Caminetti act. This act recognizes the sediment-carrying quality of the streams which drain the western slope of the Sierras, and provides for the construction of restraining works and settling basins to prevent the debris from reaching the navigable streams, the provisions of that act in this regard being contained in Secs. 23, 24, and 25 of the act.

Sec. 25 of the act specifically provides for the construction of the necessary works and contains, among other provisions, the following: "The recommendations contained in Ex. Doc. No. 267, 51st Congress, second session, and Ex. Doc. No. 98, 47th Congress, first session, as far as they refer to impounding dams or other restraining works, are hereby adopted, and the same are directed to be made the basis of operations."

Ex. Doc. 98, 47th Congress, first session, above referred to, is a report made by Col. Mendell, of the Corps of U. S. Engineers, under the provisions of the river and harbor act of 1880. This report is similar in effect to the report contained in Ex. Doc. No. 267, 51st Congress, second session, above referred to.

The policy of Congress is thus clearly and unequivocally stated. Sec. 24 of the act of March 1, 1893, above referred to, invites co-operation by the State of California with the General Government. Acting upon that invitation, the Legislature of the State of California, at its session in 1893 (see Stats. Cal., 1893, p. 339), appropriated the sum of $250,000 to be used for the purpose of constructing settling basins and restraining works but the appropriation was made upon the condition that none of it should be used until Congress had appropriated at least as much for the same purpose. This act was passed in March, 1893, and is still in force. The people of California having thus acted upon the invitation extended to them by Congress, and having shown their good faith by an appropriation of $250,000, now ask Congress to appropriate at least as much, and thus create a fund of $500,000 to be used for the protection of the navigable rivers in California in accordance with the provisions of the Congressional act of March 1, 1893 (the Caminetti act).

This committee must bear in mind that the damage heretofore done to the rivers in California through the flow of detritus from the mountains has been from several causes. Nature is continually washing the mountains down into the valleys, and this has been greatly accelerated since the advent of civilization. The denudation of the mountain sides of the heavy forests that formerly grew upon them has permitted the soil to become loosened and thus more rapidly wash into the canyons. The grazing of vast herds of cattle and sheep and other stock upon the mountain sides has also accelerated the washing away of the soil. Farming and gardening have added somewhat, and mining has also done its share towards carrying debris into the canyons and rivers. No one cause is wholly to blame. It is impossible to take care of the debris resulting from one cause without at the same time taking care of the debris resulting from all causes. The proposition is to impound this debris at convenient places in the lower foothills and in the canyons where nature seems to have provided places especially adapted to the purpose, and thus relieve the rivers from the annual danger arising from the melting snows and freshets at spring-time.

The theory is that the Government should take care of its rivers. This can be more easily done by preventing the debris from reaching the rivers than by dredging it out after it has reached the rivers.

If it be said that these works are indirectly in aid of a private industry, the answer is that the protection of the navigable streams is a public and national matter, and that the Government in thus protecting its navigable rivers unavoidably impounds the debris resulting from such mining operations as may be permitted by the Federal engineers. But to compensate the Government for the use of its works by any miner who desires to use the same and who can get permission so to do from the Government engineers, it is provided that the miner using such works shall pay to the Government three per centum of the gross output of his mine. Furthermore, California has already appropriated the sum of $250,000, thus relieving the Government to that extent. That there is need of this work for the protection of the rivers of California there cannot be the slightest question, and the mere fact that it may indirectly aid a private industry is no argument against the work, especially when that private industry is made to bear the burden which it creates, and when, furthermore, the State of California is bearing half expense.

Let me say, in conclusion, that this appropriation is a present and pressing necessity whether hydraulic mining be permitted to be carried on in the future or not. The debris already in the canyons should be taken care of, and there is a specific recommendation to this extent contained in the report of the California Debris Commission made to the House of Representatives in December, 1893, as contained in Ex. Doc. No. 16, 53d Congress, second session. The report of the commission in this regard reads as follows: "In regard to the provisions of Sec. 25 of the act of March 1, 1893, in which the recommendations contained in Ex. Doc. No. 267, 51st Congress, second session, and Ex. Doc. No. 98, 47th Congress, first session, are adopted by Congress and directed to be made the basis of operations, the commission desire to say that the restraining barrier described in these documents, situated at or near De Guerre Point, on the Yuba river, is considered an advisable construction to be soon undertaken for restraining the detritus now in the bed of the streams and in furtherance of the project for the improvement of the Sacramento and Feather rivers; a suitable appropriation for this work will be $300,000."

I would suggest the following item be inserted in the river and harbor bill when finally made up:

"For the construction of works for the protection of the Sacramento and San Joaquin rivers in California, two hundred and fifty thousand dollars; such work to be constructed under the direction of the Secretary of War and in accordance with the provisions of sections twenty-three, twenty-four, and twenty-five of the act entitled 'An act to create the California Debris Commission and to regulate hydraulic mining in the State of California,' approved March 1, 1893."

In accordance with the request and in conformity to the unanimous endorsement of the entire California Congressional delegation the committee recommended that the amount asked for—$250,000—be placed in the regular appropriation bill.

## Diplomatic Mr. Grove.

In these days of "booms," "promoters," sales and purchase it is of interest to note the manner of procedure of some of our friends in foreign parts. Recently the Rhodesia Limited amalgamated with the Buluwayo Mining and Finance Co. At a meeting of the former company in London on the 14th of last month the consolidation was ratified, and Mr. Grove, who had conducted the negotiation, made a speech. Among other things Mr. Grove said:

The environment of this company is, to a very large extent, Scottish. I need hardly say, therefore, that its primary virtue is caution. When I was requested to go out to South Africa to look after your interests, the principle of caution was instilled into my mind. I was told to be "verra" careful of what I bought. I was further told not to give more than 6d. unless I was "verra" sure that I could get is. for it. On those wholesome sound principles I ventured to work while I was in South Africa. Well, I spent some little time in Johannesburg before I went north in Rhodesia, and I should like to say in passing that the views upon Rhodesia held there are of a distinctly pessimistic nature. I spent some time in Johannesburg, and I was thoroughly saturated with what I may call a pessimistic bath, but I paid no more attention to the views of Johannesburg than I would to the personal verdict of one lady upon another lady's charms. In fact, the more Johannesburg ran down Rhodesia, the more beautiful and charming was I prepared to find her as soon as I reached her borders. In that cautious attitude of mind I found myself in Rhodesia, and there I am bound to say to be fair that I thought at first the views of the country expressed there were unduly optimistic; but although my stay there was not very long, before I left that country, to put it cautiously, I arrived at the distinct opinion that the optimism of Rhodesia was far more justifiable than the pessimism of Johannesburg. At that conclusion I arrived, after very careful and minute enquiries. Well, gentlemen, to come immediately to the point. As soon as I got to Buluwayo—after six days of traveling night and day, for which I think the sum of £1,000 ought to be voted to me on the spot—I arrived there, and I found a number of properties ready, and waiting to be offered to me. They had heard that a representative of one of the strongest groups in London was coming out to Rhodesia, and those who had properties settled upon me with the same alacrity as flies do upon honey on a hot day. Therefore, I had to bear in mind the caution I received before I went, to be very circumspect in the sifting process I went through before deciding upon any particular property that was offered to me. I may say that after very careful local enquiries, I came to the conclusion that there was no property of equal intrinsic value in the market as that of the Buluwayo Mining and Finance Co. I, therefore, approached them cautiously with my nose somewhat in the air, and if I found my nose was in the air, I found theirs was in the air somewhat higher; for on enquiry I ascertained that they proposed coming to London and expected to raise something like £350,000 from the public on the two properties that they were prepared to offer. The sum of £350,000, gentlemen, is a large sum. I wanted to get that property, but I knew that Rhodesia, Limited, could not offer them that amount, so I set to work—I will not say in an underhand way, but in a diplomatic fashion—like Mr. Chamberlain, combining diplomacy and straightforwardness. After some little negotiations, which cost me several dinners and more than one fit of indigestion, I made the proposal that instead of paying them down a certain sum, we should amalgamate, subject to the approval of our board and shareholders in London. They, knowing the position of Rhodesia, Limited, were somewhat taken with this proposal, but they still opened their mouths too wide, they wanted more than £100,000, in return for their property. I said that was quite impossible. From that moment, when I saw that they were agreeable in principle, I set to work to chip down by several progressive stages the amount we should be obliged to offer them. In the first place I had to deal with the local representative in Buluwayo. I thought to myself I would first of all chip a piece off them, and I succeeded in doing so before I left Buluwayo. Then I got to Johannesburg, where there was a local board, and I began new treaties, with a view of getting another clip off the price before I left Johannesburg. I did succeed in getting a successful clip off, and then we had to meet the representative in London, and they were again subjected to a third clipping process, which has resulted in bringing down the price to what I think is the extremely moderate figure of 60,000 shares of Rhodesia, Limited, and £10,000 in cash.

Mr. Grove certainly appears from his own confession to be justly entitled to the hearty vote of thanks accorded him by the board of directors.

# Electrical Progress.

## Experience with the Electric Locomotive in Baltimore

By LEE H. PARKER.

After a short period of experimental work, electric locomotive No. 1 on Aug. 4, 1895, took up the regular freight service through the Belt Line tunnel of the Baltimore & Ohio railroad in the city of Baltimore. A brief restatement of the reasons for adopting electricity in this tunnel will not be out of place.

The tunnel, which is the largest "soft dirt" tunnel ever built, extends from the present Camden passenger station of the Baltimore & Ohio railroad, a distance of 7350 feet north under the heart of the city. Beyond the northern portal, the Belt Line continues through a series of short tunnels and cuts for a distance of about five miles, where it joins the old main line. The main tunnel has an up grade of 0.8 p. c. going north. The heavy work that would be required of steam locomotives hauling freight trains up this grade would occasion the filling of the tunnel with so much gas and smoke as to seriously interfere with the passenger service. To show how true this is, it may be said that before the electric locomotives were put into service a few freight trains were run through the tunnel, but the result was that several men were asphyxiated, and it was therefore determined not to commence even a part of the regular freight service until the completion of the electric equipment.

The illustration (Fig. 1) gives an idea of the location of the tunnel and of what its use accomplishes. By its means a reduction of sixteen minutes in the running time of the "Blue Line" trains between New York and Washington is now made possible and it is probable that this saving will be increased later on. Moreover, all delays in winter due to ice in the river are done away with.

Shortly after locomotive No. 1 had been put into service, and had given an exhibition of its ability to haul the heaviest freight trains, it became a matter of general interest as to how much it could pull and how fast it could go. The locomotive was, therefore, given a trial at hauling several of the passenger trains at high speeds, which it did satisfactorily to all concerned. As the conditions for operating the passenger trains entirely by the electric locomotive could not, on account of track facilities, be perfected until the new Mount Royal station, at the northern portal of the tunnel, was completed, it was decided to operate them in the meanwhile by coke burning steam locomotives. The new Mount Royal station will be ready in April or before, and preparations are now being made to then operate all trains, both freight and passenger, by the electric locomotives.

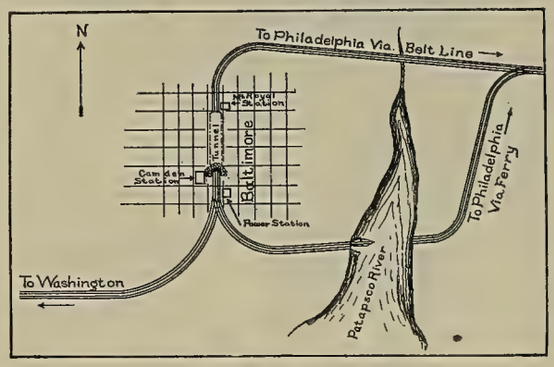



FIG. 1.—B. & O. TUNNEL.

It was shown, from the few trials made with passenger trains, that not only could the guaranteed speed of thirty miles an hour be attained, but speeds of thirty-five and forty miles, with 500-ton trains, were possible. An exhibition of high speed was made with the locomotive running light up the 0.8 p. c. grade, and a speed of sixty-one miles per hour was attained for a short time, without the slightest trouble from trolleys or motors. Several of the many exhibitions made by the locomotives in pulling heavy loads have been described in the newspapers. Probably the most striking was when two trains were coupled together and hauled through the tunnel. For some reason the freight trains had become "bunched" on the Washington division, and when they did get through they came so fast that it was decided to have the electric locomotive haul them two at a time. The first composite train, therefore, consisted of forty-four cars, loaded with coal and lumber, two regular steam freight engines and a steam "pusher" engine. The whole weight was approximately 1900 tons, and was equivalent to about fifty-two loaded cars. The steam locomotives did no work to assist the electric locomotive. The start was made easily and gradually, but when the train was in the tunnel and entirely on the grade the steady, heavy pull was too severe on a defective coupling near the head of the train, and it parted. After coupling together again, the electric locomotive started the heavy train, with all drawbars stretched—no slack in the train—and accelerated it to a speed of twelve miles an hour, without slipping a wheel, and in every way with the greatest ease. It reminded one of the start of an ocean steamship, so noiseless was it and free from any manifestations other than those of mighty power. The current recorded on the ammeter was about 2200 amperes during the acceleration period, and after the train was up to speed it settled down to about 1800 amperes. The voltage on the line was 625. By reading the amperes we were able to readily compute the drawbar pull, and found it to be about 63,000 lbs. All four motors were in series, and we were, therefore, getting the maximum pull for that current.

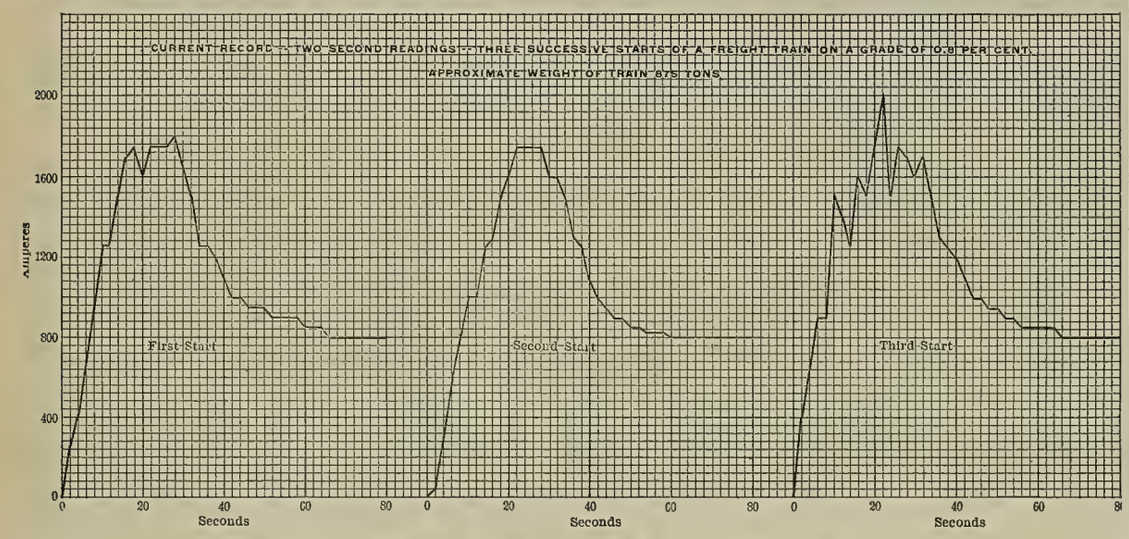



FIG. 2.—DYNAMOMETER DIAGRAM, B. & O. ELECTRIC LOCOMOTIVE.

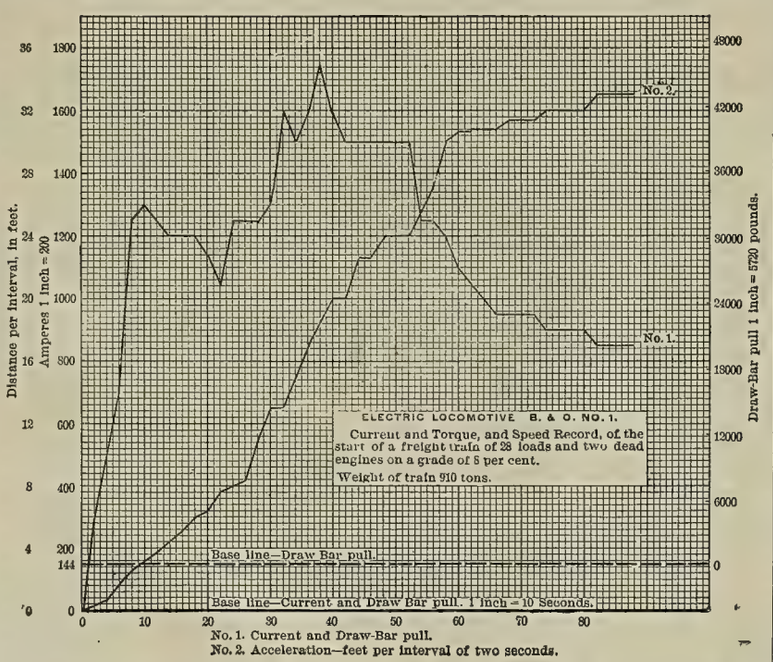



FIG. 3.—DYNAMOMETER DIAGRAM, B. & O. ELECTRIC LOCOMOTIVE.

When no drawbar pull was recorded the pen rested on base line No. 1. The height or ordinate of the irregular curve at any point represented the drawbar pull at that instant. Measuring the same in inches and subtracting a constant and then multiplying by 4000 gave the drawbar pull in pounds, i. e., every inch in height represented 4000 pounds. The paper traveled under the pen at a rate proportional to that of the train. An irregular line marked No. 2, above the base line, was the planimeter record, from which was determined the mean pull for any time. Having, then, the velocity, or the feet per minute, and the mean pounds pull per minute exerted during any period, we readily obtained the H. P. developed.

Another line on the diagram showed the chonograph record, each of the small offsets in the line occurring every five seconds. For every hundred feet the train moved the paper moved an inch. The distance in inches between any two of these offsets gave us readily the velocity of the train. Another line represented the time readings of current and voltage which were taken in the locomotive, a push-button in the locomotive being electrically connected with this recording apparatus. These readings were numbered, so it was easy to tell the current at any time and location. Still another line showed a record of the different stations in the tunnel. From this we determined the location of the train at any time.

The first test showed (*a*) how the start was made on the down grade leading to the tunnel; (*b*) how, after the train was fully started, the drawbar pull dropped off; then (*c*) how it gradually increased as the train came on to the 0.8 p. c. grade in the tunnel; and (*d*), after the train was wholly on the grade, how even the pull was, until near the stop, when the grade increases to 1.2 p. c. Mr. Dunbar, the official of the Pennsylvania Railroad Company in charge of the car, showed some diagrams of steam locomotive work under similar conditions, and it was seen that their amplitude of vibrations was considerably greater than those of the electric locomotive. This was undoubtedly due to the absence of the angle crank on the electric locomotive, and because its pull is uniform throughout the entire revolution of the armature. Most of the vibrations of the pen shown on these curves were due to vibrations of the dynamometer car, which was mounted on a single truck.

From test No. 1 we obtained the

total drawbar pull in pounds, and, knowing the weight of train, we found the drawbar pull to be 22 ± lbs. per ton of weight. Subtracting the grade pull which, in the case of an 0.8 p. c. grade, is sixteen pounds, we obtained 6 lbs. per ton as the train resistance. This confirms the usual allowances made for freight train resistance. These observations were taken in September, 1895, on a hot day. During the past winter months the train resistance has increased, due, no doubt, to greater journal friction caused by thickened lubricants, and we find it to be from our records about 20 p. c. to 30 p. c. greater than in September.

Test No. 2 was made after we had switched off six cars. The run was made under similar conditions and the same character of observations were made. The difference in drawbar pull of the two trains would naturally be the drawbar pull necessary for the six cars switched off. We had their exact weight and were thus again able to find what the drawbar pull per ton was. It was a check on our first figure and was very close to it, the slight difference we found being due to one brake on the six cars being partially set during the first run and unknown to anyone.

We had the readings of current during the first run, also during the second. The difference of these should show the current required to haul the six cars switched off. Dividing the difference in the drawbar pulls recorded in the two tests, by the difference in current recorded, gives us directly the net drawbar pull in pounds per ampere of current. This was 28.6 lbs.

It will, of course, be noted that by this method we eliminated the current required to drive the locomotive. To determine how much this was, and to check our conclusions, we divided the drawbar pull in pounds recorded in the first test by 28 6 and thus obtained the current that should exert that net drawbar pull. Subtracting this current from the current actually recorded on the locomotive would give the current required to drive the locomotive. We found it took 144 amperes. As a further check we figured similarly for the second test and obtained precisely the same, i. e., 144 amperes. So at any time now when hauling a train with the four motors in series if we take the current indicated on the amperemeter and subtract the 144 amperes needed for the locomotive, and multiply the remainder by 28.6, we have the total net drawbar pull in pounds, and if we divide this by the drawbar pull per ton we get the tons of load we are pulling.

From the results obtained above we were able to show the current and drawbar pull at any moment while accelerating a train. The curves (Figs. 2 and 3) explain themselves very fully.

The acceleration curve, Fig. 3, was obtained in a rather humorous manner. It was necessary to have a means of marking the location of the locomotive at the end of every interval of two seconds. It was first attempted to count the number of incandescent lamps passed in each interval, as they are fifteen feet apart, but it would often occur that the interval would end when the pointer was at some position between two lamps, and therefore it was impossible to estimate accurately how far we were from the next lamp. Some one suggested dropping something as a marker on the track at the expiration of each interval. That suggestion was followed by a large number of others as to the nature of that "something." The roadbed in the tunnel is very dark colored in the dim light and is rock ballasted, consequently the "something" should be light colored, non-breakable, and what would not bound out of place when dropped. Someone then suggested a handful of flour. This was adopted and it was soon tried. It was all right for slow speeds, but at sixteen feet a second it was impossible to prevent it from blowing away. Having procured a large supply of flour, perhaps twenty pounds, and wishing to make use of it somehow, someone volunteered the suggestion that flour and water made dough and that a doughball was light colored and that it would not bound, etc. It was decided at once to use doughballs and they were the markers used in determining the distances traveled in each interval, as showed on the curves in Fig. 3.

When it comes to a comparison of the economy of electric and steam locomotives, it is readily seen that it is a difficult undertaking, knowing, as we do, the figures of only a single isolated electric plant operating under special conditions and for a comparatively short time. One great incidental advantage of electric locomotives in tunnel service is that they are smokeless. This is an important moral consideration, but one which can hardly be computed in dollars and cents. But it may be of general interest to know how the actual operating expenses per engine mile of the electric locomotives during October, 1895, compare with those of a prominent and large Eastern railway for the same month.

For the operation of the Baltimore & Ohio tunnel power house for the month of October, 1895, the itemized expenses were as follows:

| | |
|---|---|
| Labor | $1,345 70 |
| Coal ($1.35 per ton) | 400 96 |
| Oil and waste | 151 26 |
| Water | 50 66 |
| Maintenance | 25 42 |
| Total | $1,974 00 |

The expense on electrical locomotives was:

| | |
|---|---|
| Motor engineers | $200 00 |
| Oil and waste | 12 16 |
| Total | $212 16 |
| Total expense | $2,186 00 |

There were hauled through the tunnel 353 trains.

| | |
|---|---|
| Average weight of train | 1,095 tons. |
| Average time of trip | 21 minutes. |
| Average current | 986 amperes. |
| Distance of trip | 4 miles. |
| Total engine travel | 1,412 miles. |
| Total engine travel—"idle" | 3,756 miles. |
| Actual time consumed for above service | 118 hours. |
| Idle time for month | 626 hours. |

It is customary to consider an engine with steam up as equivalent to six engine miles for each hour it is idle, so that, for comparison, the actual mileage made by the engines must be increased 6×626=3756 miles.

The large charge of labor at power house will be the same for one, two or three locomotives in service. The items, coal, water and maintenance, and the expense on locomotives, increase with the number of locomotives in service. If we assume this increase to be proportional, the total expense and cost per engine mile are as follows:

| | Total cost. | Engine miles. | Cost per engine mile. |
|---|---|---|---|
| For 1 locomotive | $2,186 16 | 5,168 | $0.424 |
| For 2 locomotives | 2,875 36 | 10,336 | 278 |
| For 3 locomotives | 3,564 56 | 15,504 | .23 |

The steam railway records referred to above are for October, 1895, and may be briefly abstracted as follows:

STEAM LOCOMOTIVE PERFORMANCE.

| | East Div. | West Div. | Central Div. | N. & W. Line. | Entire. |
|---|---|---|---|---|---|
| Locomotives in service. | 74 | 57 | 33 | 28 | 192 |
| Average engine mileage in service | 2834 | 2966 | 2293 | 2305 | 2703 |
| Average cost per engine mile— | | | | | |
| Passenger engines | 1926 | .1666 | .1629 | .1552 | 1765 |
| Freight engines | .2472 | 2656 | 3428 | 2303 | 2615 |
| Switching engines | .1489 | .1650 | .1828 | .1425 | .1577 |
| Work engines | .2391 | 2258 | .2617 | .2169 | .2354 |
| Total engines | .2084 | .2193 | .2121 | .1797 | .2005 |

From the figures given above it is seen that the actual operating expenses of the electric locomotives for that particular month are about the same as for the freight locomotives on the steam railroad, i. e., 23 cents per engine mile. The service of the electric locomotives at that time was only about one-third that which it is expected they will have to do when the passenger service is taken up and the line extended the full distance.

As originally intended, a method of using to advantage the power of the station while the electric locomotives are idle is soon to be incorporated in the plant. Under the new conditions the cost per engine mile for the electric locomotives will be far under that of steam.

A comparison of the efficiencies of steam and electric locomotives shows slightly in favor of the electric. Observations made on French railways and on the Pennsylvania Railroad show that about 45 to 55 per cent only of the I. H. P. of steam locomotives is applied to hauling trains. The efficiency of the Baltimore and Ohio plant is in the vicinity of 60 to 65 per cent under normal conditions.

A word may be added as to our experience with the overhead conductor system. The conductor in the tunnel has now been in position for nine months. During all of this time coke-burning locomotives have been used for passenger service, with the consequent presence of a good deal of gas and vapor. For the first six months about half of the conductor was constantly wet from the drip due to leaks in the masonry. This occasioned a muddy, slimy deposit over the insulators and a considerable portion of the conductor. The porcelain insulators are almost entirely obscured in some places by this deposit and that of small particles of carbon given off by the locomotives.

Current was first turned on the line about three months after the tunnel structure was erected. The leak to earth was at first twenty-one amperes, but, in a day or two, this dropped to about four amperes—the present leakage. The inside of the conductor was coated with a combined deposit of rust and muddy sediment. Heavy currents were taken from it by the contact shoe only with difficulty and the presence of much arcing, heating and showers of sparks. It was found impracticable to run on this surface. By application of kerosene and frequent scraping with special shoes, a direct contact of the trolley shoe with the conductor was made possible. Although a single contact shoe then worked with little or no sparking, two shoes in tandem were adopted. Their operation through the conductor is smoother, and the contact over muddy portions of it is more nearly positive. At intervals of about three weeks the conductor is treated with kerosene, and brushing shoes are run through it, about one or two trips with these brushing shoes being all that is necessary. This serves to prevent the further accumulation of rust and to remove the sediment from the contact surfaces. An inspection shows a smooth surface over which the shoes run. Contact with the metal is seen to be in high spots and thin lines which are slowly increasing in extent.

No considerable sparking now occurs, except at the wet places, where it is occasioned by the presence of water and sediment. With the exception of three places, about 200 ft. long each, the conductor is at present dry.

The bolts to the arch of the tunnel are both galvanized and painted. They show no signs of rusting. The painting has, in general, protected the surfaces of the conductor and channels. The sides and top of the inside of the conductor are coated with rust. Most of this is hard and close grained, some of it, however, flaky. In no case is there apparent a reduction of thickness of any of the ironwork, due to rusting. Outside the tunnels the conductor is in uniformly good condition. It adapts itself to changes of temperature without trouble. The inside of the conductor is coated with rust, but in no case has there been any trouble from it. The deposit appears to be very light. There was at no time any sparking between contact shoes and conductor outside of the tunnel.

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A HOPE of Tesla and other electricians is that induction lighting may be made more economical than the incandescent lamp. Improvement in this direction has been sought by Mr. D. McFarland Moore of Newark, N. J., through a sharper and more rapid breaking of an ordinary electric current, and by using a mechanical circuit-breaker in a vacuum tube, placed with an induction coil in a direct current incandescent lighting circuit at 110 volts, he has obtained a brilliant white light in long vacuum tubes without expensive apparatus. The ends of the tubes, which are without electrodes, are coated with aluminum powder. The tubes are normally joined in the circuit by wires outside, but even this is not necessary, as they may be illuminated by being brought near a wire netting in the circuit.

## Scientific Progress.

AN account of what is in many respects the most interesting stellar system yet investigated, supplying a problem in physical astronomy in some respects not inferior to that arising from the action of Neptune upon Uranus, is given in *Popular Astronomy* for March. F 70 Ophinchi is an easily visible equatorial star, hitherto supposed to consist of two components, of the fourth and sixth magnitudes respectively. The apparent orbit is a narrow ellipse, of such size that the two stars can almost always be readily separated by small telescopes. Since 1825 astronomers have been constantly watching this system, so that more observations of it have been recorded than of any other double star in the northern heavens, while it has thus far had more orbits computed than any other. The irregularity of motion has been noticed from the first, and Madler, from measures between 1779 and 1841, even concluded that the law of gravity did not hold good in this system. The last of the computed orbits, based on over 400 observations, was published in 1893 by Prof. Wm. Schur, of Gottingen. This should have proven fairly accurate for many years, but the computed positions have rapidly deviated until an error of nearly five degrees has been noticed; and careful investigation by Prof. I. J. See, of the University of Chicago, shows a regular variation through a series of years in the actual orbit. This can only be explained by the existence of a dark body in the system. The period of the dark body appears to be about thirty-six years, the dimensions of the large orbit being probably midway between those of Neptune and Uranus, and the combined mass of the three bodies being about one and six-tenths that of our sun. Thus the system is a magnificent one.

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IN the ray lamp of Prof. Woodward of Harvard University, an aluminum cone, with sides one-tenth of an inch thick, is closed at the bottom by a tube and stopcock to permit of the exhaustion of the air, the cone being held to both plate and tube by metallic hoops, and made air-tight by plaster of Paris. The cone is strengthened by a wooden disc on the inside about half way to the top. The cathode pole passes through the glass base a little to one side of its center, and terminates in a platinum disc in a position parallel to the nearest point of the cone. The anode pole is directly connected to the metallic side of the cone at the top. This lamp has been claimed as the first important addition to Roentgen's work, and, by producing radiographs almost instantaneously with induced currents of 25,000 or 30,000 volts, has demonstrated that the Roentgen rays are greatly weakened by passing through the glass of the ordinary vacuum tube. In France, where the greatest enthusiasm has been aroused, G. Moreau dispenses with the vacuum tube altogether by using the brush discharge of an induction coil. A curious result noticed is that no effect is obtained when the box containing the sensitive plate is placed horizontally to the brush, while if placed parallel to the brush, excellent negatives are produced.

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THE first experiments of Herr Otto Lilienthal in flying were made with a single cloth-covered, wing-shaped framework, which, after a run from the top of a hill, supported him in the air for perhaps a quarter of a mile as he gently slid down the slope. He has since made it easier to keep his equilibrium by using two smaller frameworks, placed one above the other. This apparatus can be kept in position in a wind of twenty miles an hour, and

with a total wing surface of eighteen square meters he has sailed in a nearly horizontal direction against a wind of fifteen miles or more without the run at the start, even being lifted by the stronger winds higher than the starting point, and sometimes coming to a standstill in the air. Such experiences convince him of the possibility of sailing in a circle. As the apparatus would shoot rapidly toward the ground on coming into the wind, it must have sufficient height to complete the turn before landing, and the flapping of small wings may help to gain this.

SOME of the results of the French magnetic survey of the world have been already communicated to headquarters, and these indicate that the complete magnetic map will be a work of great importance. In Iceland two complete observations of variations were obtained, each with a duration of eight days. The seven observing expeditions sent to different parts of the globe will continue in the field about two years longer, making nearly simultaneous observations with the finest instruments.

A PAPER has been communicated to the Royal Society by Lord Kelvin, in which the close relation between an emission of light waves and an emission of longitudinal ether-waves is very clearly indicated. It is believed that every generator of common Hertzian waves also generates the new waves in planes at right angles to the former. This idea has an important bearing upon various photographic results stated to have been obtained without the use of a Crookes' tube.

IN the exploration of the Himalaya mountains in the Nanga Parbat region, which was made last summer, a height of 20,000 feet was attained by the exploring party. The tents used were made of silk. They weighed but sixteen ounces apiece, and formed warm and comfortable shelters with but the minimum of weight to carry.

## Mechanical Progress.

IN Marseilles, France, a railroad has recently been completed which possesses an original feature, viz: Its motive power consists of steam locomotives without fire boxes. This peculiar engine was adopted in order to effect the passage of a tunnel, half a mile long, without development of smoke. The locomotive consists of a cylindrical boiler, which is filled with hot water under a maximum pressure of 227.5 pounds per square inch. At the end of the line the pressure decreases to 43 to 70 pounds. The water is then heated again to 203°, corresponding to a pressure of 227.5 pounds, by means of steam produced by the generators at the central station. The boiler is 10 feet long, 3 8 feet in diameter, and holds, besides 550 gallons of water, 21 cubic feet of steam. The steam from the generators is uniformly distributed through the water by suitably arranged pipes. After having been used in the cylinders, the steam is condensed in a condenser consisting of 1154 pipes, provided over the boiler.—Chem.-Tech. Zeitung.

A NEW safety cartridge, in which quicklime and dynamite are so arranged that the lime in slacking heats a primer sufficiently to fire off the detonator embedded in the dynamite, is being used in the colleries at Polish Ostrau, in Austria. The compound cartridge is enclosed in a bag of loose cotton, woven like a wick. The flame is confined to the interior of the cartridge, and even in a gallery containing seven per cent of fire-damp and clouds of coal dust neither gas nor dust was fired.

ALUMINUM has been successfully electroplated with copper by Mr. Charles Margot of Geneva. The aluminum is first cleaned with an alkaline carbonate, washed in water. It is then dipped in a weak and slight acid copper sulphate solution to give a preliminary deposit of copper, and, after thorough washing, is placed in an electrolytic bath until the coating is sufficiently thick.

TRIAL has recently been made in building operations of a mechanical device known as Pease's tubular construction. It is based upon the simple fact that three tubes, each having an open slit along one side, may be interlocked. Of course the number of tubes that can thus be connected is indefinite. By adding a sufficient number on each side of the three, for instance, a flat expanse like a roof would be formed. In fact, this construction has been used for the roofs, walls and floorings of corrugated iron. Sometimes to obtain greater rigidity the tubes, after being interlocked are filled with concrete. No bolts or rivets are needed. By making the tubes of different diameters, and in other ways, a great variety is introduced in the application of the principle.

THE mine surveyor, before making magnetic obsermations with delicate instruments, is recommended to carefully test his lamp. Composed of various metals the lamp in a hot condition sets up thermo-electric currents which act on the magnetic needle. In order to settle this point six mine surveyor's safety lamps, free from iron, were first placed, one at a time, first in a cold condition, and then heated at the pole of a sensitive magnetometer. Two of the instruments had no action on the needle when cold, but all acted on it when hot. The deviations observed amounted to from 30 to 160 seconds. A new benzine lamp caused a deviation of as much as five minutes. The deviation increased with the temperature of the lamp.

A DEFINITE official statement of the cost of that great engineering work, the Kiel canal, shows the reaching point to have been some $39,000,000. It is about sixty-one miles long, 20 feet deep at dead low water, and 229 feet wide, in numerous places the width increasing to some 428 feet, to allow the largest vessels to pass each other, and work will be continued until vessels of any depth can pass at low water. The embankment is stone-lined to a depth of 6 feet below the water, and the locks at the North sea end of the canal are said to be the largest in the world, with the exception of that at Bremerhaven. Two bridges span it at a height of 137 feet above the water, and there are also six opening bridges and sixteen ferries.

AT the London Imperial Institute recently Col. J. Harris delivered a lecture on "The New British Trade Route to the Pacific." He traced the new route on a map from Liverpool to Churchill harbor (Hudson's bay), and thence to Sea falls and Albert park, joining the Canadian Pacific Railway at Calgary. The distance from port Churchill to Calgary is about 1000 miles, and a saving of 1328 miles over the present route from Liverpool to San Francisco and Vancouver would thus be effected, or, in other words, three days would be saved in going to India, China, Japan and the Pacific colonies. The London *Times* says "the necessity for the new railway was insisted upon as a vital and imperial question."

The London *Pall Mall Gazette* says: "Horseless carriages have run into the market at last. The Daimler Motor Company (limited) has been formed to carry on the manufacture and sale in this country of the Daimler motor, used for carriages, launches, stationary engines, light locomotives, and the like. The capital is £100,000, in 10,000 £10 shares, all now offered for subscription, and of which 6000 are to be allotted for the provision of money for working purposes. The price of the right to use all or any of the Daimler patents here, together with the benefits of further improvements, is 4000 shares, or cash in lieu thereof, and the option of subscribing at par for any unallotted shares of this issue."


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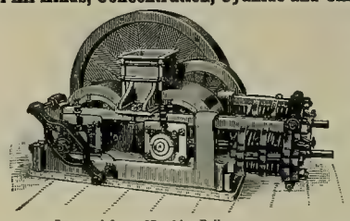
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# Practical Information.

### Incrustation in Gas Engine Jackets.

It is not often that trouble is experienced in gas engines owing to incrustation by lime deposits from the jacket-cooling water, but a case is reported where, in two engines, one of 25 and one of 50-H P., after having been in operation for about a year, different parts, notably the exhaust valves, were frequently found to be very much overheated, the circulation of the cooling water through the cylinder jackets was impeded, and there were often premature explosions of the gas and air charges in the cylinders. On taking the engines apart, it was found that portions of the water pipes leading to and from the jackets, and even in the interior of the jackets themselves, were almost completely choked up with a scaly deposit formed by the precipitation by heat of salts dissolved in the water, the action being in all respects similar to that going on in a feed water heater. Since, however, as shown by thermometric measurements, the cooling water, in flowing through the jackets while the engines were working, never reached the temperature at which lime salts are known to separate from the water which holds them in solution, it became evident that the precipitation must have occurred during the periods just after the engines stopped working.

An unusual case of metallic precipitation is cited in the *Bulletin, Soc. Chim.*, which states that when bright lead is immersed in a solution of lead nitrate containing from ten to four hundred grammes per litre, and protected from access of air, metallic lead is gradually precipitated on it in well-defined crystals, just as on iron or zinc. A certain amount of lead nitrate is produced at the same time, and in weaker solutions forms the exclusive product, being deposited in yellow crystals in place of those of the metal. The lead crystals form plates from one to four mm. in diameter, and are chemically pure, but they rapidly oxidize in air to the hydroxide, so that a crystallographic examination is impracticable. When kept undisturbed in the original liquid, the metallic crystals are gradually converted in a basic nitrate, which crystallizes in large, white tufts of silky needles as much as two cm. in length. The precipitation of the lead is not due to local electrolytic action set up by metallic impurities, for precisely the same result is obtained with pure lead made by reducing, by means of sugar charcoal, litharge prepared from the pure nitrate; moreover, the precipitation does not occur in solutions of lead acetate, as would be the case if it were due to this cause.

Strictly speaking, there is no such a thing as the H. P. of a boiler; but as a boiler is needed to drive a steam engine, the measure applied to the engine has come to be applied also to the boiler. A boiler turns one cubic foot of water to steam in one hour for each H. P.; that is, a ten H. P. boiler turns 62½ gallons, or 625 pounds, of water to steam in an hour. If the boiler is a cylinder or flue boiler, multiply its length in feet by its diameter in feet and divide the product by six. The quotient will be the nominal H. P. To find the nominal H. P. of an engine (not of a boiler), multiply the square of the diameter of the cylinder by 0.7854; multiply this product by the speed of the piston per minute (which is twice the stroke times the number of revolutions per minute), and divide this final product by 33,000; the quotient is the H. P.

Human life is in danger at an elevation of 25,000 feet, and at a considerable lower altitude bodily exertion becomes almost impossible. Birds, on the other hand, rise to an elevation of 35,000 or 40,000 feet, and at such heights sustain great muscular exertions for an indefinite period. In that respect, as in the matter of flight itself, they have a manifest advantage over the best of us.

A new way to mine sulphur is now being used, which lessens the cost of mining very materially and brings up the valuable mineral in a state which renders its reduction into a commercial product much easier. Work is commenced by sinking a well, about 12 inches wide, down to the layer of sulphur; a steel tube 10 inches wide is lowered as the work progresses, and when the yellow mineral is reached a second tube only 6½ inches in diameter is lowered within the larger one. Hot water is then forced down into the annular space between the two tubes, and the temperature of the water is kept up to at least 235° Fahr. At this temperature sulphur will be liquefied, and thus be pumped up at the rate of five tons of the mineral per hour.

A ship's rate is found by a line about 900 feet long, on a reel having one end fastened to a thin sector-shaped piece of wood called a log. The arc of the log is loaded to make it stay vertical when tossed into the sea. It then remains in the same place (is supposed to) in the water while the line is unwinding from the reel. The line is divided into equal parts of fifty feet each, called knots or 1-120th of a nautical mile. Since a half-minute has the same ratio to an hour that a knot has to a nautical mile, the ship runs at the rate of as many nautical miles an hour as it runs knots in half a minute. If, say nineteen knots pass in half a minute, the vessel is then running at the rate of nineteen miles an hour.

In some respects the famous Brooklyn bridge is the most stupendous existing work of human ingenuity and industry. It is 5989 feet long and 135 feet above the water. The piers are 278 feet above high tide. It required thirteen years for erection, being begun in 1870 and finished in 1883, at a cost of $15,000,000. The central span is 1595 feet and 135 feet above high water. There are four suspension cables, each composed of 5296 galvanized steel wires bound together, but not twisted. Its width is 85 feet. Its architect was John A. Roebling, and it was built by his son, W. A. Roebling.

The ancient idea that we owe our digestion chiefly to the stomach is being discarded, Kœning having shown that this organ may be completely removed from the living animal. Other German physiologists suggest that the proper function of the stomach is to render harmless all substances injurious to the bowels, the real digestive organs.

Plans for the construction of an electric plant, by which the Susquehanna river will be used to furnish electric power to towns in Maryland and along the Susquehanna river in Pennsylvania, also points in Delaware, have been completed by the hydraulic engineer who has charge of the construction of the Niagara electric plant.

The greatest depth, writes Prof. Seeley in his "Story of the Earth," at which earthquakes are known to originate is about thirty miles. It has also been calculated that a heat sufficient to melt granite might occur at about the same depth.


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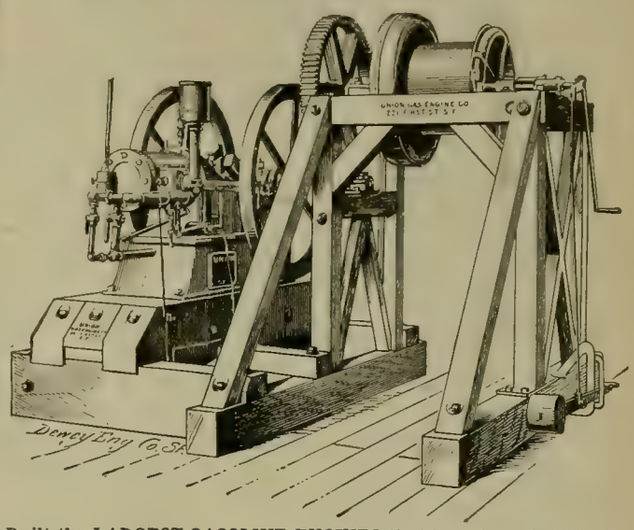
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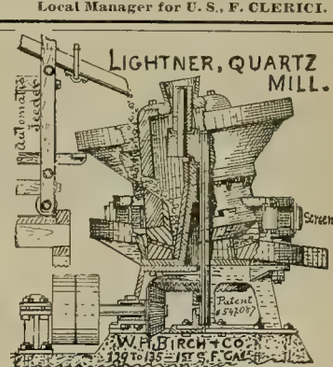
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# Mining Summary.

## CALIFORNIA.

### Amador.

LINTON — *Ledger*: Mr. Elmore has purchased the Linton mine in Volcano district from Congressman Caminetti.

The Iron Mass mine which is under the superintendency and management of A. B. McLaughlin, has completed a crushing of ore. They are now drifting on the ledge preparatory to taking out another crushing.

Emerson and Grainger have commenced leaching the old dump at the Cosumnes Copper mine near Forest Home. The dump consists of thousands of tons of ore which have been on the surface over thirty years, and on account of oxidation yields up copper readily with slight chemical treatment, although a large portion of it is still in the form of pyrites. There will be no attempt to go into the mine, operations being confined to the ore which was not smelted when the mine was operated in early days.

The directors of the Jackson Gold Fields have considered the reports of James E. Dye, manager of the property, relative to sinking the shaft at the Amador Queen at least 500 feet deeper, which recommendation was reinforced by reports from superintendents John Ross of the Wildman and Mahoney and J. F. Parks of the Kennedy. The work of sinking was resumed Thursday, the 12th inst.

### Butte.

The pump is running in the Catskill mine at Forbestown. Taking out ore will begin this week.

J. Hendley of Morris Ravine located the claim he is now working in Morris Ravine forty-two years ago and has worked it ever since. His claim has enabled him to pay assessments on numerous other claims that never yielded him a cent. When in want of money for any purpose he goes to work and digs it out. It is a bank that has always honored his drafts, and still continues to do so.

### Calaveras.

The Angels papers give accounts of the alleged sale of the Pure Quill mine to Messrs. St. Clair and Worsley for $100,000, but Harry Rutledge, superintendent and part owner, says they are two bunko men who represented to him that they had just purchased a mine in Colorado for $40,000, offered to buy the Pure Quill, the offer was accepted and the papers drawn up; they and he went to Stockton to meet a man who, they said, would come from San Jose with $12,000, the first installment of the purchase price. The two men borrowed money from Rutledge, who also paid their expenses during their stay at Angels. In the night the men decamped, taking the papers and specimens of ore, and without paying what they had borrowed.

MINING NEWS.—The Calaveras Consolidated group near Robinson's Ferry has been sold by E. K. Stevenot to a company represented by B. M. Newcomb of the Napa Quicksilver Company of Oat Hill, Napa county. Mr. Newcomb, as acting superintendent, will drive the old tunnel in to its full length. Mr. Preston describes the tunnel as placed fifty feet above the river in the footwall slate, and would cut the vein several hundred feet below the collar of the old working shaft. The course of the tunnel, 1400 feet long, was with the formation, north 65° west. The mouth was finished in masonry and timbered for some distance with the elliptical tunnel section, but farther in the width was contracted and given the ordinary tunnel timber sets. The tunnel will be run in at least 3000 or 4000 feet.

The Carley mine, near Altaville, has been taken by a company, of which C. A. Hooper & Co. of San Francisco form the leading spirits. The attachments have been cleared and the company will go down 400 or 500 feet before drifting.

*Echo:* Recently in the Ghost mine ore was struck at a considerable depth which assays over $80 a ton. The mine is under the management of Mr. Drake.

*Chronicle*: The mill at the Moser mine has been shut down, pending the addition of twelve more stamps, making twenty in all. The building of the new mill has commenced.

At the Gwin mine connection has been made with the old works by means of the drilling process, and a very small flow of water was encountered. At present it will not exceed 10,000 gallons per day, which amount can be easily handled, and the work of sinking has been commenced. The last 20 feet of the drilling was through quartz of a good quality, containing a large percentage of sulphurets.

Work on the Hexter mine tunnel is being pushed. The tunnel is 7 feet 5 inches wide and 6 feet 4 inches high, and will be large enough to run a double track. It is claimed for the Hexter that it will open up a mile or more of a gravel channel in addition to the quartz developments, workings from which in the early days and in a primitive manner showed the ledge to be gold-bearing. The developments are being made under the superintendency of Col. W. T. Robinson, one of the owners.

Part of the Emerson ranch, in Happy valley, about a mile from Mokelumne Hill, has been sold. The purchasers are San Francisco capitalists in conjunction with W. T. Robinson. The Emerson ranch is known to contain mineral in large quantities, and an extension of the Moser mine passes through it. Development work will be started in a short time.

Supt. Eaton of the Blair mine informs the *Voice* that work will start the first of April. The company intends putting up a fifty-stamp mill this summer, and is considering the feasibility of using the water power from the Stanislaus by means of electricity. A new shaft will be put in, and sinking will be continued until a depth of 1000 feet is reached.

At the Eureka mine of Drake & Tryon the shaft is now down 180 feet. It has passed the green rock and is now in vein matter, which prospects well and promises better. The shaft will be put down 800 feet. At 200 a compressor will be put in and the sinking continued with Burleighs.

The Turner mine has been rechristened the Indiana, after the battleship of that name. A company has opened it up and will push operations this summer.

J. F. Henry has agreed with H. Craig to bond the Soap Root mine in West Point district for one year from March 1, 1896, for $6000, with the option of purchase at the end of that time; to enter upon, explore the mine, extract and reduce ten tons of ore; if the money is not paid at the expiration of the year, all the property and improvements to revert to the original owner, Henry.

At the Machu mine sinking the shaft and drift and building the hoisting works progresses. Part of the machinery has been placed in position. There are thirty men employed. The mine is worked by the Godbe Co. J. M. Martin of Angels Camp is foreman.

### El Dorado.

(Special Correspondence).—Seymour & Staver are making good headway in their prospecting and development work just above the Big Canyon mine.

Work on the Pocahontas is progressing very satisfactorily. This is an old time property of a romantically rich gold productive history. Water will soon be out of the shafts and then depth will be sought.

A. Harpending has become interested in the old Springfield, and contemplates starting work on the plant at once.

At the Big Canyon mining camp a new school district has been mapped out, and the pedagogue will soon teach the thirty-five urchins in the school house now building.

John Darrow's five-stamp mill, one-half mile below Big Canyon, is hammering out gold day and night. The ore is free milling and averages $4 per ton. The ore body is from 3 to 20 feet.

J. C. Murphy, in the Kelsey district, occasionally does some ground sluicing to uncover a 4-foot ledge. Last week he found a nugget on his sluice fork that carried one-half ounce of quartz, and the nugget weighs fifty-five ounces. Your correspondent had the pleasure of seeing the chunk. This gold yields Mr. Murphy, at the Mint, $18.25 per ounce. This property is in close proximity to the Lady Emma mine.

Placerville, March 18, '96.

### Inyo.

At the Hirsch mine, near Independence, now owned by the Reward Mining Company, the new ten-stamp mill is at work. Supt. Rives states that it crushes twenty tons in twenty-four hours. The ore is brought from the mine by buckets suspended from an endless wire cable. These are attached one hundred feet apart, and hold about one hundred and thirty pounds of ore each. They are arranged with hinge bottoms, and a trip over the ore bin at the mill releases the catch so that the ore drops and the bottom goes back to place as soon as the ore is out. From the bin the ore is shoveled into a rock crusher and passes down to the self-feeders. The slums pass over two six-foot concentrators. Supt. Rives has eighteen men working in the mine, and four at the mill—two on each shift.

### Mariposa.

*Gazette*: At the Dorse mine in the Hornitos district, E. Steuart, the owner, is sinking. Mr. Sullivan, the superintendent, has a dozen men at work.

At the Tyro mine the mill is at present shut down. There are six men at work. Under the present system ore cannot be taken out fast enough to keep the mill running.

At Hite's Cove about 20 men are drifting and cross-cutting. In the west drift things are looking well and the pay ore is coming in.

A Coulterville dispatch of the 18th says that the published report that the Merced Gold Mining Company has closed down is false. The men in one of the three shifts were laid off on the 7th on account of having finished development work. The ore in that shaft is all blocked out ready to be taken out for milling. The mill is running full handed, and steam is up in all their mines.

It is claimed in Coulterville that the cause of the partial suspension of work in the Merced Gold Mining Co.'s mine is connected with the Butte & Boston Co.'s affairs at Butte, Mont., some of whose members are interested in the Coulterville mine. The mine is being kept pumped out and some men are at work while the mill is being run, and no doubt the works will be running again with a full force as soon as the present legal complications are straightened out. Thos. Couch, who has been directing operations in Coulterville, has just been appointed one of the receivers of the attached Montana corporation.

### Nevada.

St. Louis, Mo., men have bought the Texas mine, Willow Valley district. New machinery will be bought and the property developed. J. T. Smith of this city will have charge.

*Telegraph*: The Central has struck a 2-foot ledge, rich in gold. The Central is the old Green Horn mine, and no rock ever came out of it but what paid at least $20 per ton, and fully $200,000 has been taken from the ledge. Charles Duval is now working on the Central, and has to show for his labors one of the best prospects that he has seen after thirty years in the business.

*Herald*: F. Golden has formed another company to take the Chapman Ranch mine; they are prospecting the Chapman Ranch through the Nevada City. A drift has been run from the 450 level of the Nevada City, and is now within 70 feet of the Chapman Ranch ground, which adjoins the Nevada City on the west. Mr. Golden and J. T. McCall still have an option on the Nevada City, and thereby effected an arrangement to develop the Chapman Ranch through his mine.

### Placer.

A nugget, valued at $160, was lately discovered at Iowa Hill by John Watts.

### Plumas.

At La Porte the Dutch Company have replaced their dam, which went out during the recent heavy rainstorm, and the same has been accepted by the Debris Commission. Work at this mine is now in progress.

### Riverside.

R. P. Winters of Perris has been appointed assignee of the Santa Rosa Gold M. Co.

### San Bernardino.

An *Examiner* dispatch says: A five-stamp mill belonging to the Virginia Dale Mining Company at their property on the desert has been "sanded" out of sight and abandoned. The Virginia Dale is about 120 miles east of San Bernardino, and its output has been worked in the five-stamp mill of the company which has been located in a depression, probably in the dry bed of what was formerly a lake. Recently one of the sandstorms for which the desert is famous visited the locality, and when the storm ceased blowing the mill had been completely buried in the sand. To dig it out and clear away sufficient space to permit of its being again operated or to raise it to the new level, was considered to involve an outlay of more than the value of the mill. It was therefore determined to abandon it and a new ten-stamp mill has been ordered.

### San Diego.

AT JULIAN.—At the Owens mine men are at work on the 250, 300 and 350-levels, the objective point being the Owens ledge.

*Sun*: A large number of quit claim and warranty deeds, contracts and mining locations arrived at the county recorder's office this morning from Yuma. They all refer to the recent heavy transactions of ex-Senator Stephen W. Dorsey, of Denver, Colo., and Frank S. Ketchum of the same place, who has given Dorsey complete power of attorney to attend to his business for him. Senator Dorsey has acquired by purchase, trade, locations, etc., nearly 100 mines and claims of more or less value in the Old Picacho district about thirty miles north of Yuma on the Colorado river. Among the more important of these are the Golden Casket, the Golden Horn, the north Belt and the Eastern California. The prices paid run from $1 to $5000 per claim. R. C. Cotton of Los Angeles has also bought a lot of claims of S. D. Northcutt of the same place, also in the same district, for $5000.

### Shasta.

*Free Press:* Three miles west of Kennet, in Back Bone mining district, Saeltzer, Wallace and Graves recently relocated some mining property and bonded it to County Treasurer Jackson for $25,000. Last week ore was struck that will go 20 per cent copper and yield considerable silver. Directly across the ledge an old shaft had been sunk into the sulphuret ore 120 feet. The owners have locations on 4500 feet of the lode and believe they have a bonanza.

Dr. Mitchell has bonded the West End mine at Stella to the Northern California Development Co. of Oakland.

The report published regarding the compromise and sale of the Windy Camp properties is denied.

### Sierra.

*Enterprise:* The Gold Star Mining Co. struck a pocket of gold while sinking on its incline this week.

Thirty-five men are working at the Bald Mountain Extension drift mine; the gold output continues good.

### Siskiyou.

The *Journal* thinks that the mines owned and operated by Billups, Quigley & Humphrey, on Barkhouse creek, Klamath river, will prove to be the biggest bonanza in the mining industry that Siskiyou has experienced for a number of years. There are seven different ledges leading into one large ledge, and the ore prospects from $6.50 to $40 a ton. They have bought a ten-stamp mill. They have been realizing $100 a day from rock crushed in their arrastra.

A five-stamp mill has been bought for the Nebraska mine, on Cherry creek, which is at present worked under a lease by Means & Mahan, who have about eighty tons of rock out now, and by the time the mill is erected, they expect to have 300 tons ready for crushing. This ledge is eighteen inches to three feet in width, and the parties who worked it last year crushed 200 tons of rock, which went from $10 to $20 to the ton.

The Eastlick Bros.' mines at Oro Fino employ sixteen men. They expect to have a prosperous season, as their water supply will last until late, as there is plenty of snow in the high mountains. It takes between 4000 and 5000 inches of water to operate these mines.

The Blue Gravel mine, at Greenhorn, is in constant operation, and the cleanup will no doubt be excellent this season. There has been a plentiful supply of water to operate the mines ever since the January storms. Two shifts are kept employed to accomplish all the work possible as long as the water holds out.

Down at Oak Bar and Hamburg Bar, above and below the mouth of Scott river, active preparations have been inaugurated towards wingdamming and mining the river bed on an extensive scale, as the stream is very low this year, to insure successful working. The snow is nearly all off the Siskiyou range, so that there can be no danger of high water and heavy freshets to interfere with putting in dams and current wheels. The creeks, however, are getting very dry, making the creek and bar mining season shorter than usual.

*Union:* Prospecting and mining, on a comparatively small scale, are being continuously carried on in the close neighborhood of Yreka and also all through the mining districts of Siskiyou. Here in Yreka, almost every morning, one can see one or more starting out at an early hour equipped for a dig or a hunt; and if one strikes something seemingly good, he is not apt to advertise it in the papers until he has thoroughly investigated it, and not then, unless he wants to sell.

### Trinity.

MINING NOTES.—*Journal:* Pierce Asbill has been prospecting and locating mines in the Minersville district. Fortuna citizens interested with him propose to organize a stock company and issue non-assessable stock.

The Enterprise Company is taking out ore, preparatory to crushing, from the Lone Jack and Enterprise locations. The Yellowstone has been opened up in good shape and looks well. A force of men has been put to work on the Golden Chest.

### Tuolumne.

Two years ago Messrs. Scott, Dowe and Campbell, gave San Francisco parties an option on the Black Oak group of five mines for $100,000, which subsequently was forfeited and the owners continued development work themselves. The same property is now reported sold to Eastern men for $300,000.

TUOLUMNE COUNTY MINING NEWS.—*Independent:* On Saturday last another pocket was taken out of the quartz mine belonging to Messrs. Birney, Wainright and Monroe, at Railroad Gulch, near Bald Mountain. The pocket is estimated to be about $3,000, and there is plenty of gold in sight. Gold has been taken out steadily since the large pocket was found several weeks ago. Mr. Monroe showed us a piece of rock for which he said he had been offered $500. The quartz is rather dark in color and is thickly sprinkled with yellow metal.

An unusually rich body of ore was struck last week in the famous Rappahannock mine, owned by Richard Chute. The bonanza was encountered in the 100 and 350-foot levels, and is a surprise, even for that famous mineral belt—the mother lode.

The Rawhide mine is opening out as large as ever on the 900 level. The App mine is showing every indication of being another Rawhide at the depth now attained.

### Yuba.

AN INJUNCTION SUIT.—*Democrat*: In the injunction suit entitled The County of Yuba vs. J. F. Cowdery, et al, Attorneys Forbes and Dinsmore yesterday filed the answer of J. F. Cowdery, J. T. Donohue and T. Hayes, also a notice of motion that on Monday, March 23d, at the hour of 10 o'clock, they will move the court to dissolve the preliminary injuction and to dismiss the action.

The defendant, Cowdery, while admitting that he has an interest in the mines at Grass Flat, Howland Flat and Sacketts' Gulch, Sierra county, claims that they have been working by the ground-sluicing process, drifting process or quartz-crushing process, and denies that they have been working by the hydraulic process since July, 1894. He states that he was never served with a process and was obliged to pay $5.50 to the plaintiff, Yuba county for a copy of its own complaint, so that he could move to dissolve the unserved injunction before irreparable injury was done.

He also denies that they have been working a mine at St. Louis by the hyraulic process, and discharge tailings into Slate Creek. He claims that the injunction was issued to prevent them discharging debris into the Yuba river without any distinction being made between hydraulic and other mining.

The defendant prays that the injunction in the matter may be ex-parte dissolved so far as it relates to other mining than hydraulic and that as to hydraulic mining the action may be at the trial thereof dismissed.

The attorneys moved to dismiss the action and dissolve the injunction on the grounds that the injunction was issued without any legal action being pending. That the action out of which said injunction was issued was commenced and is being prosecuted without any authority of law, and without the authorization and consent of plaintiff.

This is the first time that the latter point has been made.

The contention of the attorneys for the defendants is that Attorneys Phipps and Devlin have commenced the action in the name of Yuba county, without the consent or authority of the Board of Supervisors, and without the proper law officer of this county, the District Attorney, having anything to do with it, and that if the defendants were damaged thousands of dollars by the injunction they would have no recourse against Yuba county because it could hide behind the defense of not having authorized any suit to be commenced.

## NEVADA.

### ESMERALDA COUNTY.

At the Humphrey-Stimler mine at Silver Peak the ore assays high in gold. The lode is wide and well defined.

Teams are engaged in hauling ore from the Big Indian mine. The lessees have out between seventy and eighty tons, which they expect will mill about $80 per ton.

### LINCOLN COUNTY.

Emerson and McGowan, returned from a prospecting trip, are in Pioche with samples of copper ore, found in the southern part of the county. They propose to return with supplies to open up the property and ship ore by the Colorado river.

From the State Line and Eagle Valley district reports are that the coming summer will develop some of the richest mining claims ever discovered in southeastern Nevada and over the line in Utah.

At De Lamar the large force of men employed and the continual arrival of teams from Milford with machinery, reminds old timers of Comstock days.

The Flagstaff Mining Company has levied another assessment, made necessary by the work now in progress on its property at Ferguson district.

During the month of February 115 mining

location notices were placed on record in the County Recorder's office.

To reach De Lamar, it is necessary from Salt Lake City to go by rail to Milford, a distance of 258 miles by rail. At Milford the journey is continued by stage a distance of 100 miles to De Lamar. The stage trip occupies 48 hours and is rough traveling over a barren desert of alkali with water 40 miles apart. De Lamar has a population of 2,000. The bullion wagon goes weekly to Milford, accompanied by four guards. The water for the camp is delivered by wagon. The water rates are one cent per gallon at the spring or one and a half cents delivered. There are a great number of freight wagons running from Milford, and one and a half cents per pound is the rate for freight and it takes from 14 to 17 days to make the trip. Teamsters are charged 50 cents per barrel for water while on the road. Board is $27.50 per month; a room costs $12 per month.

*Pioche Record:* The gold tailings left at the Condor mill from the workings of the Jim Crow ore there last year have been sold by the Nesbitt Bros. to the Phœnix Reduction Company at Bullionville. They are estimated at a thousand tons and will be worked at the Bullionville mill by the cyanide process.

NYE COUNTY.

Tybo is jubilant over the discovery of rich silver and lead ore recently made by two Eureka miners in the Dimmick mine, Tybo district.

STOREY COUNTY.

*Enterprise:* The Hale & Norcross is the wettest mine on the lode, and many of its workings are in clay and soft ground, which is only held in place by careful timbering and constant attention. Once these workings are neglected for any considerable length of time they will cave and fill up beyond redemption. There is considerable low-grade ore in sight in the mine and 20,000 tons of good ore in the bins, and at present there are said to be one or two points in the mine where prospects are good. It seems a great pity in the face of these facts for the mine to be closed down indefinitely.

WHITE PINE COUNTY.

H. L. Frank is about to build a concentrator on the San Jose mine, Egan canyon.

A Eureka company has purchased the copper mines at Bald Mountain and intend to erect a smelting works at once.

## OREGON.

BAKER COUNTY.

A sale involving 571 acres of placer ground on Clarke's creek, formerly known as the Virtue & Van Schuyver gravel mines, was last week made to the Exploring Syndicate of Mines and Mining, composed of Paris and Havre (France) capitalists.

## WASHINGTON.

A Palouse report says that at Jerome, mining prospectors are arriving every day. Palousers are awaiting the vanishing of the snow to strike for the hills and secure claims. Day and night shifts are at work on the Daisy, the shaft is at a depth of 90 feet. As soon as the roads permit, a hoisting engine and stamp mill will be put on the property. A free-milling, three-foot vein has been uncovered on the Lola.

At Kettle Falls, nearly every man in town has located a claim across the river, and every rod of placer ground within ten miles of town. Many are waiting for the snow to leave the higher hills, where quartz ledges are supposed to exist.

IN THE OKANOGAN COUNTRY.—The owners of the Spokane mine, the south extension of the Triune, report a rich strike of ore, assaying high in gold. The Triune has men at work and will run the mill.

## BRITISH COLUMBIA.

The North Star Mining Company, whose mine is located thirty miles from Fort Steele, in East Kootenay, has about concluded to erect its own smelter this season, and to construct a tramway connecting the mine with steamboat navigation on the Kootenay river. The daily output of ore averages fifty tons.

The Le Roi Mining & Smelting Company has a contract with the Tacoma smelter for the delivery of 500 tons of ore.

The Minister of Mines reports that during '95 there were employed in gold mining in the province 1050 white and 979 Chinese and Japanese, besides those in Trail Creek, for which no gold returns were sent in. The output of the other districts was as follows: Cariboo, $282,400; Cassiar, $22,575; East Kootenay, $17,575; West Kootenay, $10,520; Lillooet, $40,663; Yale, $237,311; a total of $636,544 exclusive of Trail Creek. Of this all came from placers except $135,000 from the quartz mines at Fairview and Camp McKinney.

All of the ore shipments from West Kootenay are credited to Collector Johnson's office at Nelson, except that which goes out by way of Revelstoke, which is credited to the New Westminster office. The value of ore passing through Nelson during the month of February was about $300,000, and that going out by the way of Revelstoke $150,000. This makes $450,000. Mr. Johnson estimates the exports for the year at $5,000,000, basing not on what they expect, but what is actually being done, as shown by the records in his office.

The Cariboo Hydraulic Co. will increase its capitalization from $300,000 to $500,000. A new ditch, to cost $60,000, will be built.

Bowles & Raymond of Baker City, Or., have bought the Lily May at Rossland for $40,000, half ninety days, remainder six months, and will put C. H. Egbert in charge.

At Rossland the War Eagle reports that the ore body in the lower tunnel has widened out to 11 feet, and that the ore carries $80 gold and 15 per cent copper.

## ALASKA.

About the best candid statement from an old practical miner seen lately regarding matters of interest to miners in Alaska, or thinking of going there, is the following from L. N. McQuesten, who has been on the Yukon since '73, and who writes from Circle City as follows:

There has been a great change in this country since I came I was the only white man on the Upper Yukon for about ten years, and now there are about 1000 men here and three large steamboats. The business has increased from a few thousand to half a million a year. This is a great mining country. Gold is found in small quantities for 2000 miles on the river, and in several places it is very rich. The country is not one-half prospected as yet. It is very difficult to prospect, as the ground is frozen all summer, and one has to thaw out the ground with fires, which makes very slow work. This is the largest camp on the river: it was struck one year ago last June. There are 600 men wintering here, and the outlook is favorable of it being double that next year. There are about 800 men at Forty Mile. That is about 240 miles from this place. I am doing business at both places. There is another company here; they came in three years ago, but I do about three-fourths of the business. My trade is about $250,000 a year, but the profit is small, as one is compelled to give considerable credit, as it is a hard country to get out of. Any one coming to this place ought to have $300 to winter on, as he is liable not to make anything the first year.

Wages are $10 per day in the mines when you can get work. The mining season is about three months. Flour is 8 cents, bacon 35 cents, beans 12 cents, apples 25 cents, peaches 35 cents, tea $1, coffee 50 cents, butter 50 cents, ham 40 cents and all things in about the same proportion. The mines are about seventy-five miles from here, and it costs 15 cents per pound for freight to the diggings. It costs about $1 a day for living. Fresh meat is 25 cents per pound, and we have had very little this winter. Moose and carribou are the most plentiful, but there are so many men coming into the country that they are getting very scarce.

We have a theater once a week, and tickets are $1.50. There are about fifteen saloons, and there is a dance about every night. There will be a school started next week. There are fifteen white ladies here. They gave a ball to raise school funds. They made about $350 selling cakes. One cake brought $125. They had a very good time, but the funds were not enough to start the school, so the native women gave a ball and sold mittens and caps, and they received $750. Mittens sold for $20 a pair. It was a surprise to the women, as the regular price is only $2.

This place is near the Arctic circle. At this time we see the sun for one hour in the middle of the day. We have had a very pleasant fall up to two weeks ago, then it turned cold.

## UTAH.

The Bingham Electric Light and Power Co., capital $250,000, O. B. Hardy, F. K. Gillespie, R. F. Hayward, J. W. Burton, J. Moffat of Salt Lake, incorporators, proposes to furnish light and power in the West Mountain mining district. Manager Gillespie tells the *Tribune* that it means much for the low grade gold ores of that camp. For years the effort has been made to find a method for the successful treatment of that class of ore, but the cost of transportation and milling has prevented. He also says that where mines now using steam were disinclined to put in electric motors the company will do it, and operate them on a reasonable rental. Contracts have already been made with a number of the large companies, and negotiations are in progress with others. The power for the operation of the Bingham plant is to be derived through the Gillespie water right at Big Cottonwood.

The Elko & White Pine Transportation Co. has purchased the stage line running from Milford to De Lamar and Pioche, Nev., and will run out of Milford daily except Sunday.

C. M. McEntire, Sunshine, is reported to have sold the Black Horse group in Rush valley to C. L. Dignowitz of San Antonio, Texas, for $8000.

The Line district is fifteen miles north of Desert Springs and seventy miles north of Milford. On the Utah Spur lode the vein carries small stringers of ore from three to four inches wide that go as high as 2000 ounces in silver to the ton, besides carrying from $5 to $25 in gold. The ore is black sulphuret and can be easily treated. The Ophir mine shows from three to four feet of ore on the surface on the hanging wall that averages 100 to 300 ounces in silver and also gives good returns in gold.

The Bingham Mining Co. has bought all the property of the Nast Mining and Milling Co. at Bingham, Utah.

W. A. Clark has an option on the Mercur property on which he paid $100,000 this week.

## IDAHO.

Work on the Lewiston Water and Power Company's ditch began last Monday. The lumber for the flume, 1,500,000 feet, will be shipped from the sound. Porter, a local millman, received the contract, but was compelled to come to the coast to fill such a large order on short notice.

In the Blackfoot District, Latah Co., the Blackfoot Consolidated Gold Mining Company are working six claims, the ore is free milling. Different ledges run from 12 inches to 12 feet.

Capt. De Lamar expects to put a gold mill on the Bismarck group of mines.

At Custer, at an altitude of nearly 7000 feet the Lucky Boy and Black mines and mills furnish employment to 150 men, directly and indirectly. The Lucky Boy mine is run steadily. The mill is closed down for repairs. The Black mine and mill have been in operation without intermission since last fall. The bullion is high in gold—the highest, it is said, that has ever before been produced from any mine on Custer mountain. It is a ten-stamp wet crusher, pan process, chemical amalgamation; and it is claimed that the percentage saved is but little less than the battery tests, although the ore carries a manganese base.

At Gem the Standard is daily putting on a few more men; no night shift is working yet. Ten cars of crude ore are daily shipped to the mill at Wallace. A night shift is being worked on the Campbell tunnel, which is now in about 1350 feet, leaving some 2000 yet to drive. Work on it has been pushed steadily since last August, the rate of progress being about 225 feet a month.

FIRE AT BURKE.—Last Wednesday morning at Burke, Idaho, the mills and tramways of the Poorman and Tiger mines were burned. The fire started in the compressor of the Poorman mine, gained great headway, burned the tramway and communicated to the mill of the Tiger mine. The loss is about $200,000, insurance $115,000. All the machinery in both the concentrators and the Poorman compressor and hoist are ruined, with the exception of two boilers, which may be good. The company will immediately rebuild.

The burned mills had a capacity of 500 tons per day, and the new mill will be the same. It will probably be toward the beginning of '97 before the new plant will be in running order. The Tiger mill was built in 1887, and the Poorman in 1888. They are two of the first silver-lead claims located in the Cœur d'Alenes, running most of the time since. The two companies were consolidated October 14, 1895, and the properties were considered among the best mines in this district. They were well equipped with machinery, and since consolidation much new machinery has been added. There has been running only a small force for several months past, while alterations were being made. About 150 men were working at the time of the fire. The principal owners are Glidden, Culbertson, Kingsbury and Clarke of Spokane, Wash.

Boise *Statesman:* Major Liddel has gone to De Lamar to install the electric machinery to be used by the De Lamar Company for the treatment of its ores.

This week a strike was made in the main tunnel of the Trade Dollar mine at Silver City, under the superintendency of James Hutchinson. This tunnel has been following the vein and has been driven 4300 feet. It had previously opened seven distinct ore chutes, from which the large gold and silver production of the property has been maintained. It has now developed another, which seems to be larger and richer than the others. The entire face of the tunnel is in ore, much of which is high grade. The mine is to be further developed by sinking from the tunnel level at a point 3000 feet from the entrance. For this purpose an electric plant is being provided.

MORNING STAR.—*Avalanche:* Money is now in a Boise bank to settle up the indebtedness of this company, and Supt. Nugent will pay off. The draft arrived in Silver City on the 9th inst., while Mr. Nugent was in Boise. In the meantime the miners, who had given the company until the 10th to settle, quit work, and nothing has been done at the Star but to keep the pumps working.

## MONTANA.

State Inspector Shoemaker in his report for '95 says: "During my incumbency the number of mines inspected and miners employed therein are shown by the following tables:

| Year. | Total Mines Inspected. | Number Men Employed. |
|---|---|---|
| 1893 | 56 | 4,309 |
| 1894 | 71 | 6,061 |
| 1895 | 82 | 6,337 |

"Of this number of mines inspected, there were in 1893 in Silver Bow county 28, in other counties 22; in 1894, Silver Bow county 39, other counties 32; in 1895, Silver Bow county 48, other counties 34.

"The coal mines in operation during these years were as follows:

| Year. | Number Mines. | Number Men Employed. |
|---|---|---|
| 1893 | 5 | 1,003 |
| 1894 | 7 | 1,021 |
| 1895 | 6 | 2,411 |

"The grand total of coal, gold, silver and copper mines was as follows:

| Year. | Number Mines. | Number Men Employed. |
|---|---|---|
| 1893 | 53 | 5,312 |
| 1894 | 78 | 7,082 |
| 1895 | 88 | 8,758 |

"I will add to the total number of men engaged in steady mining, 1242, who are working small mines and representing mines, and the large number of prospectors who are classed as miners. This gives a grand total of 10,000 men. I consider this number sufficiently large, as my estimate is made from actual observation and general information gathered in the mining districts."

The unsecured indebtedness of the Butte & Boston Company is estimated at $100,000. Messrs. Couch and Forbis have been appointed receivers.

F. August Heinze has conveyed to his brother, Arthur P. Heinze, nearly all his mining and smelting interests in Butte, the consideration named aggregating $500,000. One deed conveys the Liquidator concentrator, the property, including the claim, concentrator, machinery, tools, etc., for $200,000. The other deed is for the Rarus mine, the Johnstown and Pennsylvania lode claims, together with all improvements, machinery, etc., for $300,000.

Great Falls *Leader*: At the Boston & Montana smelter men are building a foundation for the new power-house, which is to be equipped with three large dynamos. The company contemplates building a new electrolytic plant of about equal size and capacity of the present one. The present plant has a capacity of 3,000,000 pounds per month.

*Inter-Mountain:* The reduction plant of the American Developing and Mining Company at Gibbonsville is successful. Hitherto all the numerous efforts made to extract the values from the ores of that district had signally failed, and the camp was listed with the large number of others in this section of the mining regions under the head of "Plenty of ore, but so base that the gold cannot be extracted with commercial success." The stamp mill is crushing an average of ninety tons per day, and saving about ten tons of concentrates. This mill is specially designed for the crushing and concentration of auriferous pyrites, and a saving of 40 per cent of the value in the crude ore is made on the plates. Nearly 10 per cent of the total value is lost in the tailings and 50 per cent remains in the concentration.

The concentrates are then subjected to treatment by chlorination.

This process involves dead roasting as a requisite preliminary to the chlorination proper. In this process an average extraction of 96 per cent is made of the gold contained in the concentrates. The mechanical loss in the operation will not exceed 1 per cent. By this combination of processes a recovery of 87½ per cent of the total values in the crude ore is effected.

The bar gold saved on the plates ranges about 850 in fineness, while that saved by the chlorination reaches 992½, the latter being the purest bar gold ever tested in the United States mint assay office at Helena.

The unqualified success of this, the only chlorination works running on a commercial scale in Montana or Idaho, should mark a new epoch in the economic reduction of low-grade auriferous pyrites.

## SOUTH DAKOTA.

The Deadwood *Times* wants a branch mint or assay office in the Black Hills. It says the gold product of the Black Hills mineral district, which includes the counties of Lawrence, Pennington and Custer, exceeds $7,000,000 per annum, and individualizes as follows: Homestake and associate mines, lead, $3,000,000; D. & D. Smelting Company of Deadwood, $1,000,000; Golden Reward Company of Deadwood, $900,000; Black Hills Gold and Silver Extraction M. &. M. Company of Deadwood, $400,000; Kildonan chlorination mill of Deadwood, $750,000; Deadbroke Company of Deadwood, $50,000; Columbus M. & M. Company of Deadwood, $75,000; Holy Terror Mining Company of Keystone district, $300,000; Custom Milling Company of Keystone district, $250,000; J. R. Milling Company of Keystone district, $100,000; Old Charley Mining and Milling Company of Custer, $25,000; product of placer mines, estimated at $50,000.

## COLORADO.

Canon City, Colo., reports that as a result of the recent discovery of rich float in the vicinity of Fremont's peak, a few weeks ago, the territory is filled with prospectors and gold hunters. Samples of ore yielded free gold, and people are swarming into the hills.

A. B. Cowles has sold his millsite at Empire Station to N. Gregg of Denver, who will this summer erect sampling and concentrating works to handle gold and silver ores.

El Paso county has a big scheme, the Pike's Peak tunnel to be 55 miles long and to cost $25,000,000.

The Fort Collins, North Park and Western Company has incorporated; capital stock, $1,000,000; to build a road from Longmont, Col., to Steamboat Springs, via Fort Collins and through Hahn's Peak mining district, to connect with the Burlington and Union Pacific.

A new mining camp, Gold Creek, has been located thirty miles west of Cripple Creek by the Gold Creek Consolidated Town and Mining Company. The formation is andesitic breccia and tough granite, porphyry and phonolite dykes, which formation carries the gold deposits of the Cripple Creek district. There are over 150 prospectors in the district.

AROUND VICTOR.—The Ocean Wave and Mimi S. claims located on the southwest slope of Squaw mountain have been bought by the Little Ross Gold Mining Company. The price of the Ocean Wave was $45,000; a cash payment of $22,500 was made to close the deal. The remainder of the payment will be made in stock which will be turned in at twenty-five cents per share. For the Mimi S. the owners are to receive $25,000 on the same terms as the other property. Most of the stockholders in the Little Ross Company are Chicago men. The Ocean Wave and Mimi S. have been worked a little during the past ten months and a small amount of pay ore has been found in them.

*Gazette:* Colorado City will soon have a plant for the reduction of gold ores. Prof. Bartlett is here looking over the situation for Eastern capitalists, and if he reports favorably, a $50,000-plant will be erected at once. The proposed plant will have a capacity of 200 or 300 tons per day, and will be so constructed as to allow of an increase to 500 tons per day with a comparatively slight expense. The process used is of Prof. Bartlett's own invention, and saves silver and copper, as well as gold. It is especially useful for low-grade ores and is said to be very economical and to show a good profit on $10 ores.

Cripple Creek *Times:* J. F. Brady of Chicago has purchased the Crank and Crank No. 2 on Raven hill for a price said to be $150,000, of which $50,000 has already been paid.

## NEW MEXICO.

The plans have been made for a new chlorination mill at Gillett. Fisher & Kadish, backed by New York capitalists, will carry out the undertaking. The new mill will use the California roasters. The capacity will be 100 to 200 tons per day.

The Gold and Silver Extraction Company of America (limited), Denver, Howarth & Co., London, England, and E. C. Smith, E. M., Trinidad, Colo., talk of erecting mills in the La Belle district.

LA BELLE DISTRICT.—Last month C. P. Casey, of La Belle, sent several samples of La Belle ores to the Gold and Silver Extrac-

tion Company of America, at Denver, who on the 13th ult. returned the following report:

MIDNIGHT MINE.

| | |
|---|---|
| Assay, gold, 0.86 oz | $17 20 |
| Assay, silver, 1.30 ozs. at 60 cts | 78 |
| Total | $17 98 |

Extraction by cyanide followed by amalgamation:

| | |
|---|---|
| Gold, 85 per cent | $14 62 |
| Silver, 36 per cent | 28 |
| Total | $14 90 |

Cost of chemicals used per ton in cyanide treatment, $1 25.

EDISON NO. 1.

| | |
|---|---|
| Assay, gold, $1 00 oz | $20 00 |
| Assay, silver, 1.40 ozs. at 60 cts | 84 |
| Total | $20 84 |

Extraction by cyanide followed by amalgamation:

| | |
|---|---|
| Gold, 85 per cent | $17 00 |
| Silver, 38 per cent | 32 |
| Total | $17 32 |

Cost of chemicals used per ton of ore in cyanide treatment, $1 85.

EDISON NO. 2.

| | |
|---|---|
| Assay, gold, 6.82 ozs | $136 40 |
| Assay, silver, 3.96 ozs. at 60 cts | 2 38 |
| Total | $138 78 |

Extraction by cyanide followed by amalgamation:

| | |
|---|---|
| Gold, 95 per cent | $129 58 |
| Silver, 35 per cent | 83 |
| Total | $130 41 |

Cost of chemicals used per ton of ore in cayanide treatment, $2 05.

**ARIZONA.**

Prescott is excited this week over the discovery by Frank Wright of some rich gold ore in Old district, near the Senator mine, twelve miles south of that city.

At the Henrietta mine, near Prescott, 20 men are working in the mine. The manager, Mr. Mayer, reports plenty good ore in sight.

The Queen Gold Mining Company has incorporated at Prescott, to operate the Golden Rule and Missing Link mining claims, west of Prescott, in the Golden Standard mining district.

MOJAVE COUNTY.

(Special Correspondence.)—A rich strike was made a few days since by Mexican prospectors thirty miles south of Yucca station on the line of the A. and P. railroad. Capitalists at the Needles have been interested in the new find and development will be pushed as rapidly as possible. The quartz brought in by the prospectors shows considerable coarse gold.

Shipments of sulphide ore containing both gold and silver are made regularly from Kingman, showing that the mines of Stockton Hill, Cerbat and Mineral Park are not worked out.

## Personal.

CAPT. GILLETTE, U. S. Board Engineers, has returned from a tour of inspection of the upper Sacramento.

M. B. KERR, who is successfully superintending operations at the South Paloma quartz mine, is here purchasing supplies.

HENRY R. WOLCOTT, Jos. K. Choate and C. G. Codman, prominent mining men of Colorado, are here to examine into some proffered properties.

L. G. HAYBROOK of Omaha has charge of the construction of the new bullion refinery which the Puget Sound Reduction Co. is building at Everett, Wash.

IT is understood that Thos. Couch of the Merced, Cal., Gold Mining Co., in Mariposa Co., will be appointed receiver of the Butte & Boston Co., Butte, Montana.

MR. POUNDSTONE succeeds Mr. Allen as superintendent of the Big Canyon mine, El Dorado Co. Mr. Allen takes a similar position in the Utica, Calaveras Co.

W. C. RALSTON, chairman of the Mineral Lands Committee of the California Miners' Association, has returned from an extended sojourn in Boston and New York.

CAPT. J. B. DE LAMAR has gone to Europe. He took with him 200 pounds of arsenical ore from the Golden Gate, Mercur, Utah, that will be subjected to a test at Swansea and Freyburg.

J. B. HOBSON, formerly of Placer Co., has engaged about fifty experienced California placer miners and will take them to the forks of the Quesnelle, Cariboo, B. C., where he has charge of extensive hydraulic mining interests.

JOHN R. REAVIS has been appointed the Trail Creek agent of the Lillooer, Frazer River and Cariboo Gold Fields Company pany of London, England. F. S. Barnard, one of the members of the dominion parliament from British Columbia, is the resident director of the company in the province.

## Recent Publications.

"*The Manual of Statistics and Stock Exchange Handbook*," for 1896, Chas. H. Nicoll, publisher, 189 Broadway, N.Y., price $3, is the eighteenth annual issue of a publication of reference value and authority upon financial topics, railroads, miscellaneous corporations, and the mining, grain, cotton and petroleum markets. The contents include detailed statements of the mileage, capitalization, earnings and offices of all the important railroad companies of the United States, and of the leading coal, industrial and miscellaneous corporations. It also gives the range of quotations for several years past for all securities dealt in on the New York, Boston, Philadelphia, Baltimore, Chicago, Pittsburg, New Orleans and San Francisco stock exchanges. A new feature is the prices of mining stocks in all the markets of the country, with statistical data on the mining industry.

## Coast Industrial Notes.

—The Stanford ranch at Vina, Cal., cleared $80,000 last year.

—Ashland, Or., is shipping woolen blankets to San Francisco.

—Nevada potato growers get $10 per ton for their produce here.

—Beef steers sell at Battle Mountain, Nevada, for $30 per head.

—The S. P. Co. will build extensive railroad shops near Mission bay, this city.

—The steel mill at the Pacific Rolling Mills will resume operations next Monday.

—Tacoma, Wash., shipping men have organized a company to run boats to Alaska.

—There are nearly 1900 men working in the Southern Pacific Co.'s shops in Sacramento, Cal.

—The Manufacturers' and Producers' Association will hold its annual election on the 25th inst.

—Portland, Or., capitalists talk of building a modern steel sailing vessel for the Pacific coast lumber trade.

—Official denial is made of the report that the Panama and Nicaragua canal companies intended to consolidate.

—Convict labor at the San Quentin, Cal., penitentiary makes profitable the manufacture there of sugar bags.

—The Great Northern Railway Co. has cut the wages of nearly all its employes. President Hill draws no salary.

—The Occidental Smelting Co. has organized at Linnton, Or., ten miles from Portland, to build a new smelter there.

—Wool sells for six cents per pound on the railroad platform at Reno, Nev. Freight to San Francisco is one cent per pound.

—Track on the Valley Railroad is laid to the bridge over the Tuolumne river and the bridge builders are putting up a bridge over that stream.

—San Diego has voted to accept a water system to be constructed by the Southern California Mountain Water Co. at a cost of $1,500,000.

—The San Joaquin Valley Oil and Fuel Co. has incorporated with a nominal capital of $2,000,000 to develop oil properties at Coalina, Fresno Co.

—Santa Clara supervisors have granted L. M. Hale a franchise for an electric road from San Jose to Saratoga and Congress Springs. The estimated cost is $250,000.

—With the exception of Congressman Johnson, the entire California delegation oppose the refunding bill and favor the foreclosure of the Government C. P. mortgage.

—After a steady five months' run, during which time 5000 tons of pomace were used in the manufacture of cream of tartar, the Healdsburg, Sonoma Co., factory has shut down for enlargement.

—Since '80, California's orange growing industry has developed greatly. There are nearly 12,000 acres of bearing trees; 75,000 acres planted. Over $3,000,000 is invested. This year's crop will amount to nearly $4,000,000.

—The West Los Angeles Water Co. wants permission to create a bonded indebtedness of $350,000, the interest rate being 6 per cent, payable semi-annually. It is organized to develop water on the Provedencia and Scott ranches.

—F. H. Seymour has been granted by the State of Sonora, Mexico, a concession to build a narrow gauge railway between Torres and Minas Prietas. The maximum rate of freight is to be 40 cents per carga, and maximum fare $1. The concession, which extends fifty years, permits extension of the line to Soyopa, if desired.

—The *Call* says several carloads of horses that started from Oregon for Kentucky last week were stopped at Shoshone, Idaho, by the owners, and the horses were taken from the cars and sold at 50 cents apiece. This was more profitable than to pay the heavy freight bill with what the horses would have brought in Kentucky.

—The Seattle and Lake Washington Waterway Company, which has charge of the construction of a ship canal connecting Lake Washington and Elliott bay, in the State of Washington, has executed a mortgage in favor of the Mississippi Valley Trust Company of St. Louis for $3,250,000. The instrument is given to secure two issues of bonds for the sum named, and the money will be used in excavating the canal and waterways. The work has been in progress about six months, and will be pushed to completion.

—House bill No. 4566, introduced by Congressman Loud of this State, in its present form is a menace to an important industry of the coast and should be opposed by every printer and publisher in the country. It is a direct blow at the existence of weekly newspapers, is framed in the interests of the express companies, and, while not wholly objectionable, needs considerable pruning and amendments. It proposes to so restrict the mail facilities of the country as to threaten the very existence of the weekly paper, general and local. Its effect, if passed, would be to make it almost impossible to successfully conduct the average weekly publication.

—Col. M. R. Jefferds, an American railway engineer now in this city, has an agreement by which he is to have the contract for building the Peking & Hankow Railroad, provided he secures subscriptions in this country or in Europe to the amount of 10,000,000 taels, about $13,500,000 in Mexican money. There are in China at present but two short railroads, one of 150 miles and the other of 62 miles. In January Hsu Yin Tsiang, a Tavtai, or mayor, of Kuangtung, was given by Prince Kung, superintendent of military affairs, permission under authority of the Emperor to construct a railroad from Peking north to Hankow, a distance of 750 miles. The right is also granted to build from Peking south to Canton, a distance of 600 miles, upon completion of the Hankow road. One of the conditions is that not less than two-thirds of the capital necessary, which will amount to about 30,000,000 taels, must be subscribed by Chinese. Col. Jefferds, who was in China at the time, secured an agreement from Hsu, which, if he carries out his terms, will give him the contract for building the road. He agreed to come to California to induce the Chinese merchants in San Francisco to subscribe and to use their influence to dispel the prejudices of their countrymen against railroads and show them their value.

## Books Received.

"*Matte Smelting: Its Principles and Later Developments, with an account of the Pyritic Process.*" The above, by Herbert Lang of Shasta, Cal., is a valuable addition to metallurgical literature. Mr. Lang's two-page article in the MINING AND SCIENTIFIC PRESS of January 12th, 1895, showed his possession of practical knowledge on this important subject, and the 90-page treatise just issued by the Scientific Publishing Co., from his pen, is additional evidence of the successful study he has given scientific modes of smelting. The essay is timely and important. The magnitude of the smelting industry is great, and growing. It is probable that $25,000,000 is not an exaggerated estimate of the aggregate value of metals extracted by matte smelting processes in this country in 1895. Mr. Lang has wisely compressed discussion of his subject into such space as to make it of added value to the busy reader. There is not a page of padding; it may even be said that the book is too brief, but if more be found necessary, as will probably be the case, it can be supplied in a subsequent edition. The volume is divided into four sections; the first discusses matte smelting per se, the second treats of slags, the third of pyritic smelting, the fourth losses in smelting, sale of products, tables, etc. Mr. Lang does not write solely from observation, but from the more satisfactory standpoint of practical experience, and his book deserves to be read by every man who is in any way interested in the subject. Seldom has a book appeared that gives so much valuable information in so readable and condensed a form. As advertised elsewhere, it will be sent postpaid to any address on receipt of price, $2.

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING MARCH 10, 1896.

556,248.—SALUTING DEVICE—J. C. Boyle, Spokane, Wash.

556,089.—CONCENTRATOR—W. G. Dodd, S. F.

556,187.—ORE PULVERIZER—H. P. Holland, Oakland, Cal.

556,188.—ORE FEEDER—H. P. Holland, Oakland, Cal.

556,195.—GAS ENGINE—F. W. Mellars, S. F.

556,157.—WATER STILL—W. G. Minor, Los Angeles, Cal.

556,052.—CAN LABELING MACHINE—Parkinson, Childers, Hanson & Wakefield, Crescent City, Cal.

556,168.—COUPLING BICYCLES—T. S. Taylor, San Rafael, Cal.

556,294.—COASTING WAGON—C. L. Whipple, Los Angeles, Cal.

556,076.—BICYCLE CLEANING STAND—C. A. Wright, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

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## Obituary.

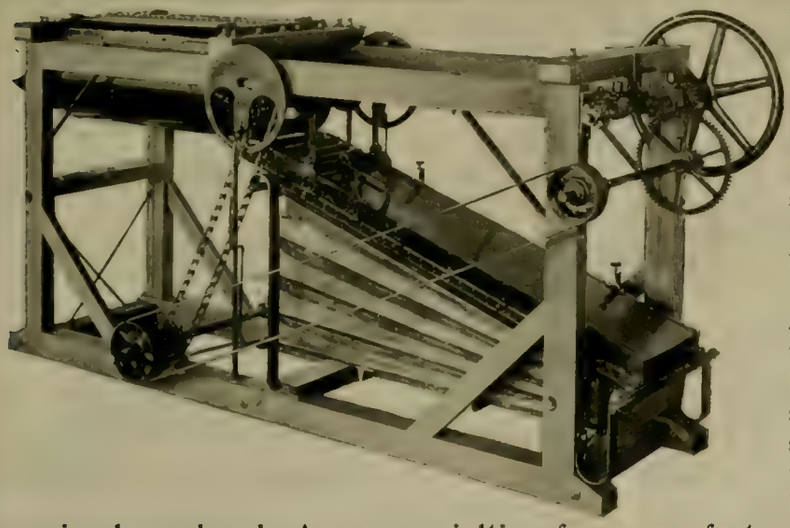
ANOTHER of California's distinguished miners and metallurgists has passed away in the person of Mr. Carl A. Stetefeldt, who died at 967 Alice street, Oakland, Cal., last Tuesday morning, aged 57. Deceased was a native of Germany, and for nearly thirty years was a resident of this coast, actively engaged in mining projects. His contributions to standard mining literature have been many. His last published work is "The Lixiviation of Silver Ores with Hyposulphate Solutions." Mr. Stetefeldt was the inventor of the furnace which bears his name.

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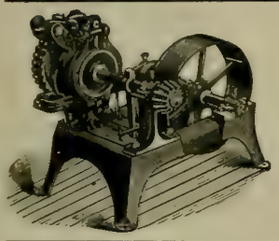
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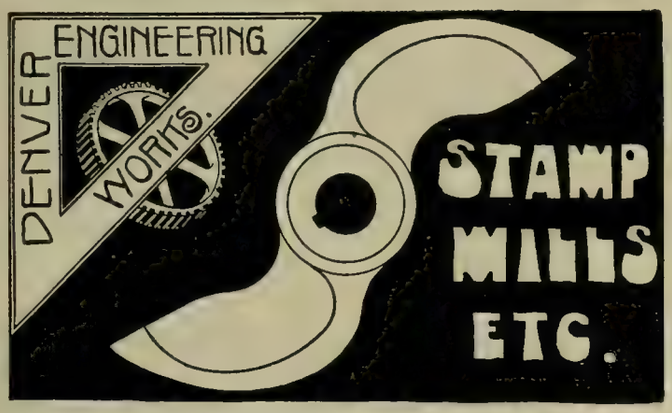


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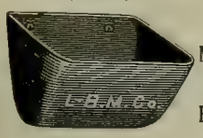
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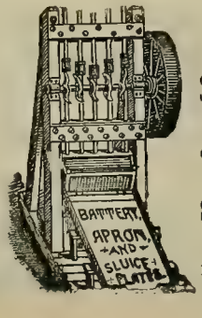
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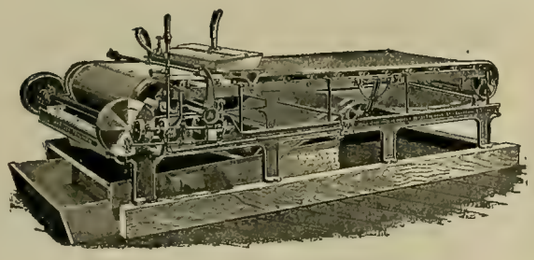
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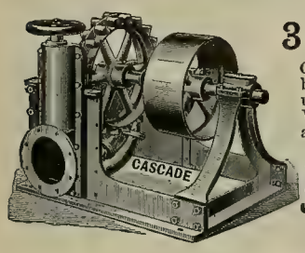
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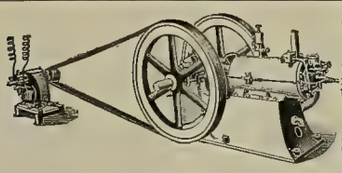
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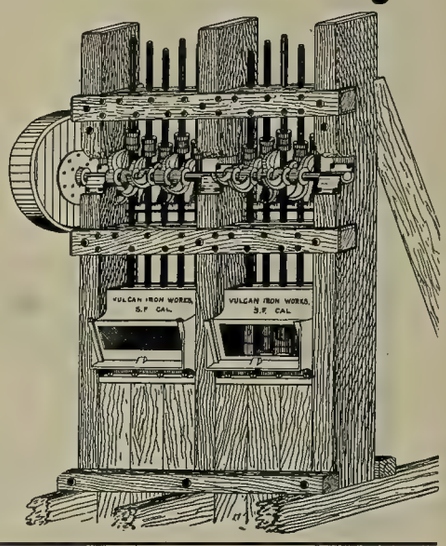
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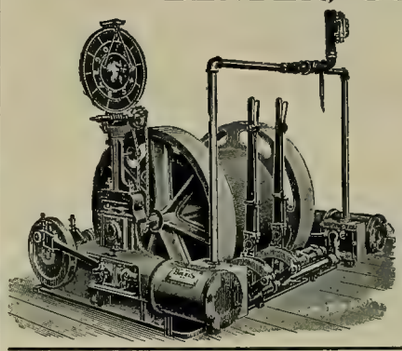
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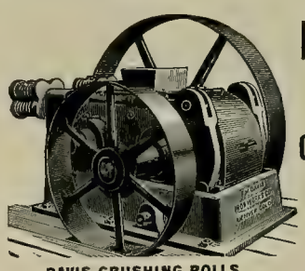
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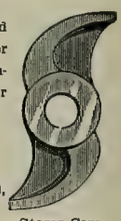
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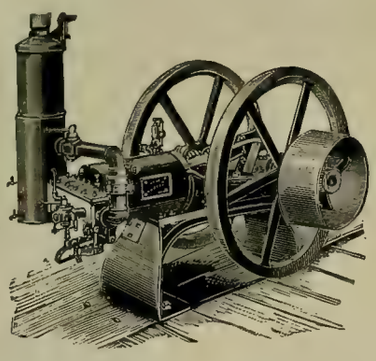
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|---|---|
| Coal Gas, ten hours' run, 1000 feet | $2 00 |
| Gasoline (74 deg.), ten hours' run, 8¾ gallons @ 14c. | 1 25 |
| Coal Oil, ten hours' run, 7½ gallons @ 10c. | 75 |
| Crude Petroleum, asphaltum base, 16 gallons @ 3c. | 48 |
| Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c. | 65 |

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon—21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1½c per horse power per hour; and on gasoline, 2½c per horse power per hour.

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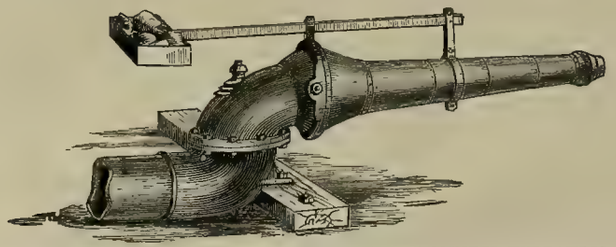
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# Market Reports.

## The Markets.

SAN FRANCISCO, March 19, 1896.

There is a continued free movement in goods for Alaska. The buying is for canners' supplies and gold miners' outfit. Outside of the above, the general trade is about the same as ruled in 1895. It is conceded that the call from the gold mining districts on this coast will show a large increase over last year. This will set in quite actively next month. In the agricultural districts trade depends largely on the weather. If there are well-distributed spring rains, dealers will have confidence and not hesitate to buy freely. A good wheat crop means much better times, for farmers can pay cash for supplies, besides being able to pay up or else pay considerable on their back debts.

The money market is in a mixed condition. While borrowers offering choice to gilt-edge security have no difficulty in getting funds, those not so favorably situated have considerable difficulty in getting money. The latter are compelled to depend largely on outside capitalists, and these never miss an opportunity of exacting a good rate of interest. This necessarily interferes with speculation and new ventures, where more money is required than the promoters command. This condition will change for the better if we have good crop weather.

**New York Silver Prices.**

NEW YORK, March 19.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 31 9-16 | 68¾ | 10 80 | 3 07½ |
| Saturday | 31 9-16 | 68¾ | 10 80 | 3 07½ |
| Monday | 31 5-16 | 68⅝ | 11 | 3 10 |
| Tuesday | 31 7-16 | 68⅝ | 10 80 | 3 07½ |
| Wednesday | 31⅜ | 68⅛ | 11 | 3 12½ |
| Thursday | 31¼ | 68⅛ | 11 | 3 12½ |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, ⅝ per annum | .7@8 |
| Commercial Loans, prime | .6@8 |
| Call Loans, gilt edged | .7@8 |
| Call Loans, mixed securities | .7@8 |
| Mortgages, prime, taxes paid by lender | .6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.87 |
| London Merchants | $4.85 |
| London Sight Bankers | $4.88 |
| Refined Silver, per oz., 1000 fine | 68¼c |
| Mexican Dollars | 55@56c |

SILVER.—As will be seen above the market fluctuated more than for months. While the closing was lower in London, yet there is a belief that it will strengthen next month. This opinion is based on the fact that the China tea trade opens then and this is invariably followed by a better demand for bullion from the orient.

The steamer that sailed the past week from this port took out $220,700 in silver bullion. On Tuesday a resolution passed the House of Commons declaring that the House was of the opinion that the unstability of the relative value of gold and silver since the action of the Latin Union in 1893 has proved injurious to the best interests of the country, and urging the Government to do everything possible to secure by international agreement a stable monetary par of exchange between gold and silver. During the debate it was brought out that the English Government was not adverse to opening the Indian mints to silver, provided an international monetary agreement was arrived at. This sets at rest the opposition against the latter metal in the German Reichstag. It looks at this writing as if an international monetary convention will be held either in 1896 or 1897.

MEXICAN DOLLARS.—The shipments to China the past week aggregate 140,369. The market is quiet at quotations, but a better demand is expected to set in next month.

COPPER.—The European and Eastern markets shaded off, but toward the close they showed more strength. The stronger feeling is due to an improved consumptive demand.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

LEAD.—Inside quotations for pig are lower. The market at the East weakened off, but yesterday it moved up under an improved speculative and consumptive demand. The output in this country is said to be about the same as it was last year.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—A fair trade demand is reported at steady prices.

The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

QUICKSILVER.—The market is quite but steady for both home and export.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 40 00 |
| West Coast of Mexico, for Export | 35 00 |

BORAX.—The output on this coast is being absorbed by eastern shipments. The market is firm.

The market is quoted as follows:

| | |
|---|---|
| Refined, in car lots | 6½ |
| Refined, in sacks | 5¾ |
| Powdered, in car lots | 6¼ |
| Concentrated, " | 5½ |

TIN.—For pig, the market has ruled steady at all demand markets. With us the heaviest demand for tin plate for canners' use seems to be over for the season. There is considerable going forward to the canners in Alaska. For fruit canners the demand is of an offish character.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

ANTIMONY.—The market is quoted at 9 cents, which is a decline on last week's prices.

COAL.—Arrivals the past week were not large, but liberal stocks here and to arrive are against sellers. The consumption is fully up to the average at this season of the year. The feeling among dealers seems to be unsettled, but the impression with the majority is that prices will not change until the wheat crop prospects are mose definitely settled.

SPOT FROM YARD—PER TON.

| | | | |
|---|---|---|---|
| Wellington | $7 50 | @ | 8 00 |
| Greta | 6 00 | @ | 6 50 |
| Nanaimo | 6 50 | @ | 7 00 |
| Gilman | 5 50 | @ | 6 00 |
| Seattle | 5 00 | @ | 5 50 |
| Coos Bay | — | @ | 4 50 |
| Cannel | — | @ | 8 00 |
| Egg, hard | — | @ | 13 00 |
| Wallsend | — | @ | 6 50 |
| Scotch Splint | — | @ | 7 50 |
| Brymbo | — | @ | 7 50 |

TO ARRIVE—CARGO LOTS.

| | | | |
|---|---|---|---|
| Australian | 5 25 | | |
| Liverpool Steam | 6 25 | | |
| Scotch Splint | — | | |
| Cardiff | 6 25 | | |
| Lehigh Lump | 9 00 | | |
| Cumberland | 13 50 | | |
| Egg, hard | 10 00 | | |
| West Hartley | 6 50 | | |

COKE.—The general situation is unchanged since our last week's issue.

| | | | |
|---|---|---|---|
| Gas Companies' | — | — | — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — | @ | 8 50 |
| " in sacks | — | @ | 9 50 |
| Cumberland | — | @ | — |

LUMBER.—The demand is said to be active. The general market is firm, with some kinds reported to be selling higher.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 16 00 | @ | — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

NAILS.—There is a continued good demand for the season of the year. The market is strong. Advices from the East state that an advance of 25 cents a keg will go into effect April 1. Our market will sympathize.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Wire, carloads, basis per keg | $3 07½ | | |
| " jobbing, " " | 3 20 | | |
| Cut, carloads, " " | 2 82½ | | |
| " jobbing, " " | 2 95 | | |

## Mining Share Market.

SAN FRANCISCO, March 19, 1896.

The market for shares in the Comstock mines was dull and heavy up to Saturday, when it became active at slightly firmer prices. On Monday the strength was more pronounced, particularly in Yellow Jacket, Belcher and Crown Point in the Gold Hill group and Sierra Nevada in the North end. Prices were fairly maintained Tuesday morning, but in the afternoon they eased off, chiefly under the selling of a well-known plunger in the Pacific Board. Yesterday the market held around at Tuesday's closing. The advance in the Comstock shares is not attributable to any improvement in the mines, but it is stated to be on a reported contest for the control of one or two of the Gold Hill mines. This report may be correct, yet there is an impression that it is put out for the purpose of favorably influencing the market, so as to collect assessments now levied and also those to come on in April. Mine managers work on the principle that once a bull always a bull in sentiment, and that it does not take much to cause outside bulls to carry stocks and pay assessments, even with conditions being against much of an up movement. Outsiders evidently forget that, with over a million shares to handle, it takes a large moneyed interest, backed by ore developments in two or more mines, to send the market up to an average of one or two dollars a share. Gudgeons and suckers, as the English call sentimental traders, are scarce nowadays, and without them no bull movement can be maintained without dividend-paying mines. While saying this, it must not be inferred that a small up-move cannot be promoted at almost any time, provided the parties back of it see an opportunity of selling out. The active work in some of the mines is apt to run into ore at any time, which can be magnified by cappers and others so as to excite the cupidity of a few outsiders, who rush in as buyers for fear of being left.

The new managers of the Hale & Norcross mine have met with an unexpected opposition from the Miners' Union on the Comstock. This organization is said to be opposed to the new superintendent of the mine. This action on the part of the Union makes it bad for a combination outside of the present rings to get control of any of the mines. This spirit of opposition is not calculated to promote a healthy movement in the share market.

The market for shares in Bulwer and Bodie was more active the past week. Prices were advanced under a reported contest for the control of Bulwer, but towards the close it weakened off. Whether the lower prices will be followed by still higher figures is as yet an open question, for the news from the mines is not of a character to sustain much of an upmove.

From the Comstock mines the news is, as yet, of the same character as has come to hand for some time past. In the Alta group the work in Alta seems to be the guiding star, but so far as can be learned it is not calculated to inspire confidence that a large body of good ore will be run into, although it is liable to run into stringers at any time. At this writing it looks as if it will take considerable time before anything of a definite character can be ascertained, and this means assessments and probably no body of ore. In the Gold Hill group, Overman and Belcher continue to report some ore being extracted and raised, but not enough to cover expenses. In the other mines in this group no ore is reported in official letters. The work in this group is not of such a nature as to create a bull feeling, although stringers of more or less size are liable to be run into, which may give temporary life to the shares. The most active work seems to be in Crown Point, but even this appears to be mostly for the purpose of laying the foundation for future work. It may take some time before this is laid. In Confidence, Challenge and Con. Imperial the joint west drift is being extended about six feet a week. At this snail pace the striking of the west ledge points to time, with assessments soon. In Alpha and Bullion the work to the west makes slow progress. To raise funds the latter company had to levy an assessment, while the former company will be compelled to levy one before long. In the Middle group attention is largely centered on Hale & Norcross, where work has been suspended pending a settlement with the miners. When work is resumed in this mine it will probably be on the 900-foot or 700-foot level. Expenses have been cut down very materially by the new management. In this city they have been reduced fully one-half, and it is said a similar reduction will be made at the mine when work is resumed. Some ore is being raised by the other mines in this group, but not enough to excite the cupidity of dealers in the market. In the North End group new work has been started this month in Con. Virginia and Sierra Nevada, but what it will result in is, as yet, largely a problem. The recent strengthening in the share market admitted of Ophir levying an assessment, which will be followed by another company in that group putting on one next month. The market for Comstock shares was more active this afternoon, with Yellow Jacket, Crown Point and Belcher selling at higher prices.

From the Brunswick lode our advices continue to report active work in Occidental. It is expected that the ore for which they are running on the 750-foot level will be struck soon, but how much will be found is entirely guesswork. In the meantime the shares in this mine are well held. The work being done by the other mines on this lode is not of a very active character. It seems to be held back so as to find out what will be found in Occidental.

Late advices from the Bodie district state that a few tons of ore are raised each week in Bulwer while pushing exploiting work. In Bodie they have run into six-foot ore, but it is low grade. The work in this mine is being pushed in several directions. This will help the management to collect the assessment levied last week.

The following illustrates the changes of the week:

| MINES. | Mar. 12. | Mar. 19. |
|---|---|---|
| Alpha | | |
| Alta Consolidated | $ 14 | $ 16 |
| Andes | | 31 |
| Belcher | 20 | |
| Best & Belcher | 66 | 67 |
| Bodie | | 27 |
| Bullion | 12 | 09 |
| Challenge | 31 | |
| Chollar | 46 | 48 |
| Confidence | | |
| Consolidated California and Virginia | 1 55 | 1 65 |
| Consolidated New York | | |
| Crown Point | 32 | 41 |
| Exchequer | | |
| Gould & Curry | 30 | 31 |
| Hale & Norcross | 1 10 | 1 15 |
| Justice | | |
| Mexican | 51 | 55 |
| Ophir | 1 15 | 1 15 |
| Overman | | 16 |
| Potosi | | |
| Savage | 32 | 36 |
| Sierra Nevada | 60 | 70 |
| Union | 55 | 61 |
| Utah | | |
| Yellow Jacket | | 46 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, March 19, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 100 Best & Belcher | 67 | 100 Hale & Norcross | 1 10 |
| 200 Bullion | 08 | 500 Overman | 16 |
| 50 Bulwer Con | 38 | 300 Savage | 34 |
| 200 Chollar | 48 | 500 Sierra Nevada | 69 |
| 200 C. C. & Va | 1 60 | 500 Union Con | 61 |
| 400 Eureka Drift | 40 | 300 Yellow Jacket | 41 |
| 200 Gould & Curry | 31 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 150 Ophir | 1 15 | 500 | |
| 28 | 1 10 | 1100 Yellow Jacket | 41 |
| 50 Mexican | 54 | 300 | 45 |
| 100 | 55 | 650 S Belcher | 07 |
| 200 Con Cal & Va | 1 65 | 300 Bullion | 09 |
| 100 Savage | 36 | 500 Alta | 16 |
| 400 Sierra Nevada | 70 | 50 Andes | 30 |
| 200 Chollar | 48 | 50 | 31 |
| 100 | 47 | 900 Bodie | 27 |
| 100 H. & N | 1 15 | 155 Bulwer | 35 |
| 400 Crown Point | 40 | | |

## Recent Mining Dividends.

The Centennial-Eureka, Utah, paid a $30,000 dividend of $1 per share on the 16th, and is expected to declare a similar dividend April 1st. Yesterday the Mercur, Utah, mine paid a 12½c dividend, amounting to $25,000.

# MINING SHAREHOLDERS' DIRECTORY.

ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied, Delinq't and Sale. | | | Secretary. |
|---|---|---|---|---|---|---|
| Andes Silver M Co, Nev | 42 | 15c | Jan 30. | Mar 6. | Mar 28. | J W Twiggs, Nevada Block |
| Bay State M & D Co, Cal | 30 | 2c | Feb 1. | Mar 9. | Mar 28. | F E Luty, 330 Pine |
| Belcher S M Co, Nev | 52 | 25c | Mar 3. | Apr 7. | Apr 28. | C L Perkins, Mills Building |
| Bullion M Co, Nev | 47 | 10c | Mar 18. | Apr 22. | May 14. | R R Grayson, 331 Pine |
| Bulwer Con M Co, Cal | 12 | 5c | Feb 5. | Mar 11. | Apr 3. | J E Jacobus, 309 Montgomery |
| Con Cal & Va M Co, Nev | 6 | 30c | Mar 4. | Apr 8. | Apr 28. | A W Havens, 309 Montgomery |
| Gold Bar Con M Co, Cal | 3 | 5c | Feb 10. | Mar 19. | Apr 10. | E C Godfrey, 38 Crocker Building |
| Lady Emma M Co, Cal | 1 | 15c | Feb 26. | Apr 6. | Apr 27. | W W Boughton, Mills Building |
| Orleans Mining Co, Cal | 1 | 10c | Jan 21. | Feb 29. | Mar 24. | W Olney, 101 Sansome |
| Osceola Con M Co, Cal | 5 | 1c | Feb 11. | Mar 14. | Apr 8. | H Smith, 307 Montgomery |
| Sierra Nev S M Co, Nev | 110 | 25c | Feb 3. | Mar 7. | Mar 27. | E L Parker, 309 Montgomery |
| Silver King M Co, Arizona | 13 | 25c | Jan 28. | Mar 3. | Apr 6. | J W Pew, 310 Pine |
| Summit G M Co, Cal | 14 | 5c | Mar 17. | Apr 20. | May 12. | J E Jacobus, 309 Montgomery |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., March 18, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| CALIFORNIA STATIONS. | Total Rainfall for the Week. | Total Seasonal Rainfall to Date. | Total Seasonal Rainfall Last Year to Same Date. | Average Seasonal Rainfall to Date. | Maximum Temperature for the Week. | Minimum Temperature for the Week. |
|---|---|---|---|---|---|---|
| Eureka | .04 | 32.07 | 32.56 | 32.74 | 64 | 44 |
| Red Bluff | .38 | 14.91 | 25 30 | 20.21 | 92 | 44 |
| Sacramento | .58 | * | 21.58 | 12.42 | * | 48 |
| San Franc'co | 1.06 | 14.95 | 22.10 | 19.41 | 70 | 46 |
| Fresno | | 4.93 | 11.88 | 7.39 | 76 | 44 |
| S. L. Obispo | T | 14.61 | 23.08 | * | 84 | 40 |
| Los Angeles | | 7.32 | 12.68 | 14.84 | 78 | 44 |
| San Diego | | 4.44 | 11.33 | 9.41 | 72 | 46 |
| Yuma | | .88 | 3.01 | 2.85 | 88 | 48 |

* Indicates no record.

# Assessment Notices.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, Cal.; location of works, Auburn, Placer county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of February, 1896, an assessment (No. 2) of 1 cents per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 237 Twelfth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of April, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made be before, will be sold on THURSDAY, the 30th day of April, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. WINTERS, Secretary.

Office—237 Twelfth street, San Francisco, California. Office hours from 8 to 10 P. M.

CON. CALIFORNIA AND VIRGINIA MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of March, 1896, an assessment (No. 6), of 30 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 47 Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of April, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 28th day of April, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room No. 47 Nevada Block, No. 309 Montgomery street, San Francisco, California.

FAIRFAX VILLA COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Fairfax, Marin county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 6th day of March, 1896, an assessment (No. 5) of Fifty Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 56, No 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of April, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 4th day of May, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. STADTFELD, JR., Secretary.

Office, Room No. 56, No. 309 Montgomery street. San Francisco, California.

THE CALIFORNIA DEBRIS COMMISSION—having received applications to mine by the hydraulic process from A. J. McDonald, in the Kanaka Valley Mine, at Salmon Falls, El Dorado Co., to impound tailings in a ravine; from Paris Bean, in the Empire Hill Mine, in North-East Township, Yuba Co., to impound tailings in Empire Creek and in an old pit; from John J. Bailey, in the Badger Hill Mine, near Placerville, El Dorado Co., to impound tailings in a ravine; from B. Guidici, in the Grasshopper Hydraulic Mine, near Pleasant Valley, El Dorado Co., to impound tailings in a ravine; from Mrs. Amalie Hafner, in the Dark Ravine Mine, near Crescent Mills, Plumas Co., to impound tailings in Dark Ravine; from E. D. Hurd, in the Miners' Row Mine, near Michigan Bluff, Placer Co., to impound tailings in a ravine; from Alfred A Ludwig and William Everest, in the Nellie Bly Mine, near Igo, Shasta Co., to impound tailings in a ravine; and from R. R. Gumbert, in the Duquesne Placer Mine, at the head of Poplar Creek, Plumas Co., to impound tailings in a ravine—gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on April 6, 1896, at 1:30 P. M.


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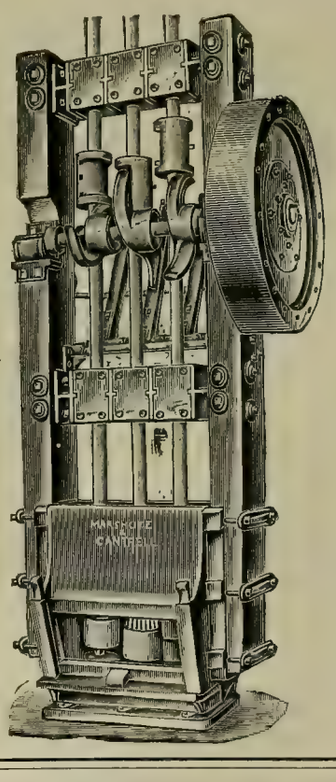
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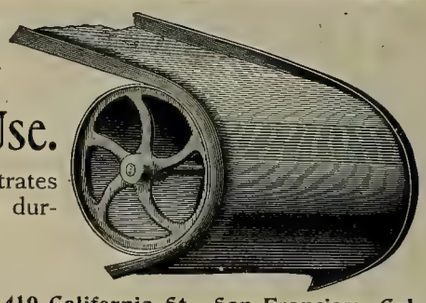
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OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

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One ring plate will crush from 2200 to 2300 tons.

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In regard to sliming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK. Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK. Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY.
S. BAMBERGER, President and Manager.
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,

[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO.
C. C. McIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. McIVER, President.

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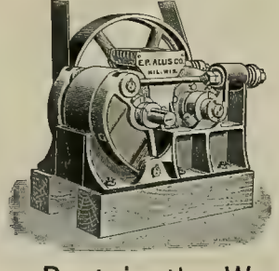
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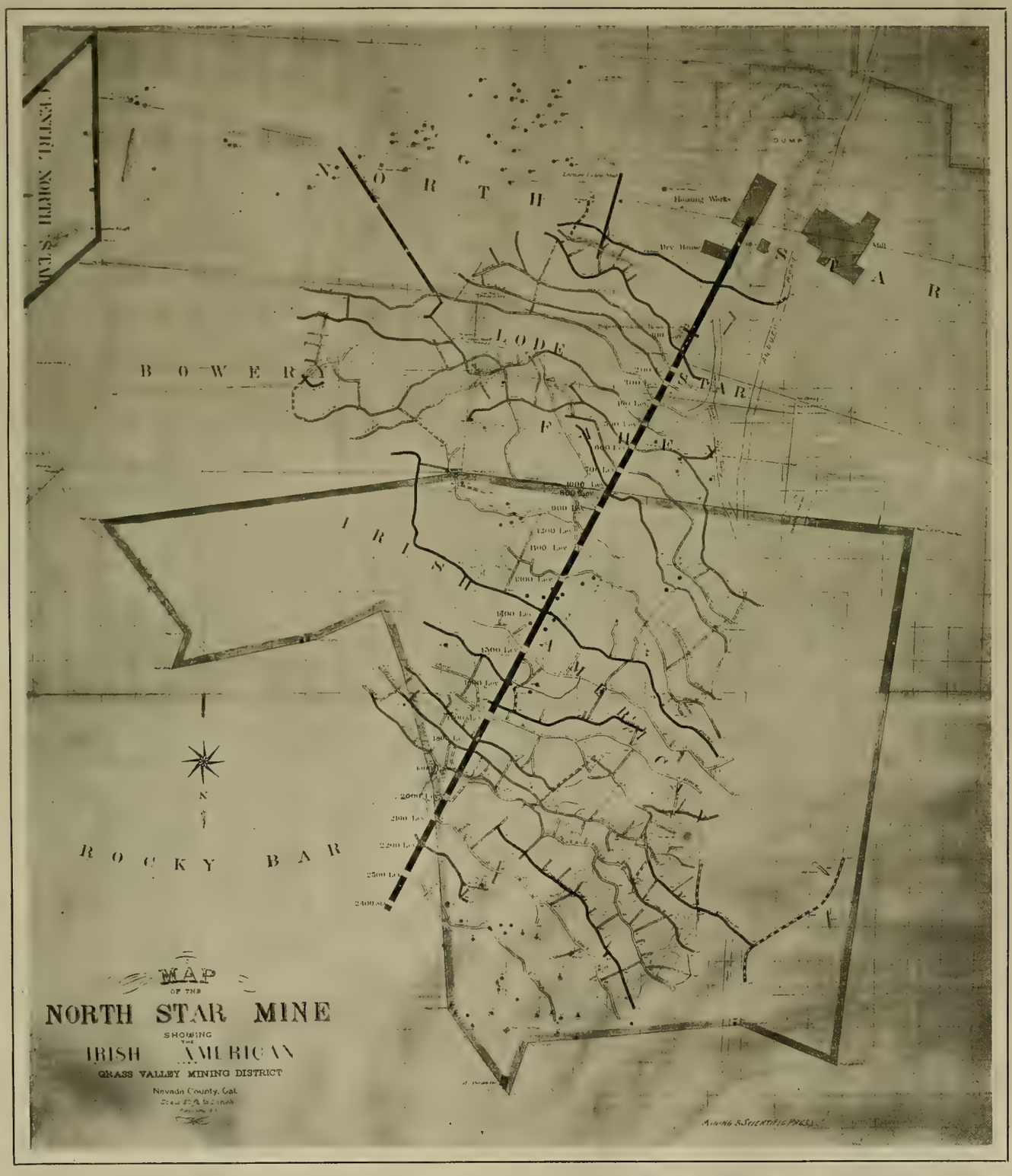
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## AND PACIFIC ELECTRICAL REVIEW.

VOLUME LXXII. Number 13. SAN FRANCISCO, SATURDAY, MARCH 28, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.


### An Important Mining Decision.

The recent judicial decision in the case of the Carson City G. & S. M. Co. vs. North Star M. Co., in which judgment was given for the defendant, is of sufficient interest to the mining world to merit reproduction in full. Herewith is an engraving of the ground in controversy, and the decision of the judge in full:

In the Circuit Court of the United States, for the the Northern District of California.

Carson City Gold and Silver Mining Company, plaintiff, vs. North Star Mining Company, defendant.

W. H. Dickson, A. C. Ellis and C. W. Kitts, attorneys for plaintiff, and Curtis H. Lindley, attorney for defendant.

This is an action of trespass brought by the plaintiff, as owner of the Irish American mining claim,

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J. F. HALLORAN.....General Manager

San Francisco, March 28, 1896.


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situated in Nevada county, California, against the defendant, which, as owner of the North Star claim, has followed and worked its ledge upon its descent under the surface of the former claim. Each claim is a consolidation of a number of small claims, many, if not all, of which were located long prior to the enactment of any mining law by Congress, and is patented in the irregular shape and of the unusual size represented upon the following plat—the Irish American being about 1500 feet square, with a strip extending from the main body about 600 feet east, and the North Star, lying 300 to 400 feet south, is about 3100 feet long from east to west and 650 to 1250 feet wide.

The plaintiff's theory is, that the apex of the "North Star" ledge runs so near northwesterly and southeasterly that if continued in its course it would cross the side lines, 1-2 and 3-4 of the claim, but that the ledge in its northwesterly course, before reaching the north side line, is interrupted by a nearly perpendicular north and south fissure or at least a distinct line of change in the geological formation of the country, called in this case a "crossing," to the west of which the ledge does not appear either upon the surface or in the underground workings. The defendant claims that the apex of its ledge runs in an easterly and westerly direction from end to end and along the center of its "North Star" claim, and that its dip is northerly or practically in the direction of its main working shaft, and, while admitting the existence of the "crossing," affirms that the ledge continues to the west of it. The surface of the claim is so covered with soil, and any outcroppings of a ledge that ever may have existed are so obliterated by past mining operations, that very little can now be determined by surface indications of the course of the ledge. Perplexity is added from the fact that over much of the surface there are many old mining shafts and workings in which more or less ore has been found and which are in such relative positions that they are no guide to the location of the course of any ledge. A portion of them are represented on the plat by dots and crosses.

(1). During the trial plaintiff objected to defendant's evidence based upon the North Star claim as patented, and insisted that the claims of which it is composed should be shown as originally located, and that the rights of the parties should be governed by the located lines of those claims and not by the patented lines of the North Star. This objection was overruled, and as upon final argument plaintiff insisted upon its objection, a brief consideration of it will precede any discussion of the other issues.

In this objection are involved the questions of the parallelism and of the intersection by the ledge of the end lines of the original locations. When those locations were made there was no law requiring such parallelism, but independent of all lines the right to follow the ledge along its course for the full distance claimed and underground upon its true dip to any depth was undisputed. Although Section 9 of the act of 1872, in repealing certain parts of the old law, provided that "such repeal shall not affect existing rights," the courts have held that when any claim is patented those rights are controlled by the patented lines. If, however, plaintiff's objection could so far prevail that defendant should be compelled to rely upon the original claim as located, instead of upon the North Star patent, it ought to follow that they should be considered as unpatented claims, and all rights which attached to them prior to patent should accrue to defendant, for manifestly it would be unjust to deprive defendants of all benefits arising from its North Star patent, as well as those which attached to the original location while unpatented. Moreover, the defendant, owning the several claims which now compose the North Star, might have procured separate patents for each claim, and in doing so might have so changed the end lines as to make them parallel, just as is always done now in application for patent, and if the several claims jointly included the entire apex, all the claims could have been so surveyed as to make all the end lines parallel to each other, and thus give it what it now substantially claims by its North Star patent. The defendant has only done by one act, at less expense, what it lawfully might have done by several acts at greater expense. The North Star patent is of greater superficial area than any law has ever authorized for a single ledge location, but it has been held by the Supreme Court that, while the law prescribes a limitation to the size of a single location, there is no limitation to the number of claims one person may hold by purchase or that may be included in a single patent, and, as I understand, that may be included in a single survey showing only the exterior boundaries and omitting all interior lines of the several smaller claims. Such was the holding as to agricultural lands in Polk's Lessees vs. Wendell, 9 Cranch, 87, and as to placer claims in Smelting Company vs. Kemp, 104 U. S., 636. There appears no reason why the same rule should not apply to quartz claims. Independent, however, of the foregoing consideration, a patent has been granted for the North Star claim. It has passed beyond the field of discussion that a patent can not be collaterally attacked on account of any question which the land department could lawfully determine before issuing it. Without now defining what questions are settled by the issuance of a patent, it is held that the question of the defendant's right to a patent to the North Star, with the boundaries as defined by it, was within the jurisdiction of the department and was determined by it, from which it is held to follow that the boundary lines as defined by the patent are the only lines by which the rights of the parties can be determined. To adjudge such rights by the original lines of the several claims of which the North Star is composed would be such an assault upon the patent as cannot be sustained. The former ruling upon plaintiff's objection is, therefore, adhered to.

(2). Without making special reference to the testimony of the several witnesses as to the location and course of the apex, it may be concluded, as clearly established, that a ledge had been found in a number of the group of old shafts existing near the south side line of the North Star. Upon one of the plaintiff's maps is indicated a line of shafts running east and west which is marked "shafts on apex." Plaintiff's witness, Hugunin, was on the ground the day this ledge was discovered in 1851, and located a claim running west from the main shaft, and he fixed a point, designated "B" on the plat, being over 100 feet westerly from the mouth of the main shaft, as within his claim and as the most westerly cropping of the ledge. He also located the apex of the ledge 50 feet south from the mouth of the Larimer shaft and 40 to 50 feet south of the old powder house, which was on a direct line connecting the mouths of the main and Larimer shafts. An apex running through these three points fixed by this witness and continued in its own direction each way would cross the south side and west end lines of the North Star, and the same result would follow to pass a line through these points and the group of shafts. I do not think that from a fair consideration of all the plaintiff's evidence, it can be concluded that the source of the ledge is across both the side lines. On the contrary, defendant's witnesses locate the apex easterly and westerly near the center line of the claim as indicated upon the plat, and the witness Morse located croppings at a point designated "C," being about 300 feet west from the mouth of the main shaft, and he says that he and his associates located ten claims running west from the Auburn road, "as near as we could tell on the line of the ledge." Defendant's witnesses are corroborated by other established facts: (*a*) Before the surface was disturbed and when indications of the ledge were clearer, the original locations were made upon an east and west line and about along the central line of the North Star. (*b*) The workings of a mine made in mining operations and not in support of litigation are generally important as evidence of any facts which may be legitimately inferred from them. The three incline working shafts were started upon this North Star central line and are all shown to follow the ledge in their descent. It is reasonable to presume they were started upon or near the apex of the ledge. (*c*) The working levels in this case are not so conclusive as usual of the course of the ledge, for the reason that there are large "horses" in the mine to the upper and lower surface of which the workings have conformed, which largely accounts for the varying directions the levels have taken. A majority or many of the upper levels are nearly parallel with the north side line, while others, if prolonged, would cut the west end and south side lines, and still others would cross both side lines and especially those in the deeper workings. But as ledges may in their depths change their course, and as the surface course or the course of the apex is to govern the miner's rights, the workings nearest the surface are better guides to the course of the apex than those far below. Plaintiff admits that there is a mineral vein along the line claimed by the defendant as the apex, but says it is but a spur or seam from the ledge which runs elsewhere, its exact locality not being fixed. That this is but a spur or seam of a ledge and so important that it cannot be made the basis of a mineral location, cannot be reasonably concluded when it is remembered that the first locations were made upon and along it. However, the law fixes no limit to the size or prominence of a mineral-bearing vein before a mining location can be made upon it. While in the group of shafts referred to a ledge was found, its apex or the course of the apex has not been located unless it be by the plaintiff's testimony concerning the "shafts on apex" before named, and it has not been shown that any vein crosses or is found beyond the south side line. It is not impossible that the apex of whatever vein exists at this place, if traced out, would assume a course somewhat corresponding to the outline of the group of shafts and running in a northeasterly and a northwesterly direction until it unites with the other line of apex, and that the two outcrops or ledges are but parts of one vein which are separated by a large "horse," which defendant's evidence and diagrams show exists near the surface of the mines. There is some evidence, at least, to show that two veins do unite in the workings not far below the surface.

From a full consideration of all the evidence it is concluded that the first mining locations were located along the central line of the North Star claim; that such line is practically the line of the apex of the ledge in controversy; that it has been fixed at different points along the irregular lines indicated upon the plat between the letters "*C* and *D*" and running in a direction south about 80° east.

(3). Generally when a ledge has been traced for such a distance in a claim of this size it would not be an unreasonable presumption that it would continue in the same direction far enough to cross the end lines of the claim. This presumption may be indulged as to the east end line, but as before stated, plaintiff asserts that it does not, either on the surface or underground, pass west of the "crossing," which contention is sustained by the testimony, while that of the defendant is to the contrary. Underground there may be some indications of a ledge west of the "crossing," but little if any ore has been found there and the workings of the mine, with some unimportant exceptions, sustain plaintiff's contention. Upon the surface there is nothing shown by which to definitely locate the line of this "crossing." Conceding, however, that the ledge intersects the east end line, from whence it extends no farther than about 2200 feet westerly to the point "*C*," fixed by the witness, Morse, as the place where he found the croppings of the ledge, what are defendant's underground rights? That the end lines are not parallel, cannot be the basis of an objection, because their convergence when extended in the direction of the dip of the vein would give defendants less, instead of more, than the law provides for.

Attention has not been called to any precedent in which a ledge is abruptly terminated on its onward course, as is claimed occurs in this case, but a similar principle is involved when a ledge passing through an end line is terminated as to the claim, by going through and out of it, across a side line. Under such circumstances it has been held that the ledge may be followed on its descent between the perpendicular plane drawn through such intersected end line and another similar parallel plane passing through the point where the ledge crosses the side line. Last Chance M. Co. vs. Tyler M. Co., 61 Fed. 560–564; Wyoming vs. Champion, 63 Fed. 541–546; Del Monte M. Co. vs. New York M. Co., 66 Fed. 212; Fitzgerald vs. Clark, Pac. — which I followed in the last hearing of Last Chance vs. Tyler, — Fed. —. When the last case was first before the Circuit Court of Appeals, that Court said: "If the lode in question, instead of extending into the Last Chance location, had abruptly broken off within the surface lines of the Tyler near the point where, in fact, it crossed the line, there could certainly be no question as to the right of the Tyler to follow the lode or vein in its downward course for its entire depth outside of the vertical planes drawn through the side lines. The fact that it continued its course and crossed the side line does not in any manner change this principle. In either case the locator is entitled to the same rights. In such cases the end lines are not necessarily those which are marked on the ground as such. An end line may be drawn at the point where the lode abruptly terminates within the surface lines or at the point where the apex of the lode crosses

the side line of the surface location. 54 Fed. 292. It is therefore concluded that the defendant may follow its ledge on its descent under the Irish-American claim and to any depth between a perpendicular plane drawn through the east end line of its claim and another similar parallel plane crossing such claim at the point fixed as the western terminus of the ledge, being designated by "C" and westerly from the east end line 2200 feet, measured along the straight central line upon the plat and along the like line upon defendant's exhibit 8; provided, that defendant shall in no event pursue its ledge west of a perpendicular plane extended through the west end line of its claim, and judgment for the defendant is ordered accordingly.

There was another question suggested, but as it was based upon the theory that the course of the ledge was such as would carry it across the side lines, which I cannot adopt, it will be unnecessary to consider it. BEATTY, Judge.

March 9, 1896.

Either party shall have thirty days after notice of this decision to take any steps in the case desired. And proposed judgment or papers to be signed by me must first be presented to the opposite side and, with their objections noted, may then be presented to me for action. BEATTY, Judge.

Filed March 16, 1896.

## Concentrates.

BANNING, CAL., is becoming the center of supplies for the desert mines.

THE fifty seats in the Gold Mining Exchange of this city have all been sold.

LAST WEEK Placer Co. raised nearly $300 additional for the State Miners' Association.

CRIPPLE CREEK, COLO., is now supporting eight daily newspapers within a district of eight miles.

HELENA, MONTANA, proposes to have a $20,000 gold and silver refinery in addition to the present assay office.

THE *Observer* says that around Grant's Pass, Oregon, miners are paid from $1.50 to $3.50 per day, according to skill.

ALREADY on the Colville, Wash., reservation there are 500 claims recorded in Stevens Co., and 250 in Okanogan Co.

AT Newcastle, Colo., the last two bodies of the forty-nine who lost their lives in the Vulcan mine disaster have been recovered.

THE little mining town of Northport, Wash., at the Canadian boundary line, was almost totally destroyed by fire last Saturday.

THE Senate Committee on Territories has ordered a favorable report on the bill admitting the Territory of Arizona to statehood.

IN the last ninety days the Colorado Secretary of State has turned into the State treasury $133,000 fees for mining incorporations.

THE Amador *Record*, reliable and enterprising, published at Sutter Creek, Cal., has entered upon the sixth year of a prosperous existence.

NEVADA COUNTY, CAL., has recently contributed $500 to the California State Miners' Association, and added 200 names to its county membership roll.

OVER fifty experienced miners left here last week to handle mining properties in South Africa, South America, British Columbia, Colorado and elsewhere.

A TON of black sand was this week sent from La Porte, Cal., via New York, to Berlin, Germany, where a new process will be tried to extract the gold therefrom.

UTAH mine and smelter owners oppose the proposed eight-hour mining law in that State. They claim it is a blow at the low-grade mine and miners' wages.

A LARGE PARTY of Utah miners, led by W. H. Chapman and W. C. Snyder, leave Salt Lake next month for Venezuela and British Guiana, there to hydraulic for gold.

PETER WYBORG is again in Juneau, Alaska, en route to the Yukon. He distinguished himself last fall by bringing out $45,000 in gold dust, all the result of his own labor.

THE House Congressional Committee has favorably reported a bill making the California Debris Commissioner a member ex officio of the United States Debris Commission.

A SIERRA COUNTY paper declares that "citric acid is successfully utilized in separating the gold from the auriferous black sand with which the beds of the Yuba streams are filled."

OF all fool rushes the present exodus to Alaska is the most foolish. Nine-tenths of those going have little idea what is in front of them, and the sum total of hardship and death will be a grave one.

ARSENIC AND ARSENIOUS ACID in Mercur, Utah, ore, has so far militated against the best obtainable results there from the cyanide process, and present efforts are making to overcome the difficulty.

IN the window of Shreve & Co., Market street, this city, is a nugget worth $1,003, picked up by J. C. Murphy at Kelsey, El Dorado Co., last week. A few days previous he got a nugget from the same claim worth $618.

A LATE RULING of Secretary of the Interior Smith is to the effect that a corporation organized under the laws of a State is in contemplation of law a citizen of the United States, and as such can take and hold by assignment a mineral entry.

IN the map on the first page it says "scale 40 feet to an inch." That was the scale on the original map from which the illustration was engraved, but the necessary condensation makes the scale in the engraving about 350 feet to the inch.

ASSAYER BRADEN, in charge of the United States Assay Office, Helena, Mont., reports the production of precious metals in that State for the year 1895 was: Gold, 209,320 fine ounces of the coin value of $4,327,040; silver, 17,701,658 fine ounces of the coinage value in silver dollars of $22,886,992; copper, 201,093,992 pounds, of the value of $21,114,-892; the lead output he places at 24,139,504 pounds, of the value of $754,350.

SOUTH AFRICA gets its best miners, mine managers and mine superintendents from California, and now Cornwall, England, is sending to South Africa for mine managers, who, the Cornwall papers say, "are revolutionizing Cornish mining."

LAST year the Etna Con. Quicksilver Mining Company produced 3,300 flasks. The sales were $115,241: expenses, $83,632; net profit, $31,692. Two dividends of $10,000 each were paid. The balance to profit and loss account on January 1st of this year was $43,235.

THE mill constructor for the Simmer & Jack, South Africa, Gold Mining Co. is reported here engaging carpenters and mill men for the new stamp mill his company propose building at Johannesburg. When this is complete and in operation it will be the largest concern of the kind in existence.

E. A. WILTSEE, just back from Johannesburg, South Africa, says the average recovery of values is from 9 to 10 pennyweights from the plates and from 3 to 4 from the tailings. The average working expenses for mining, milling and cyanide is in the neighborhood of about 24 shillings, or $6.

THE Colorado Springs correspondent of the Denver Daily *Mining Record* says while it may read like fiction, it is nevertheless true, that it costs more to furnish water for steam plants on Gold Hill than it does coal. At present Gold Hill plants are paying $3 and $3.50 per load of eight barrels for water for their boilers.

THE January output of gold at Johannesburg, S. A., aggregated 148,178 ounces; for the preceding December it was 178,-248 ounces; November, 195,218. The highest any one month was August, '95, when the total was 203,573 ounces. Lack of labor facilities and temporary political troubles are the reasons assigned for the temporary decrease.

NEARLY $50,000 per month is now paid out for mining operations in and around Jackson, Amador Co., Cal. On the Oneida, Gwin and Argonaut mines it is calculated half a million dollars will be put in reopening and developing. At the Gwin Superintendent Thomas has rigged up a boring machine of his own invention, and used it successfully.

STRONG representation has induced the Victoria, B. C., parliament to reduce the tax on mines from two per cent on the gross output of the mine, as at first proposed, to one per cent on the smelter returns of the mine. This in effect is the same as cutting the tax down to one-third the proposed amount and it is thought will save the miners $500,000 a year.

TWENTY years ago the United States Government bought the output of the bonanza mines in Virginia, contracting for $30,000,000 worth of bullion. Greenbacks were selling in New York for 88 cents in gold or silver coin. Government bonds were paid for the bullion, the "battle-born State" being next to California, then the financial backbone of the Government.

MISS JENNIE HILTON of Pomona, Cal., who has cleared $35,-000 in mining operations in Arizona and elsewhere, is no longer "the only woman in the business of buying and selling mining claims." Miss A. M. Orcut of Palmer, Mass., another "new woman," is prospecting near Pike's Peak, Colorado, has thirty locations, eight men doing assessment work, and is reported by the local paper to have sold a claim last week "for $4500, cash."

ACCORDING to the *Index*, this "goes" at Bodie: "Locators of mining claims must be prepared to pay the County Assessor $2.50 on every new location made in the county during the years 1895-6. The presumed valuation of mines is $100. On this basis of valuation a charge of $2.50, the pro rata of the general county assessment, is due. If the locator refuses to pay his $2.50 anyone may file a relocation, and, under the statutes governing claim abandonment, take up the locator's property."

A DISPATCH from Johannesburg is published in London saying that John Hays Hammond, the American engineer and member of the reform committee, now on trial, repudiates letters to American newspapers purporting to emanate from prisoners. It is added a fresh outcry is being raised against the alleged Americanization of the Rand by mining magnates, who, it appears, have been placing machinery orders in the United States instead of England. Directors of English mining companies are also directors of American mining machinery companies.

THE mining bill, which has passed the Utah legislature provides that all locators of claims, either placer or quartz, must do 160 cubic feet of work within sixty days after location. The claim must be staked within ten days and recorded within twenty. Each claim of a group must be recorded as belonging to the group and work may be done on one claim for all, but in this case notice must be posted at the location of each claim, stating where the work has been done. Relocation is also provided for under certain conditions. The old system of recording is not changed.

A SANTA ANA, Orange Co., Cal., subscriber asks: "Can a locator of a mining claim ask for and receive a Government patent for the same any time after performing $500 worth of work and improvements thereon, or must he wait five years?" No time is specified in the statutes. All that is required is that at the time of filing the application for the patent, or any time thereafter during the sixty days of publication, the claimant shall file with the register the United States Surveyor-General's certificate that labor or improvement to the value of $500 has been put on the claim.

AFTER considerable research Colorado's Attorney General has discovered that there is no statute law in Colorado covering the question of what shall constitute a water appropriation for placer mining purposes. He is of the opinion that since the State has no law regulating the appropriation of water for placer operations, the custom in the old California days should hold good—that a water right in placer mining belongs to whoever makes the prior legitimate location, and that to make this location it is necessary to do actual work, such as making surveys for the ditch, and following this up by constructing the ditch and doing actual work on the location.

ERIE, WELD CO., COLO., reports that if the coal war has been a boon to consumers, it has also been death to the miners, bringing a reduced income, a bare subsistence in all cases, and destitution in not a few. The winter has not been a favorable one for the coal miners; weather mild and demand correspondingly light. Hence the miners earned small wages, not to exceed $25 per month. A great many have earned nearer $10 or $12 a month. Close upon this condition of affairs came the coal war, and the gradual drop in price from $4 per ton down by degrees to $2.40. Now the mines have practically all shut down. Some of the large companies are owing their men from one to two month's pay. The merchants are not able to carry the burden cast upon them, and already some have been forced to the wall.

ON March 3, 1891, Congress provided in chapters 559 and 561, second session of Fifty-first Congress, "That suits by the United States to vacate and annul any patent heretofore issued shall only be brought within five years from the passage of this act." This limitation as to patents before 1891 therefore expired on March 3, 1896, and the title to all such tracts is now absolute and indisputable. The present Congress, house bill 5474, extended the time within which suits might be brought to annul patents, but these were limited to those issued under a "railroad, Mexican, Spanish or other special grant."

THAT silver's prestige is slowly but surely advancing is revealed in the fact that dealers and speculators have abandoned futures and that they are now on a single quotation holding silver bullion as a staple the values of which for commercial and monetary purposes are coming together. When the demonetization of silver in India came in 1893, it was followed by two quotations, one spot and the other future. Since that event the future of silver has been invariably discounted and rules ¼c lower than spot quotations. On March 10th dealers in Salt Lake, Utah, reports the *Tribune*, began to receive advices that spot was the same as the future delivery of silver bullion, and there has been no digression from it since that date. Friends of silver look upon this as premonition of better times for silver, and local smelters are governing their purchases accordingly.

FURTHER complications have arisen between the Miners' Union at Virginia, Nev., and the new management of the Hale & Norcross. Last Saturday morning H. W. Tangerman, the superintendent appointed by the officers and directors of the company, was taken out of a barber shop in Virginia, where he was being shaved, and placed in a buggy. Escorted by about fifty miners and others, he was driven to the county line and threatened with violence if he returned. He continued on to Reno, where he made application to the U. S. District Attorney for protection. The mine is idle and there is a deadlock between the management, who say Tangerman will superintend operations, and the miners, who say he won't. Comstock residents are making a mistake. The mythical man who killed the daily provider of gold eggs was a marvel of prudence and sagacity alongside the man who denies himself or his fellow miners the present privilege of working in a mine for $4 a day, in the only $4 camp in existence. The $4 per day wage rate has received a hard blow in the house of its friends.

THE original articles in the MINING AND SCIENTIFIC PRESS, written by miners, metallurgists and others in every walk of life, form one of its most distinctive features. In this number, for instance, is an article on Rhodesia, South Africa, by Mr. W. St. Auburn, M. E., formerly superintendent of the Niagara mine, at French Gulch, Cal., now consulting engineer for the Rhodesia E. & D. Co., Buluwayo, South Africa; an article on "Matte Smelting," a partial critique of recent publications, by W. L. Austin, Ph. D., of Denver, Colorado, himself an authority on pyritic smelting; the full decision of Judge Beatty in the recent celebrated Carson Creek-North Star case; comment on the California State Mining Bureau by a central California miner. Next week will appear what is believed to be the best description yet written of Cripple Creek, Colorado, from the pen of T. A. Rickard, State Geologist of Colorado; and an article on "Invention—The Indefinable Requirement of the Patent Law," from W. H. Smyth, of this city, whose recent kindred essay, "Is the Inventive Faculty a Myth?" was copied and commented on in every corner of the civilized world.

REGARDING the tall new building in process of erection for the *Call*, corner Third and Market streets, this city, a Baker City, Or., subscriber encloses a printed slip stating its dimensions, height, etc., and asks if such is correct, and if so, will not winds and earthquakes make it unsafe. The statistics concerning its height, etc., are correct. Its manner of construction precludes probability of disaster from any cause. Similar buildings, erected in a similar manner, are unaffected by wind. In the 1895 edition of Kent's "Mechanical Engineer's Pocket Book," pages 493 and 494, is an elaborate discussion on wind force or pressure on buildings, from which it is fair to assume that in this city, in that location, and for a building like the one under discussion, the greatest probable wind force—eighty miles per hour—would exert a pressure of twenty pounds to the square foot. Assuming a height of 300 feet and a frontage of 50 feet would give one surface of 15,000 square feet over which would be unequally distributed a maximum pressure of 300,000 pounds. The steel girders, the skeleton system of construction of such buildings with ashlar stone fronts and rigid bracing throughout makes such wind pressure of no moment. Sometime ago the writer of this paragraph was in a friend's office in the top floor of the Masonic Temple in Chicago, during a heavy "blow," a stronger blast than ever sweeps across this city, and it wasn't noticeable in the least. The matter was discussed and the statement made that no wind, however furious, made the slightest vibration. That building is 302 feet high, nineteen stories—twenty-one including the promenade on the roof—has a frontage of 170 feet on State street and 114 on Randolph, and is considered a good illustration of the solidity of such structures. As to the earthquakes it is believed that the system of construction of such buildings makes them earthquake-proof. The whole building, from foundation to roof, is so rigidly put together, bolted, braced and interlocked, that it is practically one piece. An earthquake would shake it, probably cause it to rock, but unless the ground on which it was built gave way, opened or sunk, it is unlikely that the result of even a severe earthquake would occasion any damage. The big earthquake of October, 1868, spared a good many buildings that were not nearly as well put together as are now the Palace Hotel, the Mills Building, the Chronicle office, the Crocker Building, or the Emporium, and it is likely were San Francisco to be badly shaken by an earthquake those mentioned would be among the least injured. As to winds and earthquakes there is no part of the Union less liable to injury therefrom than this section.

## Gold Mining in Rhodesia.

Written for the MINING AND SCIENTIFIC PRESS by W. T. ST. AUBURN, Consulting Engineer Rhodesia E. and D. Co., Buluwayo, South Africa.

Of all the various quests for minerals, to the ordinary man none is so fascinating as that of the search for gold. In hunting for coal, copper, silver or other minerals, while experience can point out the proper conditions for the existence and the trained eye can often detect the presence of the object sought for, yet the tests to make sure of the valuable bodies being there are not of the simple nature of those for determining the presence of gold, and the reward for finding a deposit that is worthy of exploitation seems far off to the prospector when looking through the wrong end of a telescope composed of initial development, mining expert, company flotation, commercial development, reduction equipment and dividend distribution, whereas the grains of gold in his pan, seen through the lens of his pocket magnifying glass and his imagination, speak to him of immediate returns of what is money itself, needing no paraphernalia for its transmutation. Perhaps in that pan he might be holding a nugget, and at once the alluvial bar, over which he casts his eye, calculating its extent, and from which he has but just washed that panful of dirt, is alive with nuggets—and not small, ordinary nuggets like the one he is looking at, for why should he have washed the biggest one at the first trial panning, but "Welcome Strangers" or "Blanch Barkleys"—or should the panning be from a piece of float quartz bruised to dust between a couple of stones, the gold prospector knows that the possibilities of a "dolly" or an "arrastra" place him in a position to work out his own salvation without extraneous aid. At least, such are the circumstances of gold prospecting in nearly all the countries where gold has been found and worked to a profit up to the present day; and no doubt it was the fascination of this prospect that brought the first gold seekers into the Province of Rhodesia. And of all countries in the world nowhere was there to have been found a surface so redundant, I might say, so saturated with gold; and yet the prospector of Rhodesia is not happy to-day, for after enduring the hardships of pioneer travel, of actual warfare, of poor food and unhealthy climate, he finds that the country which should have rewarded him handsomely for all his pains and toils has been ransacked by some earlier bird, who has got the golden worm, leaving but the form or skin, as it were, of the ornithological delicatessen behind in the shape of the well known "old workings." How long and weary a struggle the pioneer prospector would have had to endure in this his favorite quest for gold, is past the power of human telling, but fortunately for him this wide Rhodesian gold field, robbed and debauched of its virginity, became, as have other entities in similar condition, the fashion, and men of wealth and position—no, I mean companies and syndicates of financial strength and influential connections—have scrambled to possess the leavings of the former lord and master, believing that all the sweetness cannot have been secured in the salad stage; conscious of superior power, of better appliances and a better knowledge of the earth's anatomy, the modern has no doubt of his ability to take up the quest for riches where his forerunners abandoned it, and to get reward where the ancient either failed or being satiated with possession had become enervated for further effort; he does not perhaps expect profit abinitio, as in other countries, but that he will be victorious in the end he feels so certain that he is not satisfied to merely "grubstake" the prospector, but freely buys any location he may have made on even the smallest "old working," and in many cases permits his enthusiasm to name the price.

In comparing these northern gold fields of South Africa with others, this then is the great difference to be noted: Whereas elsewhere the prospector "foreran the royal camp" of promoters, brokers and share speculators, and by the sweat of his honest brow and the strength of his good right arm earned for himself an independence, only giving place to syndicate or company when he had demonstrated the value of his ground and his nomadic spirit urged him "to seek fresh woods and pastures new," here, along with the prospector, must travel hand in hand the middleman, for nowhere can the former find the "actual stuff" to give him even the poorest living, but must content himself with pegging off the empty shell of some "old working" and then handing it over to his companion-in-alms, the promoter, must await the successful begging of the latter in making a flotation. Here in Rhodesia are, so to speak, the self-same gulches that in California or Australia would have supported each its own little community. But, alas, here is no "busy hum of men," for the level lips of the ravine are pock-marked and even the cheeks of the adjacent hills have lost their "bloom," for the ancient has "spread his wings on the blast and breathed on the face of the 'earth' as he passed," and his irritating little shafts are everywhere and so close together that nought remains at or near the surface that will pay our up-to-date prospector to work. So, cursing his luck and the bygone race, the pioneer would feel very much behind the times if it were not that he can sell his "rights" to an ever-ready buyer and so have the wherewithal to continue his peregrinations. I call this buyer an ever-ready one, but in this I am led by the actions of the buyer of the past, and I am not so sure that the buyer of the future will be so lavish with his cash or his undertakings because he is beginning to learn that the exigencies of proving a prospect require a personal ownership of the worker, who must be ready to work early and late and have an unbounded faith in his property in order to get the best conditions for successful development. And under the conditions in Rhodesia to-day this great incentive of ownership and belief in the property does not exist, and the result is a lax state of affairs most prejudicial to the best interests of the property and its speedy exploitation. Under these circumstances the prospector rushes over the country, not laboriously picking out by means of his pick and pan promising prospects, but pegging any "old working" that he may run across or have pointed out to him by natives, who are anxious to show him any that they know of in exchange for a "tusa," consisting of an old gun, warranted not to fire straight, a couple of blankets or an old shirt whose only parts in complete repair are the button-holes; and then, after disposing of his claims to some syndicate, he stands ready to take a contract at high figures to oversee his "boys" excavate the amount of opening required by law. The effect of this will probably be a lessened avidity to make purchases in the future.

In speaking thus of the present system of prospecting and exploiting in Rhodesia, I do not overlook the fact that there are exceptions where honest work is done and intelligent quest conducted, but these are but the exceptions that prove the rule, and in the vast majority of cases the modus operandi is as I have outlined above. Some of the syndicates and development companies have, however, gone beyond this stage, and in some cases are now conducting operations on a scale befitting their objects and in a style worthy of the properties they own. That the country should have furnished ore deposits that have survived these extravagant methods would speak highly for its future if these ores had satisfactorily stood the test of a mill-run; this has yet to come. In the Penhalonga, the Enterprise, the Salisbury, the Abercorn, the Beatrice, the Dunraven, the Bonsor, the Tebekwe, the Pioneer, the Queen's and the Ayrshire, the country can show properties that have gone beyond the initial stage, and in some of these the amount of ore in sight can be reckoned in thousands of tons. In numbers of other properties the showing is quite promising, and much exploratory work is being carried on that will without doubt lead in many cases to the uncovering of good ore bodies. To give a list of these would be burdensome and premature.

In comparing the gold occurrences in situ with those of other countries we are handicapped by the fact that, except in the few cases of "virgin" reefs, the outcrops have all been previously mined, and while we can see and determine the character of the enclosing rock, we can only tell what the matrix of the reefs is where the "old workings" have been bottomed or the reefs cut below them. In these cases the matrix usually is found to be, as elsewhere, quartz, but it has been a not infrequent experience to discover that the reefs mined by the ancients were composed of some other material; thus in the Ayrshire the matrix was found to be a diorite, in the Gaika a soapstone, in the Johnson of Manica a kaolin, and I have noted other cases where the occurrence may be classed as "abnormal." Hence it is too early yet to state definitely what we must look upon as constituting the Rhodesian ore bodies and what the prospector must look for as indicating his best chance of success. A similar state of uncertainty prevails with regard to the enclosing rocks and the character of the reefs themselves; there have been opposing opinions given by the various geologists and mining engineers who have visited the country. To some the veins are, as one celebrated engineer of Johannesburg expressed it to me, "mere whip-lash veins on the surface;" to others, they are "true fissure veins;" to others, "seggregation" or "substitution" veins, while yet to others, they are "interbedded" veins. Probably there exist some veins of all these different classes, and while some are more or less fugitive, others may be regular and permanent; further, I believe that we shall find occurrences that will not come under any of these heads, where gold will be found in payable quantities, under conditions not before observed in other parts, and as the Witwatersrand series astonished the world, so some to-be-discovered Rhodesian deposit will set the scientific coterie agog to account for the possibility of its existence. The old miner's adage that "Gold is where you find it!" never had a country that more fully exemplified its truth. It is difficult to find a spot from which a pan of dirt can be taken that will not show "the color," and some spots that I have tried have shown some remarkable results. My advice to all Rhodesian prospectors is to not rest content with trying the recognized gold-bearing rocks, but to pan every kind of rock in sight. Of the enclosing rocks but little need be said, for although they are those that elsewhere have been considered the home of the rich pocket and the elusive seam, still they are those that have always been considered gold-bearing; and as each district has its idiosyncrasies and each country its own characteristics, so it may remain for Rhodesia to prove that under favorable conditions the granitic and schistose formations may produce reefs of great permanence and sustained value.

It remains but to mention alluvial deposits, and as most of the gold quest has been hitherto made in the "high veldt" and at the headwaters of the streams, these deposits as so far known consist of shallow gulch gravels and detritus from the reefs; these have all been gutted by the ancient miners. Whether any gravel banks exist similar to the ancient river channels of California is an open question, but if they do exist they must be sought in the lowlands where the mountain streams empty into the valley of the Zambesi, a country but ill adapted to the well-being of the white man. Along some of the rivers of Manica are bars and shallow banks that will probably pay to work by hydraulic washing, but the fall of these rivers is generally too flat to permit of the most economical working. Similarly on the lower reaches of the Mazoe, the Luia, the Hunyani, the Umfuli, the Sanyati, the Shangani, the Guay, and their tributaries, bars and banks may exist that will pay to wash, if the climate will permit.

In conclusion I would point out that in gold mining, as indeed in all mining, the surrounding conditions are what govern the question of whether a deposit will pay to work or not. An ore body may be never so rich but what, if the conditions are unfavorable, it will fail to be remunerative. These factors in gold mining are cheap timber, water, fuel, labor and, in a lesser degree than in other mining, but still of importance, transport. Rhodesians believe that they have the gold, that they can demonstrate and have demonstrated that it exists in their country in quantities and in grade of value that in other countries has been commercially remunerative, but the thoughtful among them are not so ready to affirm that the other requisites to success are present. In nearly all the various districts timber exists in fairly large quantities and fairly conveniently situated to the mines, but most of this is subject to the ravages of insects that abound, and the varieties that are resistant to these ravages are far from plentiful and their wood is not easily worked. For fuel for some time to come the poorer timber will furnish an adequate supply, and when the supply fails it is possible that coal may be found to take its place, as reports of several discoveries are rife. For water, the mines are generally well situated, and as most of them must be worked by shaft they will perhaps furnish their own water supply for the batteries by means of pumps in the mine. In some cases water power is available, notably in the Manica gold field. It may, therefore, be considered that in these essentials the mines of Rhodesia will be as well off as the average of mines in other localities. It is, however, in labor and transport that the danger of failure lies. At present the native labor market is in a very disorganized condition; great scarcity of "boys" is everywhere reported. This may be in part due to the season of the year, which is that of the sowing of crops and the tending of gardens; but I do not believe that it is due entirely to this cause, and unless proper steps are taken for the regulation of this market, so that a steady supply of laborers can be obtained, I foresee grave trouble. White labor, too, is scarce and high-priced, but this, I have no doubt, will remedy itself as the country becomes more settled up and a securer feeling in its future more widely felt. In dealing with the question of transport there is only one thing to be said: it is simply prohibitive; only the richest deposits can possibly be profitably mined at the present rate of transport and the cost, delivered at the mines, of the necessary supplies. It is useless to go into details until an amelioration takes place; the country as a whole can not be a successful mining community. In this paper a discussion of the new mining law, as recently promulgated, would be out of place, and while it may work hardship if rigidly enforced, I believe the interests of the Government are too much bound up in the success of the mining industry for it to be a permanent trouble, and I am as sure that alterations in the law will be made as their necessity becomes apparent.

Buluwayo, South Africa, Jan. 30, '96.

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ACCORDING to general report the Cook's inlet, Alaska, tides are terrors. They travel, it is said, with the swiftness of a Johnstown flood. They rise and fall a distance of 47 to 49 feet. They will carry out a schooner or vessel eighty miles in four hours. Turn Again Arm is said to be a narrow continuation of Cook's inlet and turns from the inlet easterly almost at right angles. In that part the tides are said by some to sometimes rise 60 feet. It goes like a moving wall. It is up the Arm on the southerly side where the best placers are found.

## The Usefulness of the Mining Bureau.

TO THE EDITOR:—In view of the increased interest manifested in mining and the renewal of energy and investment of capital in that direction, comes a demand for more general information on the subject—a demand which the Mining Bureau, under its present organization and system, is supplying the miner and the capitalist with much valuable information and data.

The Mining Bureau from time to time issues bulletins written in simple and plain language easily comprehended, and such are illustrated with cuts. Among these recent bulletins are the one on "Mine Timbering," by W. H. Storms, one of the Bureau assistants, "The Cyanide Process," by D. A. Scheidel, who has supervised the erection of cyanide plants in Australia and Africa; the bulletin on "Mill Practices," by E. B. Preston of the Bureau, which is one of the most useful publications to the millman, describing, as it does, with illustrations, every part of a milling plant of modern pattern as well as the best methods of amalgamating every description and variety of ores. In addition to these useful guides to the miner, the Bureau has in hand and will issue a pamphlet on "Mine Drainage Pumps, Etc.," to be followed by other equally valuable information for the miner.

The Mining Bureau has distributed over twenty thousand of these instructive pamphlets, which have drawn from the mine owners and operatives the heartiest approval, and applications for them are received almost daily from every part of the world, particularly Africa, Australia, Colorado, Montana and Idaho. In addition to these bulletins, the bi-annual reports have brought the attention of capitalists abroad to the opportunities for investment, and have been the cause of bringing hundreds of thousands of dollars to the State. Capitalists eagerly seek information from the Bureau, and the visitors run up into thousands weekly—seekers for information. It is rapidly assuming an important source of information to the miner and parties seeking investment in California mining properties, and through which the mine owner and the capitalists are brought together without expense to either.

It is to be hoped that the next Legislature will appreciate the influence of the Mining Bureau in behalf of the miner, and the attraction of capital to the State leading to the revival of mining, and putting into active operation hundreds of undeveloped mines that have lain dormant for the want of necessary capital, all of which brings money into circulation in the State and furnishes employment to the army of idle miners.

What the Mining Bureau needs is liberal appropriations to enable it to carry out the energetic policy of its present administration, which is only limited by want of the necessary funds to diffuse such information to the miner in the way of the issue of bulletins as will save him time and expense in operating his property. Already the publication of the bulletins, which the limited means of the Bureau has enabled it to issue, has earned the grateful commendation of the recipients and urgent requests to continue the good work which a small addition to the usual appropriation will enable it to do.

Mining has experienced such a revival as to become the prominent interest of the State, and every encouragement should be given to its fostering through the spread of such publications as will call the attention of foreign capital to the inexhaustible wealth that needs but capital to develop and furnish employment to the miner; for, although it is to be regretted that our local capitalists are so slow to take advantage of the opportunities, it is of interest to the general community, as well as the owners of undeveloped mines, to induce foreign capital to invest in our mines, putting money into circulation for labor and mining machinery purchased here. It is only the surplus or profits that go abroad, and this loss to the State is of less importance when it is considered that, except for the working and development of these otherwise dormant properties, no part of the gold they contain would be put in circulation. Therefore, every dollar appropriated to bringing the attention of foreign capital to investment in our mines is returned a hundred-fold to the State. Every facility and every honest and proper effort should be made to inform the world of the wealth of our State that only needs capital to develop, for it is too well known to need mention that we have hundreds of millions of dollars awaiting the magic wand of capital to put into circulation.

The Mining Bureau is becoming one of the most popular and important institutions of the State, and every facility should be given it to continue and enlarge its sphere of usefulness. The effect of the present system of diffusing information is being felt throughout the entire State, and meeting with the approval and endorsement which it deserves for the good it is doing in the most economical way, with the limited appropriation available. MINER.

Stockton, Cal. March 20, '96.

## Matte Smelting.

Written for the MINING AND SCIENTIFIC PRESS by W. L. AUSTIN, Ph. D. Denver, Colorado.

The appearance of Mr. Herbert Lang's work bearing the above title is all the more opportune because of the renewed interest which is being taken in this subject on account of the preparations now being made for the introduction of the matting process at Iron Mountain, in Shasta county. It is proposed to treat the ores of that mine by this process upon a large scale. As Mr. Lang is the metallurgist in charge of the construction work now going on at Keswick, it is most interesting to learn his plan of operations in advance of actual results, as one is thereby enabled to follow intelligently the development of the methods he advocates.

Mr. Lang has put much painstaking work into his book; and, although it is impossible to agree with him in some of the deductions to which he has been led by his own experience and research, possibly if others had had similar opportunities for forming opinions, they might have reached the same conclusion. At any rate, Mr. Lang's book may be read by his professional colleagues and by those interested in the subject treated with benefit to themselves.

The importance to California of matte smelting is very great, because distributed along what is known as the copper belt of that State for several hundred miles in a northwesterly and southeasterly direction are numerous deposits of mineral which may be treated by this method, whereas it is doubtful whether they can be handled profitably by any other metallurgical process at present in use. Since the middle of the sixties, the exploitation of many of these mining properties has been undertaken from time to time; but except during the period of very high copper prices, the results have usually been financially disastrous. Attempts at matting these ores are by no means novelties; they were made as early as 1865 and repeatedly since that date, but for reasons which it is not necessary to go into at this time (and which will be apparent to the experienced metallurgical engineer who takes the trouble to look into the matter) none of them are believed to have been successful from a dollar and cents point of view.

This state of affairs is not as it should be. California is rich in copper-bearing ores which are amenable to modern methods of metallurgical treatment, and there is no reason other than the inertia of the owners of these properties themselves why California has not, during the past decade, become one of the great copper-producing States of the Union. Therefore, it is to be hoped that the work now being done in Shasta county may open up the way to a new era of prosperity along the aforesaid copper belt and result in the working of other promising properties which have too long been allowed to lie idle.

For a long time it has been thought that the Californian copper ores, as soon as the oxidized surface zone is passed, are refractory and too low in grade to handle at a profit; but such views have arisen from a lack of information in regard to metallurgical progress elsewhere than on the coast. Complex, heavy sulphide ores are now considered very easy of treatment, and yield larger profits than were formerly obtainable from oxidized ores of equal grade. California metallurgists lead the world in the milling of gold and silver ores and are eagerly sought after by foreign corporations owning deposits of mineral which may be worked by milling processes; but this department of metallurgy has been built up on the coast at the expense of other branches, and this is especially noticeable in all that pertains to the smelting of ores. Sulphides, very similar to those found along the copper belt, are now being calcined (roasted) and smelted into matte for less than $3 per ton of ore, and this is done in localities with which California compares favorably with reference to costs of fuel and labor.

Granted that it is a debatable point whether or not, even with matte so cheaply produced, some of the California mines could be profitably worked if the operation were stopped at that point, still it is now an easy matter to convert such matte into metallic copper by means of the Manhes process or other well-known metallurgical methods. Wherever water power is available (and California is liberally supplied with such power by the many streams which flow down from the Sierras through the mining regions), the cost of converting the matte into crude copper should not exceed $6 per ton of matte and ought to be done for less.

To mine and transport ore from the mines to the furnaces should not cost over $3 to $4 per ton along the copper belt, and in many cases would not reach this figure, all dead work included. Assuming that such a raw sulphide ore carries seven per cent copper, and that in reverberatory matte smelting fifteen tons of ore are concentrated into two tons of matte, and that these two tons of matte are converted into one ton of crude copper by the method indicated above, the total cost of producing this ton of crude copper (98 to 99 per cent fine) from the ore should not exceed a total of $57 per ton of copper, or $3.80 per ton of ore. Even better results than these should be reached by other methods of reduction, notably by pyritic smelting; so that crude copper should be produced from the seven per cent ores of the California copper belt at from five to six cents per pound of copper at the outside.

Nor is it necessary in accomplishing such results to have recourse to hypothetical or untried processes of reduction, but simply to reproduce in California operations which are everyday matters in other mining regions. At one large establishment in the Rocky Mountain section heavy sulphide ores are calcined and smelted into matte for less than $2 per ton of ore; not spasmodically nor in small batches, but on a basis of several hundred tons of mixed ores per diem every day in the year.

The operations at Iron Mountain will, therefore, be watched with unusual interest, and the working of the smelting apparatus installed by Mr. Lang will be carefully noted, because of their bearing upon the prospective value of the undeveloped metallic resources of the State. It is very much to be hoped that Mr. Lang will, from time to time, favor the readers of the MINING AND SCIENTIFIC PRESS with accounts of the extent to which he finds fact to correspond with theory in the problems he is working out. Discussion of technical and scientific matters invariably results in benefit to all concerned. This is markedly instanced in the advance made of late years in the metallurgy of iron and steel, which advance is largely due to discussions of matters bearing vitally upon those subjects, in papers and at the meetings of technical and scientific societies. It is much to be regretted that the same lines have not been followed out in other branches of the profession, for if they were, the diversity of views held by different metallurgists would be moderated in exactly the proportion in which the actual facts became general knowledge. The truth is what is wanted, not the views of any one individual based upon a more or less limited experience, and the truth can best be reached by a combination of the experiences of many.

In view of the prominence that has been accorded the name of the writer in Mr. Lang's work, it becomes obligatory on the part of the former to correct some of the statements made therein, especially with reference to the writer's own work. This is not done, however, in an unfriendly or hypercritical spirit, and if in a subsequent article some of the theses advanced by Mr. Lang in his book are commented upon, it will be merely in the effort to correct what are considered as errors due to insufficient, or incomplete, information furnished the author from sources which he was not able personally to look up. If in this way it is possible to throw additional light upon a subject concerning which the statements of current writers are exceedingly misleading, the principal object of these articles will have been attained.

Before taking up in detail some of the questions raised by Mr. Lang's work, a few remarks upon the nomenclature made use of by metallurgical writers in treating the subject of pyritic smelting would perhaps not be out of place. The use of different terms to express the same idea tends towards confusion. This is particularly true in the case of the casual reader not familiar with the subject that is being treated. For this reason it is well not to complicate matters by introducing a new terminology into the subject of matte smelting, especially when the terms already in use are sufficiently explicit to cover the whole subject.

Pyritic smelting is a term borrowed from Percy (see Percy's Metallurgy of Gold and Silver, Part I, page 531), and was used by him to designate "The smelting of silver ores, which are either free from lead or do not contain it in sufficient quantity to collect the silver, in conjunction with pyrites, in order to produce a regulus in which the silver may be concentrated." It is assumed that Percy limited the use of this method of smelting to silver ores, for he called it pyritic-silver smelting, and it is inferred that he considered an iron matte as a fairly efficient vehicle for collecting silver from dry ores when lead was not to be had in sufficient quantities. Pyritic smelting, then, according to Percy, differs from other methods of smelting solely in regard to the vehicle of collection. No reference is made to copper in the definition, and it is probable that where ores contained that metal it was intended to treat them as properly belonging to the methods of reduction coming under the head of copper smelting.

But the collection of valuable metals in an exclusively iron matte is for various reasons not practiced to any extent at the present time, and therefore we have in the term pyritic-silver smelting a rather comprehensive name affixed to what might be considered an obsolete process. For this reason it occurred to the writer to adopt the expression pyritic smelting in designating a somewhat different idea from the one for which Percy originally used it, omitting the word silver because, in the new adaptation of the name, the process described by it is applicable to the treatment of various other metals besides silver.

In a pamphlet published by the writer in 1889 the term pyritic smelting was first made use of to designate that method of smelting in which pyrites were not only made the vehicle for collecting the precious metals, but also the source from which the greater part of the heat necessary to carry on the smelting operation was derived. The use of the word pyritic to specialize a system of smelting in which the heat required in carrying out the operation is for the most part derived from the pyrites contained in the charge—in other words, in which pyrites are employed to produce fire—is a closer approach to the true etymological meaning of the word (which is derived from the Greek, signifying fire) than is its use in the sense of employing pyrites as a vehicle of collection. But, whether justified or not, the later signification of the term has now become its generally accepted meaning.

On account of the conflict of ideas which might occur from indiscriminate use of the term pyritic smelting in the sense in which Percy first introduced it and in that of its more modern acceptation, possibly it might be advantageously replaced by the expression sulphide smelting, first proposed by the writer a number of years ago; but as the operation which it is desired to define embraces the use of arsenides as well as sulphides, the word pyritic (because it refers to all kinds of pyrites) appears to more completely cover the case.

In this article the term pyritic smelting is used to designate a process of smelting in which the greater part of the heat used in fusing the slag and matte formed in the furnace is produced by the oxidation of the iron and sulphur contained in the furnace charge itself. Matte smelting, on the other hand, is used as a generic term for all systems of smelting, where matte of any kind is the valuable resultant product, whether in reverberatory or blast-furnace practice. Pyritic smelting is therefore a branch of matte smelting, but the terms cannot be employed interchangeably, because as a general thing in matte smelting matte is produced from ores which have been calcined down to the point where only sufficient sulphur remains to form the desired percentage of matte fall, and practically none is available for heat purposes. As illustrations of matte smelting might be mentioned the practice at the Anaconda works in Montana, where the calcined concentrates are fused down in reverberatory furnaces to a matte, or the smelting of raw and calcined ores to a matte in water-jacketed cupolas at Bisbee, Arizona.

The practice at Silverton, Colorado, however, where raw ores are fused to a matte by burning the pyrites contained in the charge, might be considered as pyritic smelting, but not as the highest development of the art, because the auxiliary heat supply used to effect the combustion of the protosulphide of iron is largely derived from the burning of coke in the furnace itself. The use of coke at all in a pyritic smelting furnace hardly recommends itself where it is not needed, nor is it requisite in the case of heavy sulphide ores, because as it is evident from an inspection of the Manhes process alone that the protosulphide of iron contains in itself the thermal units essential for maintaining a high degree of heat, therefore the addition of more fuel to a charge already amply supplied is of doubtful utility. But that the practice of charging coke with a pyritic ore charge which already contains more than sufficient pyrites to be self-smelting is adhered to at several works cannot be denied. The explanation of this paradox in the cases referred to is that the furnaces in which pyritic smelting operations are attempted are not suitable for the purpose to which they are put, and being designed for a different method of smelting, the addition of some coke becomes a necessity. The apparatus in which a given fuel is to be combusted should be constructed to meet the requirements of that special combustible. For instance, the residuum of a petroleum refinery is not a suitable substance for burning in a kerosene lamp, yet when sprayed from a properly constructed hydrocarbon burner, it shows itself to be an excellent fuel. A blast furnace constructed upon the lines of those used for smelting lead ores is just as unsuitable for pyritic smelting as a coal-oil lamp is for burning residuum.

In treating the art of matte smelting, the subject can be suitably divided into the following principal heads:

MATTE SMELTING.

| I. Ordinary smelting of ores into matte, in which carbonaceous fuel is used to supply the necessary thermal units. | | II. Pyritic smelting, in which the combustion of pyrites furnishes the principal source of heat. | |
|---|---|---|---|
| (*a*) Reverberatory matte smelting. | (*b*) Blast furnace matte smelting. | (*a*) Pyritic smelting, where the blast is heated externally or through combustibles introduced into the tuyeres. | (*b*) Pyritic smelting, where the blast is heated at the expense of carbonaceous fuels (coke, etc.) introduced with the charge and burned within the furnace itself. |

The variations in matte smelting may, in nearly every case, be brought under one or the other of these general heads. In any case, whatever the system of dividing up the subject may be, the distinctive feature of pyritic smelting, namely the use of the natural or artificial sulphides or arsenides as metallurgical fuels, should be made the dividing line between it and the ordinary matte smelting methods.

Mr. Lang, in his work, gives the following definition of matte smelting: "As the smelting of natural sulphides with the design of collecting their valuable parts in a quantity of artificial sulphides. Or, more explicitly, as the smelting of ores composed of, containing or giving rise to, sulphides, for the purpose of collecting their values in a less quantity of artificial sulphides."

In this definition Mr. Lang limits matte smelting to the smelting of natural sulphides. If, under this synonym, raw or unroasted sulphides are meant, which appears probable, then the matte-smelting operations at Butte, for instance, are excluded, because very little, if any, raw sulphides are smelted at that point without calcining. This statement applies to nearly all the large matting establishments in this country, and it is difficult to understand why Mr. Lang should limit matte smelting to the smelting of "natural sulphides" only.

In the book referred to reference is repeatedly made to the "German system" of matte smelting, under which title is meant (see pages 11, 30, and 57) the smelting of ore mixtures containing more or less unroasted iron pyrites, which, when melted, are intended to serve for the collection of the valuable metals. This method of smelting is identical with the one described by Percy under the heading pyritic-silver smelting, which has been already referred to and is the "silberroharbeit" introduced into the Freiberg works by Barthel Koehler in 1585 (see Plattner's Vorlesungen ueber allgemeine Huettenkunde, Vol. I, page 7). So the "German system" of matte smelting, "pyritic-silver smelting," and "silberroharbeit," or simply "roharbeit," are all one and the same thing, and are simple matte smelting. The process is minutely described in all the old text books and would be classified under I in the table given above. No attempt was made in this method of smelting to utilize the protosulphide of iron as fuel; in fact, it does not differ materially from ordinary lead smelting, except in the use of an iron matte (?) in the place of metallic lead as the vehicle of collection.

Mr. Lang further introduces into the literature of matte smelting such terms as "a practical cold-blast pyritic process" (see page 57), and "gradual reduction methods" (see page 84), or "gradual reduction processes" (see page 5). Apparently these terms are all meant to express one and the same idea, namely, pyritic smelting in which the blast is heated at the expense of wood and coke introduced with the charge, and they all would come under II. (*b*.) of the above table. Mr. Lang's "gradual reduction methods — hot blast" are simply pyritic smelting, and would come under II of the table referred to.

In writing upon any metallurgical subject it would seem unadvisable to introduce terms which may cause even those well versed in the topic under discussion to pause and wonder what they are reading about. The tendency should be towards simplifying, not complicating a subject.

Denver, Colo., March 20th, 1896.

## Notes on the Handling of Slags and Mattes at Smelting Works in the Western United States.*

By WILLIAM BRADEN, Helena, Montana.

It is obvious that the choice of the method to be employed in the handling of blast-furnace slags and mattes depends upon local facilities and conditions which may indicate as advisable some particular plan. As a result of the variety of such conditions, hardly any two smelters use identically the same method, though they be located only a few hundred feet apart. For instance, of the several plants in Leadville, Colorado, each has a more or less distinctive system. The same is true of Salt Lake City and vicinity. In view of this, it is evident that the existing diversity of practice cannot be accepted, prima facie, as evidence of the lack of wisdom at any one works, and the following account of the methods pursued at several leading establishments in the West is offered, without purpose of criticism, as likely to furnish for all parties useful material for consideration:

*The Boston and Montana Consolidated Copper and Silver Mining Company.*—This company has large mines in Butte, Montana, whence the ore is shipped in cars to Great Falls, 170 miles distant, for treatment. Such ore as is suitably high in copper is smelted in blast furnaces to a copper matte, carrying from 50 to 55 per cent of copper, which goes to the converters. These are as large as the average steel converter, the minimum charge being about 3 and the maximum 8 tons. The crude ore, too low in copper to smelt direct, is concentrated, roasted in Bruckner cylinders and reduced to 50 to 55 per cent matte in reverberatory tilting hearths. This matte, as well as the blast-furnace matte, is converted to "pig copper," which is either refined electrolytically on the spot or shipped for refining elsewhere.

The works, located on the north bluff of the Missouri river, some two miles below the city of Great Falls, occupy a well-nigh ideal site for a large smelting establishment, there being great water power and a steady slope of about 1 foot in 5, more or less, from the edge of the river for several hundred feet back. Switches of the Great Northern Railway run through the works at the top and bottom with convenient grade for unloading of ore, coal, etc., and for the handling of empty cars.

Fuel for the "Wellman" and the "Taylor" gas producers is supplied from the Sand Coulee coal mines in the Great Falls district. Water, to be used under head, is pumped to large tanks on top of the bluff above the smelter.

The ultimate disposal of the slag at these works is effected by granulation and sluicing away; but the method may be better explained by considering the handling of the slag from three more or less distinct sources, namely, the blast furnaces, the reverberatory tilting hearths and the converters.

1. The molten material from the blast furnaces is run continuously into a movable fore-hearth or settler, which is simply a rectangular box bound with cast-iron plates about 1 inch in thickness and lined with split fire-brick.

The matte (which is high in copper, thus assuring a clean slag) is tapped periodically, according to the amount being made, from a tap-hole some 5 or 6 inches from the bottom of the fore-hearth into an ordinary slag-pot. When this is full it is wheeled away a few feet and the matte is poured into molds. When cool, being in slabs of from 2 to 3 inches in thickness, it is easily broken to suitable size.

The slag from the fore-hearth overflows continuously (except while the matte is being tapped) into a jet of water under pressure, and is sluiced into the river, where it is carried by the current.

2. At the tilting furnaces, after a thorough fusion has taken place and the furnace is prepared for a separation of the slag and matte, it is tilted and a man with a long hoe skims the slag from the furnace into a trough, from which the slag is granulated and sluiced to the river like the blast-furnace slag above mentioned.

3. During the operation of skimming the tilting hearths a converter is also being skimmed into a large ladle of 10 tons or more capacity. When the skimming of the converter and the tilting hearth is finished, both are swung to normal position and the ladle carrying the converter skimmings is picked up by a 20-ton electric crane and carried to the tilting-hearth just skimmed, into which the slag is poured. By the cleansing on the "copper bottoms," so to speak, of the tilting hearth, lasting a few moments, I am told that the converter slag is reduced from 2 to 2½ down to 0.6 per cent of copper. After this cleansing the hearth is again tilted, and the slag is skimmed and granulated and sluiced off, as already described.

At other copper works in Montana slag is handled from the blast furnaces in much the same way where sufficient supply and head of water are available. But the slag from blast furnaces more generally run from the fore hearth into an ordinary slag pot, which is wheeled to the edge of the dump and emptied by tilting.

*The United Smelting and Refining Company.*—This company has near Great Falls, on the Missouri river, about 2 miles below the Boston & Montana Copper Works, above spoken of, works at which purchased ores are reduced to base bullion. The sampling works, roasters and ore bins, blast furnaces, engine room and boiler room are practically on the same level, which is that of a bluff above the river, where the furnaces are located, giving ample dumping ground for the slag. The slag flows from the furnace into a settling pot, and overflows into a Devereux pot, which is an ordinary slag pot with a hole about 1 inch in diameter on the front side. In this case the hole is very low down, about 4 or 5 inches from the bottom of the pot. These Devereux pots, when filled, are pulled some 150 or 200 feet to the edge of the slag dump and tapped by inserting a steel bar through the top of the crust and poking the same through the hole, which has previously been plugged with clay. Of course, when struck by the bar the plug of clay falls out, and the molten slag flows over the dump. If there happens to be any matte, it is saved in the portion of the pot beneath the hole. This is allowed to cool, and is then separated on the dump from the slag by men with "culling hammers." Usually there is between the slag and matte quite a perfect cleavage plane, often characterized by crystallization. When a "settling pot" has become filled with matte a fresh one is substituted. The matte is allowed to cool and then broken up, as before described, and is ready for further manipulation. The advantage of the Devereux pot over the ordinary slag-pot, is connected with the possibility that a small quantity of matte may overflow with the slag from the settling pot. In the use of the ordinary slag-pot everything except the crust adhering to the sides of the pot and a small amount of the top crust would be thrown away over the dump; whereas, with the Devereux, if any matte is present, it is saved in the "button" below the hole. If, upon cooling, this "button" is seen to carry no matte, it is either thrown away, involving little additional expense (which is justified by the safeguard thus secured against loss), or it is re-smelted with the "crusts."

*The Omaha and Grant Smelting Company.*—At the works of this company, in Denver, Colorado, a very good system for handling slag and matte has been introduced. Slag is received from ten blast furnaces. The molten material is tapped from the furnace into a slag-pot, which is wheeled away, and the slag is emptied as quickly as possible by tilting into a large pot constructed on the Devereux principle, which has previously been lowered into a cylindrical compartment or pit in the dump, so that the top of the pot when in position, shall be on a level with the dump at this point. Those pits with their large pots, of which there are several, are located in a row about 120 feet in front of the blast furnaces. When one of these large pots is full of slag and matte, it is hoisted and carried by an overhead crane to such a position that when the plug of clay is punched out the slag will run into side-dumping slag-pots on trucks, after which the large pot is conveyed to another position, so that the matte left in it may be tapped into a pot of the same construction, but somewhat larger than the ordinary slag-pot. The shell in this large pot, after the slag and matte have been tapped, is conveyed to a convenient spot, and the "crusts" are dumped.

When the side-dumping slag-pots have been filled, they are pulled by mules to the edge of the dump, and the slag is thrown over. The matte is allowed to cool in the pot into which it was tapped, and is then broken with culling hammers. Any slag on the dump, in the form of crusts or otherwise, which is to be re-smelted, is loaded into a small car lowered on a tramway, so that its top is below the level of the dump, and hoisted in this tramway several feet above the charge floor, upon which the car is wheeled to the furnace at which it is desired to dump the slag. * * * *

*The American Smelting Works.*—At these works, in Leadville, Col., a branch plant of the Aurora Smelting and Refining Company, the slag from seven lead furnaces is granulated, as is likewise most of the matte made. The molten material is tapped from the furnace into a settling-pot. A portion of the matte settles in this pot, and that which does not, overflows with the slag into a second, somewhat smaller, settling-pot. From this the slag overflows into a jet of water, under 20 pounds pressure, in which it is granulated and sluiced away. When the second settling-pot is full of matte, it is replaced with an empty one and hoisted to a suitable point, and the matte is granulated, the granular particles falling into storage bins, from the bottom of which the stock is drawn out, when desired, into tram-cars and conveyed to the roasters.

*The Consolidated Kansas City Smelting and Refining Co.*—The main works of this company are at Argentine, Kansas. Here slag is handled in somewhat the same way as at the works in Leadville, with the exception that the Argentine slag, instead of being thrown away, is sold to the railroads as ballast. The molten material is run from the furnace into Devereux pots, which are wheeled to a cut somewhat similar to that described at the Arkansas Valley Works. Into this cut are run slag-trucks, which, however, carry, instead of conical pots, rectangular cast-iron boxes. When a train of these boxes is ready for the slag to be tapped into them, a wrought iron pronged eye-bolt, 1¼ inches in diameter, is placed in the middle of each box, the eye extending about four inches above the top of the box. When all the boxes on the trucks have been filled with slag, a small motor side-tracks the train and puts another train of empty boxes in the cut. After the slag in the boxes has cooled sufficiently, a small traveling crane picks up one cake of slag after another by means of a hook inserted into the eye of the pronged eye-bolt, and deposits the same in front of a crusher. The cakes are broken up with hammers, the eye-bolts are withdrawn and the slag goes through the crusher, and is loaded on railroad cars, ready for use as ballast.

*The Omaha and Grant Smelting Company.*—At the works of this company in Omaha another adaptation of the Devereux system is in use. The molten material is tapped into the Devereux pots from the blast-furnaces and allowed to stand long enough for as complete a separation of slag and matte as possible. About 75 feet in front of the furnace building, and centrally located, is a contrivance which handles very ingeniously the slag as tapped from the Devereux pots. It consists of a circular pit, about 35 feet in diameter, and filled with water, upon the outer zone of the surface of which an annular disk of cast iron plates, about 2 feet wide and 1¼ inches thick, and slightly trough-shaped on the top, is made to revolve. This disk is supported partly by radial arms from a pillar in the center of the pit and partly by rollers attached to the plates underneath, and traveling or stationary plates, which are in turn supported by pillars around the circumference of the pit. Revolution is effected by means of a rack on the periphery of the disk. A constant stream of cold water is run into the pit and an outlet is provided for the heated water, the supply being so regulated that the water shall not overflow the trough-shaped surface of the disk, but the lower side of the plates, with the rest of the mechanism, shall be constantly immersed in cold water. The apparatus makes one revolution in five minutes.

A Devereux slag-pot having been wheeled to the edge of the pit, the slag is tapped, first striking a cast iron plate fixed at an angle of about 60 degrees from the horizontal, to prevent the undue scattering of the slag, which passes through upon the revolving trough-shaped disk. On this it spreads out, covering the plates to the depth of ¼ to 1 inch, according to the amount of slag being made. From the molten state in which it was tapped from the pot, the slag cools gradually on those water-cooled plates, until at the end of a revolution it is quite brittle. A piece of ½-inch steel is set diagonally across the revolving plates in such a manner as to break up the slag and force it on to a conveyor, which takes it up into bins, from which it is loaded on railroad cars. It is of such size and structure as to be of superior quality for the purpose of ballast, being square or rectangular in shape, from ¼ to 1 inch in thickness and from ½ inch to 4 inches in surface area. This arrangement was designed by Mr. Page, the superintendent at these works.

*The Hanauer Smelting Works.*—At these works, near Salt Lake City, Utah, silver-lead ores are concentrated in blast furnaces. A sluice carrying water under pressure is run under the floor in front of the furnaces. The slag and matte are tapped periodically from the furnace into settling-pots; the slag overflowing into the sluice is granulated by the stream of water and carried to a pit or "boot," whence it is hoisted by a belt-elevator into bins, from which it is loaded on railroad cars to be used for ballast. The matte and the small amount of adhering slag in the settling pots are culled and handled in the usual manner.

*Slag Tiles.*—As a matter of particular interest, I will briefly describe, in conclusion, a successful manufacture of slag tile from blast-furnace slag, invented by Mr. Marco Cheapponi, E.M., which I saw in operation at the smelting works of Senor Concha i Toro, about 15 kilometers from Santiago de Chili.

The slag and matte are tapped from the blast-furnace into a slag-pot, and, after settling a few moments, the slag is poured from ladles into moulds (6 by 1 inch each); these are placed on a hearth which has a movable cover; the moulds being filled with slag, a cover is placed on them, as well as on the hearth. A very light heat is kept up, so that the slag is very slowly cooled; and when it appears black the moulds are lifted from the hearth and the slag-tiles are dumped into cold water. The slag-tiles thus made are light and portable, and, when laid, tough and durable. A slag carrying a considerable excess of iron has been preferred. These tiles are sold for from $30 to $60 (pesos Chilenos) per 100.

It is generally known that it is impossible under ordinary circumstances to make tiles of such dimensions as are mentioned above without some extraneous means for toughening.

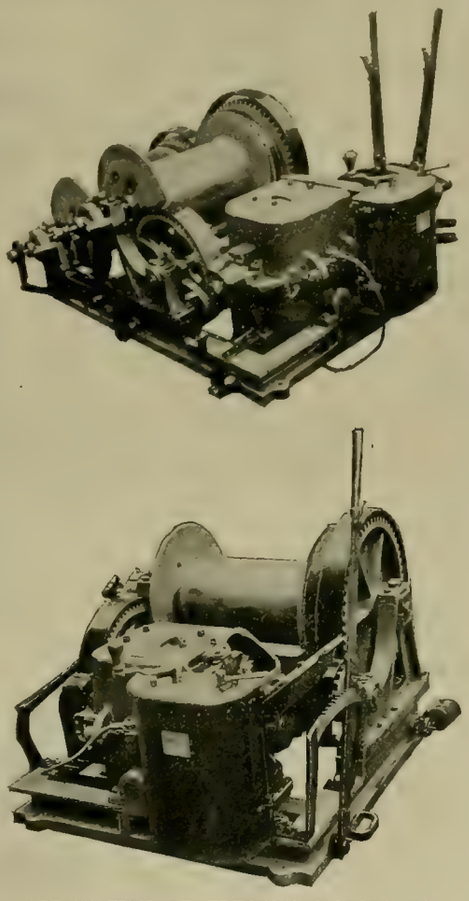
Though, at other establishments than those spoken of, I have observed somewhat altered details in the systems of slag and matte manipulations, I believe this paper covers essentially my purpose, which was to describe the main features of our Western practice.

*Read at the Pittsburg meeting of the American Institute of Mining Engineers, February, 1896.

# Electrical Progress.

### Portable Electric Hoists.

The application of the electric motor to portable hoists for derricks is herewith illustrated in engravings of two hoists which the General Electric Company has lately furnished the United States Government, in connection with an important electrical installation. These hoists are of the double drum and single drum type, respectively, the double drum hoists being operated by a 20 H. P. motor, the single drum hoist by one of 10 H. P. Each motor is mounted upon the same bed plate as the hoist and is of a late and efficient type, resembling in general appearance the well known G. E. 800, so extensively employed in railway service. The parts of the motors are all readily accessible for examination and repair, but are entirely covered in by the motor casing and are thus fully protected against dust, moisture and mechanical injury. The armatures are iron clad, each coil lying in a slot in the iron core entirely below the outside surface. The motors are sparkless and the bearings are self oiling. The controllers are known as M. R. and embody all the excellent features of the controller K2 used in street car work. The levers for the brakes, controllers, etc., are so arranged that full control of the entire mechanism is had without change of position by the man in charge. The hoists themselves are from the works of the Lidgerwood Company. The drums are 14 inches in diameter and 26 inches long.



APPLICATION OF ELECTRIC MOTORS TO DERRICKS FOR HOISTS.

THE Salt Lake & Ogden Railway Company has incorporated with a capital of $800,000, divided in 8000 shares of the par value of $100 each. Ten per cent of capital stock is subscribed for by C. K. Bannister, E. M. Allison of Ogden, E. W. Duncan, J. S. Critchlow and C. Browne, Jr., of Salt Lake, to build and operate forty miles of railroad between Salt Lake City and Ogden. The Pioneer Power Company of Ogden is at the head of the enterprise, Mr. Bannister, its chief engineer, being one of the prime movers in the matter. That company, which is erecting a big power plant in Ogden canyon, wants to transmit that power to Ogden and Salt Lake by electricity. To do that requires wiring the whole distance, and as long as the wires have to be strung, the laying of a track and the operation of an electric road would be a comparatively easy matter. The Salt Lake & Ogden Railway Company will commence operations by building an electric road from the power company's power station, four miles away, to Ogden.

IF the recent discovery that all substances through which the Roentgen rays are passing become, for the time, conductors of electricity implies that the conductivity of an electrolyte can be improved by the transmission through it of Roentgen radiation, there are many new processes in electrochemistry which may become practicable—for instance, the deposition of crystalline carbon. The internal resistance of galvanic cells and storage batteries may also be diminished, with consequences of great magnitude as regards the generation of electric current by these means.

THE Telluride Power Transmission Company, supplying Telluride, Col., and mines as far distant as fourteen miles, will adopt the two-phase system. The change necessitates an expenditure of over $150,000 for the machinery alone. The new plant will be set up at Ames, ten miles from Telluride. Eight miles from the power works, in a direct line from the town of Ames, the power transmission company has tapped the San Miguel river, turning the water into a flume.

AN economic method of treating low-grade and refractory ores is being successfully applied at Broken Hill, New South Wales. The method is really zinc base smelting. By this process the zinc is saved, and all of the minerals contained in the ore are made available for market. The smelters now charge 50 cents a unit for zinc in excess of 10 per cent. For instance, 20 per cent zinc ore shipped from this section during the past year has added $5 a ton to the smelting charges. The difference between a zinc penalty or none at all means many dollars profit to a number of the shipping mines and renders available many ores which cannot be marketed now. The zinc is extracted by the electrolytic process, which leaves the sulphide ores, which were in combination in the form of an oxide, making a very desirable product for a smelter.

AT Mt. Lowe, southern California, there are now three independent generating stations, each auxilliary to both the others. At Altadena is a 180-horse power dynamo, operated by two 60-horse power gasoline engines. At Rubio is an 80-horse power dynamo, and at the new power-house on Echo mountain is a 150-horse power multipolar dynamo, actuated by a 100-horse power gas engine, fed by gas piped for a distance of eight miles. This engine, with two cylinders and a sixteen-inch driving belt, is said to be the largest engine of the kind on the Pacific coast. In addition is an 80-horse power motor at the top of the incline, exclusively to operate the cable.

THE Market Street Railway Company of this city, which has authority to issue bonds to the amount of $17,000,000, sold another half-million block last week to the Hellman syndicate. It now proposes to change the Post and Howard cable lines in this city to electric lines and make further extended connection therewith in the western part of the city.

LAST WEEK were incorporated the Security Electrical Inspection Company; capital stock, $100,000, $1000 subscribed; A. Bowie, O. Blain, J. Napthaly, A. Bouvier, S. N. Napthaly, T. J. Craig, D. Friedenrich of San Francisco, directors, and the Sterling Electrical Supply Company; capital stock, $100,000, $10,000 subscribed; J. R. Cole, A. H. Pennoyer, F. G. Cartright, F. W. Gale of San Francisco and F. N. Delaney of Alameda, directors.

A GOOD IDEA may be gathered of the extent to which transmission of power by electricity is gaining ground in this country by the statement that, in the long-distance plants installed by the General Electric Company during 1895, over 1200 miles of copper wire for transmission purposes alone were used, amounting practically to 1,200,000 pounds of copper.

THE new electric line between Los Angeles and Santa Monica will be completed April 10th.

# Scientific Progress.

### The Monazite Industry.

From an American standpoint, one of the most interesting results of the controversy over the validity of the German patents covering what is known as the Auer von Welsbach incandescent burner, is its influence upon the current demand for monazite—the mineral from which thoria is principally derived and which, as is generally known, is found in a district comprising several adjoining counties in North and South Carolina. According to Professor Nitze, assistant State Geologist of North Carolina, the product of monazite sand in the Carolinas was 65 tons in 1893, 300 tons in 1894, and about 600 tons in 1895, and as such sand, containing from 60 to 75 per cent of monazite, is worth in Germany from $120 to $130 per ton, the subject is one of definite commercial importance. Thus far the European market has been largely dominated by the supply of monazite sand from Brazil, where it is found in the form of a fine-washed seashore sand, containing usually only from 2 to 3 per cent of thoria, whereas the Carolina monazite abounds in crystals of all sizes up to that of a grain of wheat, and contains generally from 3 to 6 per cent of thoria. But for the reason that the Brazilian sand is uniformly fine, free from particles of titaniferous iron, and can be put directly into the extracting process without being artificially pulverized, it is preferred by the great Auer-Welsbach companies in Vienna and Berlin. The North American monazite, on the other hand, must first be ground to a fine powder, which, in consequence of the hardness of the crystals, is a somewhat tedious process, unless the best machinery is employed. A ton of Brazilian monazite sand, costing at present in Hamburg $119, yields, when well worked out, from 20 to 25 kilograms of pure thoria, which is worth from $2400 to $3000, according to the degree of purity.

The one ultimate and effective plan of organizing the monazite industry in this country will be to establish at a convenient point in the mining district a laboratory, where, by employing the most approved and economical methods, the monazite may be worked up, the thoria extracted and made available as a finished product in all countries where incandescent gas burners are manufactured.

Thorium oxide is now worth in Germany from $120 to $150 per kilogram (2.2 pounds av.), according to purity, and the demand is, thus far, greater than the supply. Most manufacturers of incandescent gas burners would prefer to buy their supply of thoria ready for use than to conduct a separate laboratory for extracting and preparing it.

The one pertinent question, from an economical standpoint, would be whether the chemicals which are used in extracting thoria can be transported from New York or Baltimore to the Carolina monazite district more cheaply than the crude sand can be brought from there to Europe, where from 96 to 98 per cent of its bulk becomes at the first operation absolute waste material. The chemicals required for this process are neither rare nor costly, and with a well-chosen site, at which water power may be utilized for pulverizing the raw material, the success of such an enterprise would in the opinion of competent authorities be practically assured.

THE theory that electricity, magnetism and chemical action are modes of motion, either of the molecule or the ether, is held by Walker, an English physicist. He claims that this view, which he published three years ago, is confirmed by the Roentgen experiments. An electric current, according to this author, is a series of waves of of greater length than the largest of the invisible heat waves, and of a transmission rate lower than those waves, electric magnetism, a series of waves shorter than the ultra-violet waves, and with a higher rate of transmission; magnetism, a wave motion imparted to the molecules of iron at their formation or to the ether surrounding the molecules; chemical action, a motion probably between the wave length of the highest sound wave and the waves of electricity. Roentgen rays, he believes, may be very short electromagnetic waves.

THE cold-drawn process is now largely resorted to in the production of steel tubing and is a great factor in the construction of the bicycle, and involves machinery both ponderous and powerful. One of the methods employed consists in taking a piece of steel in the shape of a bar or ingot. This is bored through the center and it is then passed through a die, after which it is heated and treated to a bath in a secret preparation, which removes the temper which the drawing process imparts. This is repeated a number of times, each die used being smaller than its predcessor, with the result that the tube grows smaller and longer. This is continued until the tube is of the right diameter and gauge. The drawing out of a piece of steel in this manner, without beating it, is regarded as a notable example of the perfection of modern machinery

HOW IT is possible to measure wind by its sound has been told by Prof. Carl Barus to the National Academy of Sciences. The whistling of the wind as it crosses a wire varies with the velocity, and this can be computed from the pitch of the note observed in case of a given diameter of wire and for a given air temperature. A special micrometer attachment can be made to convey the sound, isolated from other noises, to the observer at a distance. Every gust and variation of the wind can be studied in this way, and an idea of the direction of the gust can be had from the sounds obtained from three wires placed at right angles to one another. Micro-aulmometry is the name proposed for observations by this method.

OZONE is becoming an important industrial agent. It artificially ages liquors, removes the effect of oily beans in coffee, and improves tobacco. In its late application to the rapid seasoning of wood for sounding boards and musical instruments, it increases the resistance of the wood to temperature and moisture, and adds to its acoustic qualities. It thickens linseed oil for linoleum in a few days, whereas the old method of oxidation often took several months. It bleaches linen in less than a third of the time required by sunlight. It is also valuable in chemical and technical processes, especially in purifying starch derivatives from undesirable color, odor and taste.

# Mechanical Progress.

### Chemistry of Steam Raising.

The life of the boiler depends on several factors, of which the character of water, considered, is one of the chief. Hard calcarceous waters form scale, and in this respect are injurious to the economy of steam raising, partly by damaging the boiler itself, and partly by wasting the fuel required. The latter is a serious evil, for the incrustation is a badly conducting material, and, by impeding the transmission of heat from the furnace to the water, diminishes the output of steam from the boiler, if the furnace is fired normally —that is, at a rate approximate to the absorption of heat by the "heating surface" exposed by the boiler. To compensate for this diminished output of steam the natural action of the stoker (often necessary when the full output of the boiler is required) is to increase the rate of firing, with the sesult that the extra quantity of heat generated in the furnace is only imperfectly absorbed by the boiler, and goes to waste in the flue gases. It has been found that an incrustation of one-sixth of an inch thick causes the use of about sixteen per cent more fuel than would be necessary with clean plates whilst one which is one-fourth of an inch thick involves a waste of as much as fifty per cent, and one of one-half of an inch a waste of 150 per cent. The damage to the boiler itself is due to two causes —(1) the deterioration of the plates by overheating, and (2) the mechanical damage involved in removing the incrustation. A coated boiler plate is necessarily hotter than when clean, as the water is kept from free contact with it. Thus, whereas, a clean iron vessel containing water boiling under atmospheric pressure has a temperature not more than 10° C. above the boiling point of water, one with an incrustation so thin as one-sixteenth of an inch may have a temperature more than 100° C. higher. The mechanical properties of the metal composing the boiler plates are considerably modified even by the temperatures proper to modern pressures—*e. g.*, 150 to 200 lbs. of steam, corresponding with 370° to 400° F.=188° to 204° C.—and are still more affected when there is extra heating on account of the presence of an incrustation.

In the case of boilers of the water tube or of the locomotive class, a further difficulty arises from the incrustation—namely, the blocking of the tubes or of the spaces between them with scale, and consequent hindrance of circulation of the water. In aggravated instances actual stoppage of a water tube may occur, involving its speedy destruction by its exposure to the fire without being simultaneously cooled by contact with the water.

The evils of heavy incrustation are sufficiently well recognized to lead to the practice of periodically chipping the scale from the boiler plates, a troublesome operation, liable to cause injury to the boiler, and best avoided by removing the cause of incrustation. Although a water yielding a heavy or even a moderate scale is thoroughly objectionable, one giving a slight film of calcium carbonate or sulphate is not wholly harmful, on account of the protection which it affords against corrosion from the several sources to be mentioned.

### Fine Road in Fresno County.

Fresno county is trying the experiment of building a line of road upon scientific principles. It is to be eight miles in length, extending due east from Fresno, and passes the County Hospital, the fair grounds, the Fresno, Eisen, St. George, Butler, Oothout and other large vineyards. There has been a road along that line for a quarter of a century, but that old road is now undergoing a great transformation. It was plowed up, the high places scraped, low places filled, and portions liable to become muddy in winter filled in with sand. The road is as straight as an arrow and as level as a floor. After being graded to the proper form, it is hardened by a 20,000-pound roller. A small ditch is made along the road and filled with water from neighboring canals. A sprinkling machine, made especially for the purpose, lifts the water from the ditch and throws it in a shower over the road. One team can sprinkle from twenty to twenty-five miles of road a day by this process. The machine is placed on a wagon and is driven as fast as the team can walk. The road will be kept damp during the summer. A broad-tire ordinance is under consideration by the Board of Supervisors. A path for bicycles has been constructed along the side of the road.

### Endless Belt Conveyors.

It is customary in some ore mills, especially those employing magnets for the separation of iron from rock, to use endless belts for the transportation of pulverized material from one spot to another in a horizontal or nearly horizontal direction. Such belts are often twenty or thirty inches wide, and some of them are long enough to pass over rollers 500 apart. The latter are driven by machinery, and move the belt forward at a speed which now and then rises to 300 feet a minute. Between the end rollers, at proper intervals, are others, called idler pulleys, which merely sustain the belt and its load.

At first it was common to use a perfectly straight roller for this purpose, but of course there was danger that the ore or other material carried (like clay in a brickyard) would shake off the edges. Besides, it was necessary to regulate the feed carefully, in order that the load would be evenly distributed along the belt. After a time some sideboards, or skirtboards, were erected at the edge of the belt—not perpendicular, but slanting outward—to increase the capacity of the "conveyor," but these would wear the belt. When it became necessary to trim off the edges from this cause the boards would be set up closer. Another improvement was to enlarge the ends of the roller so that it looked like a gigantic spool, from which the thread had had been removed. The conical attachments unlifted the edges and enabled the conveyor to carry a bigger load than if flat. This substitute for the skirtboards worked fairly well with narrow belts, but not with wide ones. Those parts of the bevelled ends having the largest circumference would slip along the under side of the belt and wear it, since they were obliged to move more rapidly than than the straight middle section of the roller. Finally, one more important amendment was adopted. Three rollers were used—one in the middle being horizontal, and two at the side, the axes of the latter being turned up at an angle of 45 degrees. These side rollers took the place of skirtboards and spool ends, but were free from the faults which those other devices exhibited.

The belts used in these conveyors are of cotton duck, coated with rubber. The former material gives longitudinal strength, and the latter a wearing surface. Many experiments were made with different adulterants before a cheap and durable compound was finally secured. This, by-the-way, is applied to a greater thickness in the middle of the belt than at the edges, as this is where the most wear comes. These various improvements have greatly lengthened the life of a belt. Formerly one would last only three or four months. Now they render good service twice as many years. The amount of power required to operate such a conveyor is very slight, and the system is a great advance on wheelbarrows.

Each of the two turbines which drive 5,000 H. P. dynamos at Niagara is situated about 160 feet below the machine, and is connected therewith by a hollow steel shaft 31 inches in diameter. The whole weight of this mass of steel is supported, not by the bearings, but by the water when the wheel is in motion. The Power Company is considering the practicability of putting the next three or four dynamos down in the wheelpit, thus getting rid af the enormous shafts altogether.

Steel wagon roads, as advocated by Martin Dodge, State road commissioner of Ohio, are likely to have a thorough trial in several States this year. These roads consist of two rails made of steel the thickness of boiler plate, each formed in the shape of a gutter five inches wide, with a square perpendicular shoulder half an inch high, then an angle of one inch outward slightly raised. The gutter forms the conduit for the water, and makes it easy for the wheels to enter or leave the track. Such a double-track steel railroad, 16 feet wide filled in between with broken stone, macadam size, would cost about $6,000, as against $7,000 per mile for a macadam roadbed of the same width, but the cost of a rural one-track-steel road would be only about $2,000 a mile. It is claimed that such a road would last much longer than stone, and that one horse will draw on a steel track twenty times as much as on a dirt road, and five times as much as on macadam.

Mechanical skill of no ordinary character is required to produce the hollow steel boom, the spar which has now become so noted in marine architecture, advantage being gained, in exigencies, by beginning in the center and riveting the plates toward both ends. In the most recent instance of this construction there were four lines of angle iron braces at equal distances from each other and running the whole length of the boom, giving it a good bracing, the face to the angles being slightly curved to take the concave shape of the interior of the boom, these angles consisting of sections measuring on an average some 15 feet, with a lap made at each joint several inches in length and bolted with steel. These laps are irregular, in order that two joints or more may not be opposite each other and thus eause weakness.


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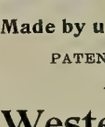
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# Practical Information.

### Water Tube Boilers for Warships.

The old style of marine boiler has fire passing through its tubes, and the latter are encircled by water contained in an enormous shell. But in what are called "water-tube" boilers, the water is inside the tubes and the fire outside. The great advantages of the new type are ability to get up steam quickly, economy of space, saving of weight, higher pressure and safety. But while agreeing upon the suitability of water-tube boilers for small craft, like torpedo boats or torpedo-boat destroyers, naval experts differ as to the wisdom of putting such steam generators into big warships. England has gone further in this line of experiment than any other country, but Holland is following her example. Just now the latter power is arranging to equip three good-sized cruisers almost entirely with water-tube boilers of the Yarrow pattern. The total horse power to be provided for each vessel is 9250, which is only a little less than that of the American line steamships. But our Dutch friends are cautious. They propose to have Scotch boilers enough to develop about 2250-horse power on each of the cruisers, and water-tube boilers enough to give 7000-horse power. This plan will guard against failure through the inexperience of the stokers, and enable the latter to become familiarized gradually with new apparatus and new methods. Moreover, if the venture should prove unsatisfactory, the pecuniary loss will be less than if water-tube boilers exclusively were employed. As showing one of the merits of the new system, it may be remarked that the Scotch boilers, while developing less than one-third of the steam obtained from the others, weigh (with water) 120 tons, and their rivals only 88 tons. The manufacturers are testing the new boilers for a pressure of 350 pounds, although 200 is the highest that will be employed in service. Messrs. Yarrow will not make the whole twenty-four required, however, but only three samples, one for each ship. Dutch boiler makers will build the others.

In the earlier attempts to produce an incandescent electric light, forty and fifty years ago, the slender filament was made of platinum. Edison, Swan and others subsequently found that carbon had several advantages over that substance. Its resistance is greater. Less energy is required to raise its temperature. And it is practically impossible to melt it, however great the heat. Curiously enough, though, some attempts have recently been made to substitute metals for carbon, but the man (or at least one man) who is trying these experiments employs niobium, tantalum, molybdenum, titanium and zirconium, instead of platinum. These are all known to be exceedingly refractory materials—that is, they are hard to melt. The object sought is greater durability than is possessed by the carbon filament; but the wonderful brilliancy of the gas-heated Welsbach burners, in which other rare and refractory metals are used (lanthanum, thorium and praseodymium), suggests the possibility that a brighter light may also be secured in this manner. J. W. Aylsworth of Newark, N. J., who is among the experimenters, uses a carbon thread for a foundation and coats it with metal.

Horseless mail wagons will soon be used in all of the large cities of the United States. Second Assistant Postmaster General Neilson has for several months been studying the project and a few days ago completed the plans for the model carriage. It is now in course of construction and will be completed very soon. The dimensions of this new wagon will be 12 feet long, 6 feet wide and a trifle over 6 feet high. It will be fitted up precisely as in a mail street car or a steam railroad postal car, except that the scale will be smaller. The body of the wagon will be hung on springs and counter springs and the wheels shielded with heavy rubber tires. It has now been definitely settled by the Postoffice Department to employ the horseless wagons in the transportation of mails in the city and country districts where there are no railway lines and where the service can be improved by making "separations," assorting the mail between office, while in transit. It is intended to place these wagons in service in cities which cover a large area and where "separation" between four or five stations will greatly facilitate mail delivery.

At one time the entire Pacific Northwest was practically a county of Iowa. In 1843 the provisional government of Oregon adopted the statutes of Iowa that had been passed by the Territory in 1839, and at a subsequent session of the Oregon Legislature the revised statutes of Iowa were made the law of Oregon—which at that time extended north to the British boundary and east to the summit of the Rocky mountains.

### Commercial Paragraphs.

Fraser & Chalmers are erecting a 20-stamp combination mill on the property of the Florida Mining Company, at Silver City, Ida.

W. S. McDonough of the Colorado Iron Works of Denver is putting in machinery for the Smith-Yanlot Co. at Bald mountain, Wyoming.

The Dow Steam Pump Co., this week sent a triplex power pump to Los Angeles, four boiler feed pumps and two sinking pumps to Central America and two pumps to Arizona, the latter with sufficient capacity to force water through ten miles of 4-inch pipe to an elevation of 500 feet.

Following is a synopsis of the contract between the General Electric and the Westinghouse companies, which may not be perfected for a month: The General Electric Company contributed 62½ per cent and the Westinghouse Company 37½ per cent in value of the combined patents, and each company may use the others' patents on royalty. A board of control, consisting of two representatives of each company and a fifth to be selected by these four, will manage the patents.

### Obituary.

Gen. T. L. Casey, late chief of engineers, U. S. A., died in Washington, D. C., on the 25th, aged 63. As a member of the Government engineer corps he spent some time on the northwest Pacific coast, and in late years had charge of the most important Government work, being placed at the head of the department in '88. His skill as an engineer was equaled by his integrity as a man, a combination common to the general character of engineers. During his incumbency over $500,000,000 passed through his hands, not the shadow of suspicion attached to the disbursement of a dollar of it. His chief claim to fame as an engineer rests on the successful completion of the Washington monument.

### Death of Nat W. Pratt.

Nat W. Pratt, President Babcock & Wilcox Co., New York city, died at Brooklyn, N. Y., on the 10th instant, aged 44. Born in Baltimore in 1852; old American stock; families on both father's and mother's side settled in Plymouth county, Mass., in 1830; inherited mechanical tastes; father, William Pratt, was, during the war, superintendent of the Burnside Armories in Providence, R. I. Young Pratt entered the employ of the firm of Babcock & Wilcox in 1870. His energy, engineering ability and remarkable business qualifications won the confidence of his employers. In 1821 the Babcock & Wilcox Company was organized as a corporation. He became treasurer and manager of the new company, retaining the position until at the death of George N. Babcock, in 1893, when he was elected President. Illustrating his versatility: In 1894 he became consulting engineer to the Dynamite Gun Company. Under his designs and patents the first successful dynamite gun was built. It was with this gun, 8-inch caliber and 60 feet long, that the experiments in throwing aeriel torpedoes were conducted at Fort Lafayette, N. Y. He was a member of the American Society of Mechanical Engineers, American Institute of Mining Engineers, American Naval Institute, also a member of the Engineers' Club in New York city.


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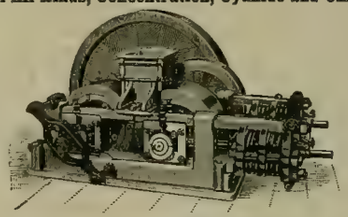
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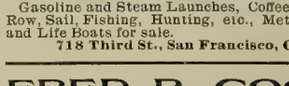
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# Mining Summary.

## CALIFORNIA.

### Amador.

The *Record* learns that Supt. Tregloan will begin sinking in the South Spring Hill shaft immediately. The 40-stamp mill will be thoroughly overhauled and it is expected that the entire stamps can be set in motion before long. A portion of the stamps have been running for several months past on ore from the Median shaft.

*Record:* The Garibaldi mine, near Hawkeye, has been bonded to a New York mining company, which will send an expert out to report on the prospect. A 50-foot shaft has been sunk.

### Butte.

A number of men are working in the mines at Bangor and it is said more will find employment after April 1st, when work will be resumed in the Catskill claim. The North Bloomfield Co. is at work at the Osgood mine, putting in steam power.

### Calaveras.

At Murphys the new owners of the Carley or Falcon mine have started sinking the shaft.

The new stamp mill of the Shaw Bros. has started up on quartz from the old dumps on their mine.

### El Dorado.

(Special Correspondence).—Superintendent Parlow has completed the 3000 feet of five-inch pipe line from the Gentle Annie mine to the tunnel that is to be run by compressed air power drills.

Wm. H. Reinbold is sinking a shaft on the Pennsylvania claim, near Garden Valley. He has attained a depth of fifty feet on a four-foot ledge which prospects $5 to the ton in free gold.

G. E. Thorsen of Garden Valley is developing a twelve-foot ledge of $3 rock on the Valley mine. This is free milling. Garden Valley is ten miles northeast of Placerville.

F. M. Bell has sunk to 106 feet in depth on the Emma mine, the second extension of the famous Rosecrans property.

Portland, Oregon, people have bonded from C. J. Heald, near Nashville, thirteen miles southwest of here, the Adams Gulch property, and are sinking a shaft and running a tunnel.

J. Morgan Taylor has bonded 100 acres of gravel property near Indian Diggings, twenty-five miles southeast of here. A New York party is associated with him. They have already begun preparations to operate on a large scale, and will soon apply for a permit to hydraulic. Mr. Taylor is the originator of the water hoisting machinery, which he has been operating largely in Oregon.

Placerville, Cal., March 25, '96.

A Placerville dispatch says six miles south of there D. H. Jackson, who recently bought ground from S. Salisbury, developed it, placed machinery and mills on it and named the mine the Salisbury has sold it to Monroe Salisbury who will sink a 500-foot shaft, erect a hoist, add milling machinery and lay a pipe line.

### Mariposa.

*Gazette*: At the Sierra Buttes Company's Tendron mine, six miles from Mariposa, the 20-stamp mill is running.

At the Tyro mine the last assay made from the 700-foot level yielded over $500 per ton. The company is pushing sinking another 100 feet below the 700-foot level.

The Triumph Development Company, headquarters in Fresno; capital stock is $250,000; general manager is F. A. Alexander; has bonded five claims on Bear creek.

The old Bear Creek mine, seven miles northeast of Mariposa, is about to be reopened by Rippe Bros. The mine has a shaft sunk upon the vein, and is down about 200 feet.

Ludwig's mill is being taken to the Laura LaGrande, Coulterville district, near Hazel Green. It is probable that a 20-stamp battery will take its place at Mt. Ophir.

About the 25th of this month the Yellowstone mine at Bear valley will open up again. A new hoisting plant is to be put in, and it is probable that the number of stamps will be increased from five to ten. The shaft is now down 480 feet, and the owners, who are an incorporated company in San Francisco, are figuring on going down to 1000. As regards the mine itself at the present time, the indications are entirely favorable.

The Alice Clark mine, one and one-half miles from Coulterville, is owned by H. H. Clark of Horseshoe Bend and Mr. MacLymont of the firm of Saville, MacLymont & Co. of San Francisco, mining assayers and metallurgists.

### Napa.

QUICKSILVER COMPANY'S REPORTS.—At the recent annual meeting of the Napa Consolidated Quicksilver M. Co., at Boston, Mass., General Manager Buckminister, vice-president of the corporation reported: "Although the past year has been one of unusual depression, we are happy to say that the operations of the company have been fairly remunerative, and we enter upon the coming year in good condition. The work of prospecting and development has been carried on vigorously and good results obtained, showing a number of strong ore bodies and putting the property in a better physical condition than ever. The different stopes are opened out, showing ore in sight for a long period. We have duplicated the reduction plant by the erection of the new furnace and works, and are ready to largely increase our output should it be deemed advisable. We have yet a large acreage of mining claims unprospected, upon which work will continue to be done as in the past, thus keeping far ahead of the requirements of the furnaces. The company owns a large amount of timber land, and its policy will be to continue to purchase more from time to time as opportunity offers. It has to-day a complete and modern plant. No construction account is maintained."

For '95 the annual report shows: Sales quicksilver, $118,862; on hand, since sold, $69,-125; total expenses, duplicate furnace and reduction plant, $112,205; net earnings, $75,721; dividends, $80,000; profit and loss January 1st, 1895, $44,671; profit and loss January 1st, 1896, $40,243; construction and repairs charged to expense, $19,274; depreciation buildings, $5,-629. The assets of the company are: Cash, $1,036; plant, $700,000; quicksilver, $69,125; supplies, $10,111. The liabilities are: Capital stock, $700,000; unpaid drafts, $4,493; Haas Bros., $34,280; unpaid dividends, $505; unpaid bills, $750; profit and loss, $40,243; total, $780,-272. During the year 17,650 tons of ore were smelted, producing 5,400 flasks or 413,100 lbs. of quicksilver. The company owns at Oat Hill 1,560 acres of land and 340 acres of mining claims, also works valued at $72,170.

The same people compose the Ætna Consolidated Q. M. Co., which owns at Lidell 350 acres of land and 573 acres of mining claims, and works valued at $37,470. General Manager Buckminister says: "In view of the depression in business during 1895 the results accomplished have been very satisfactory, and we commence the year in better shape and with brighter prospects. The dead work on the long tunnel, No. 9, which was run about 4,000 feet to catch the ore chute coming down from No. 7 level, has been completed, and a raise carried through to No. 7 level, and drifts run at No. 3 and No. 9 levels, showing a good ore body extending from No. 7 level to No. 9. Other and extensive prospecting work has been carried on and will be continued, with fair prospects. Furnaces No. 1 and No. 2 are working well and giving good per cent returns, but it is the intention to replace them at an early day, out of the earnings, with a complete modern plant. But a small part of the claims have as yet been prospected. The stopes in the new ore body were not opened until after the close of the year, so the results will show in next year's work."

For '95 the report shows: Sales quicksilver, $72,891; on hand, since sold, $42,350; total expenses, $83,631; net profits, $31,609; dividends, $29,000; balance, profit and loss, $11,609; profit and loss January 1st, 1896, $43,235; repairs to works, $4,766; depreciation, $4,553. The assets of the company are: Cash, $22; plant, $501,712; quicksilver, $42,350; supplies, $7,005; a total of $551,090. The liabilities are: Capital stock, $500,000; Haas Bros., $5,566; unpaid drafts, $3,288; profit and loss, $43,235. The result of the operation shows tons smelted, 16,-490; flasks produced, 3,300; pounds produced, 252,450; drifts and tunnels run, 4,138 feet; winzes sunk, 383 feet.

### Nevada.

The Lone Ridge mine at Blue Tent will be opened by an English company represented by Prof. George Treadwell. In former years ore was taken out that yielded $17 to the ton.

The North Star Mining Company has bought, through J. D. Hague, the Shanghai, White Ledge, Great Britain, Twilight and Tribute claims, on Massachusetts hill, south of Grass Valley, the company thus securing possession of nearly all of Massachusetts hill.

*Transcript:* In the Brunswick mine a body of fine ore is reported by Supt. Nihell; the ledge is eighteen inches and will mill from $25 to $40 a ton.

*Union:* A cleanup of fifteen loads of ore from the Illinois claim, a part of the Menlo Mining Company's property, which has just been made, netted $1,596.50, exclusive of sulphurets. The ore came from the 400 level.

### Placer.

In the Herman mine the distance from the surface to the tunnel is 280 feet.

The *Sentinel* says J. K. Carpenter has a contract for running about 2000 feet of the lower tunnel at Pioneer mine beginning April 1.

GONE TO CARIBOO.—Nearly fifty miners, en route for the Horsefly mine near Cariboo, B. C., passed through Colfax during the present week from Iowa Hill, Sunny South and Damascus. Some of the miners will travel by rail, but the majority of them will ship from San Francisco to Vancouver. From Vancouver they will go to Ashcroft, a distance of 200 miles by rail. The trip from Ashcroft to Horsefly, 175 miles is covered by stage. The party contains some of the best drift and hydraulic miners in California.

### Plumas.

*National Bulletin:* Most of the hydraulic and sluice mines about La Porte have made the most of the water season thus far, considerable work in that line having been done.

At Thistle shaft, from 110 to 120 men are employed, and work is progressing as usual.

The Pioneer mine at Grass Flat, Sierra county, has only a few men employed, and they are engaged in development work.

Ah Tye leased from the English company a part of the tailings in Slate creek for $9000, but other parties have taken possession of that portion of the creek bed and will not permit the lessee to work. Dr. Mussey, representing the English company, will, it is understood, begin legal proceedings.

### Riverside.

Riverside men have taken hold of the Hendsch mine and are developing it with excellent results.

### San Bernardino.

The McHaney (Desert Queen) mine, which has so far contributed considerable to the mining literature of southern California, is again distinguishing itself. Workmen are now reported to have struck "in a new shaft a big body of black iron ore heavily sprinkled with free gold." When "black iron ore" gets to showing "free gold," the locality becomes an interesting one.

A. F. Judson of Colton has just sold an interest in his group of four mines in the Virginia Dale district to Eastern men, and a ten-stamp mill will be erected at once and a pumping plant erected to bring water from a lake, three and one-half miles to the mill.

It is reported that the Ibex mill and mine will start up with a full force soon.

The rush to the Ibex district continues, and a number of the claims that have been prospected run well in gold. A townsite called Smyzerville has been laid off.

### San Diego.

AT JULIAN.—The Owens Company will sluice the tailings which have accumulated below the mill.

### Shasta.

Superintendent F. D. Fraser of the Siskiyou placer mine, on Clear creek, arrived in Yreka Thursday with six and one-half pounds of gold dust, valued at $1800, the result of a cleanup from nineteen days' run. The ditches on the property, of which there are sixteen miles altogether, are new and gave considerable trouble in the beginning, the banks settling and breaking away, but permanent repairs have been made and no further trouble is anticipated. There will be no doubt of a steady yield of $100 per day from this mine, the superintendent asserts, after everything is in ship shape. J. F. Morley has been engaged to make a report on the property for the New York stockholders.

A tramway from the Old Spanish mine, near Lower Springs, to a point on the railroad a few hundred yards south of the Middle Creek depot, will be built to convey ore from the mine to the railroad, where large ore bins will be erected, so that the ore can be run through chutes into the cars. The tramway will connect with that of the Eureka Tellurium gold mine at their upper works, about a mile above their mill, which is situated a short distance from the railroad. The Eureka Company will continue to use their tramway, and will also erect bins. It is expected that the ore from both of these mines will be reduced at the smelter of the Mountain Mines, Limited, at Keswick.

At Sunny Hill the Bell mine has been sold to a San Francisco mining company, which also owns and operates other mining property in Shasta county. Work will commence at once. Specifications, etc., are out calling for bids to put in a large 1000-foot tunnel, to be begun on April 1st and to continue at the rate of at least 100 feet a month till completed. The conditions will necessitate putting in power drills, with all accompanying appurtenances. This tunnel will cut the ledge at a depth of $600 feet from the surface, which is deeper by 400 feet than any ledge has been tapped in that district.

The *Free Press* says that at Harrison gulch there are forty locations, and all that have been prospected have turned out rich. Fowler and Rhodes own the extension to the Lucky Baldwin. From 100 tons on the dump 82 tons were worked and resulted in forty-nine pounds of amalgam. Nine pounds sent to Selby's netted $1500. They first sunk forty feet on the ledge, then drifted both ways, and have about 100 feet of tunnels.

*Searchlight:* The ledge of the Niagara at French Gulch, which was reported "pinched out" recently, has again been discovered, and the production of the mine, from present indications, bids fair to exceed any output of its past history.

At the Delta Lava Cap mine, owned by Deming, Preston & Co., work is progressing regularly. They are now running a crosscut tunnel to tap the lowest depression of bedrock, and are now in 140 feet. Where Dog creek cuts this channel a rich bar was deposited.

Negotiations are in progress for the sale of the Ellory, the Milkmaid and the Washington mines of French Gulch.

The A. C. D. G. M. Co. has finished its ditch and flume; the tunnel has been widened and track laid. The tunnel will be extended 50 feet farther in order to reach the deepest portion of the channel, but in the meantime gravel will be taken out of the drift from the upraise and sluiced. A few weeks more of dead work will expose this ancient lava-capped channel.

### Sierra.

*Record:* John Brandt has received an order for snowshoes for horses, from T. J. Field, of Juneau, Alaska. They are to serve as patterns for the Juneau blacksmiths. It seems that no one in Juneau understands the mechanism of the horseshoe. They got the idea of using them in crossing the Alaska snow fields from Mr. Morgan, who went to that country from this valley last fall.

*Enterprise:* The Buttes Saddle Co. has seventeen men employed under Superintendent Miller. The pay chimney is about 5 feet wide and is in contact with slate and porphyry. A second ledge has recently been struck which is about 15 feet wide and averages $8 per ton. The 10-stamp mill is run by water power under 300 feet pressure.

The Rising Sun and Early Dawn mine has struck some fine gravel similar to that of the Bald Mountain, and is expected to commence taking out pay in a short time. The Sierra Buttes tunnel No. 9 pierced 500 feet of this gravel while running their 7000-foot tunnel on the 2000-foot level. Indications point to this property as immensely rich.

The Bonanza, Young America and Phoenix are shut down, awaiting arrangements for their further development.

### Siskiyou.

*Journal*: The McConnell & Quinn claim is in operation, under lease to Chinamen, who get 80 per cent of the proceeds.

The pumping plant at Shasta river is kept in constant operation in furnishing water for the giants at the Espey, Hunter & Co. mine.

All the mines around Oro Fino are running at full blast, with a bountiful supply of water. A large number of men are employed in the mines in this section during the busy season.

The American Bar Co. at Klamath river expects to be in readiness for hoisting pay gravel inside of two weeks, and anticipate taking out considerable gold before the winter storms commence again.

J. H. Smith of the firm of Hale & Smith, railroad contractors of Portland, Or., and one of the stockholders in the Seattle Placer Mining Co., is now superintendent of that company.

While hunting cattle in Beaver creek A. Condrey discovered an exceptionally fine asbestos ledge. He intends doing considerable work this spring in developing the property.

J. C. Wood of Nolton, Siskiyou county, has bought from the Seattle Placer Mining Co. a sawmill, which has a capacity of 6000 feet a day.

### Trinity.

AT HAY FORK.—Pragmore, Gray and Duncan have located a ledge and gone to work taking out quartz and building an arrastra. The mine is four miles from Hay Fork and twenty-eight miles from Weaverville.

Two other mines are being opened on Kingsbury gulch.

### Tuolumne.

*Democrat:* Operations on the Louisiana mine, at Cherokee, will shortly be resumed.

The new twenty-stamp mill on the App mine, at Quartz Mountain, started up Thursday.

J. T. Faxon of Sonora, has a location on the mother lode, named the Isabella-Gem-Consolidated, a continuation of the Rawhide and Rappahannock mines.

Work on the Seminole and Mayflower group of mines which recently ceased, is to be soon started again. The company has decided to do 1300 feet of tunneling, drifting and sinking. While this work is in progress sufficient ore will be taken out to keep the mill on the Seminole mine in operation. Col. Coles, is the superintendent.

At the Mt. Zion mine, near Groveland, recently bonded to the Tuolumne County Mining and Development Company of Fresno, for $5000 will be in order. It is proposed to sink a shaft and run a tunnel.

## NEVADA.

In Mason valley a new custom mill to be run by water power is about ready to start up. The ditch has just been completed. In Spragg and Martin districts there is a large amount of gold quartz on the dumps and the mines are steadily improving in richness. The mill is not large but is first-class in all its appointments.

Some rich gold mines are being opened in Spring Valley, Washoe county, near Steamboat. A lot of 400 tons now on the dump will be handled at the Reno works. Assays show that it will pay well.

The mine discovered by Indian Jim, down in Douglas county proves to be wonderfully rich, and a five-stamp mill is being set up to work the ore. The vein is all alive with free gold.

The Raycraft brothers will now themselves work the Buckeye placers. They will get water by laying an iron pipe from a lake to their diggings.

### STOREY COUNTY.

ON THE COMSTOCK.—The *Enterprise* says: The point on the lode which is being watched with the greatest interest is the 750 level of the Occidental. It is expected that in about three weeks the ore body encountered on the 550 level will be encountered.

In the leading Comstock mines all is going on about as usual. At Con. Cal. and Virginia the past week the yield from the 1650 and 1750 levels was 113 tons of ore of the average value of $47.57 a ton. At the Ophir old works ore averaging $10.50 a ton is being taken out on the old tunnel level. It is nearly all gold. During the week just before the trouble culminated between the miners and the newly appointed Supt. Tangerman, which resulted in their running him out of the town, twenty-seven carloads of ore were extracted on the 975 level of the Hale & Norcross assaying $25.29 in gold and thirty-one and seven-tenths ounces silver per ton. On hand in the ore-house is about 200 tons of ore. At the Occidental the gold vein found on the 650 level has been followed a distance of 94 feet to the southeast and is still in fair grade ore. A cross-cut is being run on the 750 level to tap this rich chute of gold ore at that depth. In the work is being used a fourteen-horse power Danish best crude oil engine, driving a Rix air compressor that runs the drills. This oil engine is a new departure on the lode.

The official weekly letters from the Chollar and Potosi say:

CHOLLAR.—In the stope above No. 2 crosscut, 450 level, and the south drift from it, we are assorting old fillings on the sixth floor and saving the bunches of pay in place lying to the west of the old stopes. In the south stope near old Potosi shaft we are opening to the south on some fair grade ore, and turning over the old fillings at that point, from which we are able to save about half as pay. On the 100 level the south drift from No. 2 west crosscut was extended 30 feet and stopped, the face remaining in low grade material. We are engaged on repairs in the north drifts on the 450 and 550 levels. We have saved during the past week 54 tons and 800 pounds of ore, the average top car sample of which was $40.66, silver calculated at par.

POTOSI.—The upraise from the south drift, 450 level, has extended 7 feet, and is now up 84 feet, at which point it has been temporarily stopped, and we are now engaged in opening another compartment to the east with the intention of ultimately connecting it with the south drift on the tunnel level, now being opened. The top of the raise shows the same vein matter reported last week, except that the quartz has given place largely to clay. The west drift on the 650 level has been repaired and retimbered for a total distance of 338 feet from the shaft. On the tunnel level

we are making good progress in the repairs of the south drift and have completed 200 feet. At the Brunswick lode good progress is being made at all points, but there is as yet no find of value to report. The Savage company has worked at the Mexican mill 550 tons of ore averaging $22.69 a ton. Their concentrates average $304.24 in gold and $468.24 in silver, a total of $790.48.

On the outside Dan De Quille in the Salt Lake *Tribune* reports that the ore from the Logan mine at Como is to be worked at the Rock Point mill, Dayton. There are now 600 tons of ore on the dump. With this accumulation in the start the mill can be kept going.

### OREGON.

BAKER COUNTY.

The French mining and exploring syndicate of Paris and Havre has purchased the Flagstaff mine, in the Virtue-Columbian district, the consideration being $20,000. Work has been resumed on the Snow Storm and Lilly White mines, in the Sanger district. A large body of rich quartz is exposed in the 600-foot level of the Virtue mine.

*Democrat*: The Exploring Syndicate of Mines and Mining Company, composed of Paris, Havre and Brussels capitalists, have bought the Burnt River placers, the Clark's Creek gravel mines, a tract nearly six miles square, the Flagstaff quartz mine in the Virtue district, making an investment of upwards of $100,000.

H. H. McIntire, Minneapolis; U. L. Lamprey, St. Paul; and W. H. Young, Butte, have recently purchased the Golconda mine in Cracker Creek district.

Col. H. Wolters of Louisville, Kentucky, is at the head of a newly organized company which owns the Red Jacket and other mines at Cornucopia, formerly owned by the Oregon Gold Mining Company. The new company contemplates extensive operations and resumption of work at the Red Jacket mine and mill.

JOSEPHINE COUNTY.

*Courier*: A. W. Silsby has arranged to haul ten tons of copper per day from Waldo to Grant's Pass, the work to begin as soon as the roads can stand it. The railroad has made some concession to the Elmer Bros., and carload lots of twenty tons each will be sent to Baltimore.

The difficulties between the Black Gold Channel Mining Co. and J. Bouse, the lessee of the mines on Foots creek, have been adjusted. A certificate was given by the attorney for the company to Mr. Bouse, stating that the development work done is satisfactory and the lease remains in force until May 1, 1896. In turn, Mr. B. has entered into an agreement to pay all debts for labor and material which have been or may be contracted during the life of the lease. He claims that he will now be able to raise the required funds with which to pay the debts contracted during his regime.

### WASHINGTON.

A two-thirds interest in the Friday mineral claim, in the Squaw Creek district, is reported sold to Captain Griggs of the steamer Ellensburg for $10,000. Three cars of ore shipped last fall gave a gross return of $93 a ton. The mine is developed by a shaft eighty feet in depth and a tunnel in 300 feet. This is expected to cut the vein at a depth of 130 feet.

Miners have arrived at Monte Cristo from the Michigan and Wisconsin copper regions. Work of driving Mystery Number Three is going on. It will soon reach the Pride of the Mountains workings and will take the place of the tramway now running to the concentrator for bringing down ore. The concentrator was shut down for a portion of last week on account of the Mystery tramway again getting out of repair. The big concentrator will again begin running with the west side of Golden Chord ore. Mr. Nicholson, who has been foreman of the Union Concentrator Company's concentrator and the Mystery and Pride of the Mountains tram lines, has resigned and his position is being filled by Mr. Taylor.

### BRITISH COLUMBIA.

The Morning Star Gold Mining and Milling Company of Rossland has incorporated under the act of 1862 of the old English law for $1,000,000 at $1 per share, with 200,000 shares of treasury stock set aside for development purposes. The Morning Star full claim is 1500x1500 feet. P. A. Largey is superintendent.

At Rossland the Le Roi closed down on the 16th until the skip is in order.

The British Columbia *Mining Journal* says: Stock in the Cariboo mine is now selling at $17 per share. It will decrease in price somewhat by raising the amount of capitalization from $300,000 to $500,000. Horsefly hydraulic stock, we are informed by Vancouver brokers, is now selling from $10 to $12 per share.

The Silver King tramway will be cut in two.

Ontario produced $65,000 worth of gold in 1895.

The Nelson smelter commenced its second run last week.

The output of British Columbia coal for 1895 was 939,634 tons.

### ALASKA.

A letter written by G. R. Voss, dated Forty Mile, Jan. 23rd, says: "Quartz veins have been struck and a mill will be started in July. The ore is low grade, averaging about $8 per ton in gold, but free milling. Miller creek, in this district, will yield a large sum of money this winter, and Glacier creek will not fall far behind. Quartz mining will make this a permanent camp. Circle City is a placer camp, for it is off the quartz belt. We have had a very severe winter, the thermometer registering 72° below zero on Jan. 3rd, and it was 62° below yesterday."

Horses are a great help on the Yukon, but the animals are scarce and their services hard to get. Most of the freighting is done by dog teams. From Fort Yukon to Circle City, a distance of eighty miles, freight costs 15 cents per pound. From Circle City to the mines, seventy miles distant, in winter 15 cents per pound and in summer 45 cents per pound. A deerskin canoe costs $5, mooseskin gloves $2.50, and moccasins $2.50 per pair.

Twenty-five Yukon sleds, some of them made to be hauled by hand and some to be pulled by dogs, piles of furniture and stacks of miners' "packs" are to be seen in the ocean warehouse on the Northern Pacific wharf, says the Tacoma *Ledger*. They are to be placed aboard the City of Topeka and with their owners sail for Alaska. The exodus for the northern territory continues. It is becoming a rush. So great is the demand for tickets that the Pacific Coast Steamship Company's local agency is unable to fill all requests and many are sent away who otherwise would have gone on the Topeka. The twenty-five sleds piled up in the warehouse represent twenty-five Yukon-bound parties. With each sled is a complete outfit.

### UTAH.

*Tribune*: The periodical story concerning the presence of free gold at Mercur may be true, but it is generally discredited by experienced miners. Several times in the past few weeks stories of this nature have been put in circulation, and while such a thing may occur in any formation, it is not likely to be found in place or in sufficient plenteousness to ever induce the miner to believe that Camp Floyd is other than a cyanide proposition.

AT SILVER REEF.—*Review*: The great sandstone reef that surprised geologists by producing $14,000,000 worth of silver is still being worked by "chloriders," men who explore the workings of the old mines for little pockets of rich ore that have been overlooked, and some of them are earning much more than wages. Mr. R. C. Lund of St. George, who was in Salt Lake last week, reports discoveries in the Thompson mine of large bodies of sandstone that carry from forty to sixty ounces in silver. The reef, he believes, is not half worked out, and were silver $1 an ounce Silver Reef would be a very lively camp. The Barbee & Walker custom mill will soon be started up on one of its periodical runs for the purpose of treating the sandstone taken out by the "chloriders." This is a five-stamp mill, but so soft is the rock that it crushes fifty tons per day, and the run usually lasts about six weeks. There are two other mills in the district, but they have been idle for years. The richest of the Silver Reef mines have been worked out down to the water level, and could some economical method for draining the ground be devised they might still be profitably operated. A project to generate electric power in the Rio Virgin river, six miles distant, and transmit it to Silver Reef for the operation of electric pumps has been under consideration, but it is doubtful whether anything will be done while silver remains at its present figure.

### IDAHO.

Supt. Jennings of the Star mine, at Hailey, says he has an ore chute 400 feet long, with 100 feet of backs. He intends to put in a hoist and sink 300 or 400 feet. There are twenty men employed.

The Columbia Company, at the Yellow Jacket, has bought a cyanide process for the reduction of the ore in the Columbia mine at the Yellow Jacket, says the Salmon *Republic*, which will treat fifty tons a day. The ore will be crushed with Cornish rolls, roasted and treated with cyanide.

AROUND PIERCE CITY.

(Special Correspondence)—Golden Reward.—Work on this claim is being rapidly pushed ahead. The tunnel was driven 24 feet last week. There is about 8 inches of ore in the face, but it is refractory, and the owners are getting out a carload of the best of it for shipment.

Idaho Group.—This property is closed down for the present, as it is necessary to make some improvements in the mill and put in a concentrator.

Bond.—The Crescent Co.'s mill is running as usual, but with a smaller force of men in the mine.

Frisco.—Owing to water the work was suspended on the shaft at 60 feet, and a tunnel to tap the shaft is being driven, under contract.

Mother Lode.—This claim, owned by Messrs. Pasold, Jacobs & Gilbert, and which adjoins the Frisco and Bond, is being developed. Good ore is being uncovered.

Golden Ribbon.—The shaft on this property is still going down. The ore is rich but small.

Miner.—It is rumored that this property has been bonded by Chicago parties, but the consideration is unknown. There have been over $75,000 expended on this property in development work and machinery, a Crawford mill being among the latest additions.

Lock and Key Group.—This property, owned by I. B. Cowan and others, is showing up well. Free gold is visible in the ore. It runs about $50 per ton. The paystreak is about 20 inches wide. It is the intention of the owners to put a stamp mill on this property when the snow goes off.

Placer miners are all busy now and the camp is resuming a more life-like appearance. This camp will most likely have an unusual rush of men looking for employment this summer, and of course large numbers will be disappointed, who come here expecting to make a stake in a season.

Amongst the placer mining companies business will be good this season on account of the heavy fall of snow.

Rouch, Crowley & Grun are busy getting in shape to make a big cleanup this season.

Dr. J. H. Morris & Co. are preparing to start up their pipe, but they have over 8 feet of snow on their property on the headwaters of Oro Fino creek. They will not manage to do much for a few weeks. They have in 600 feet of flume and estimate they will average $1000 per month, with two shifts. Gravel will average 4 feet in depth and go 40 cents to the yard. Last summer they expended $3000 on this property.

Pierce City, Idaho, Nov. 20, '96.

### MONTANA.

*Miner*: The Atlantic shaft of the Boston & Montana Company has reached a depth of over 500 feet.

The Bozeman mine, at Pony, which was bonded by Merrill, Cowan and Gamer, is sold to H. Albertson, et al., under bond, for $30,000. Five thousand dollars of this amount had been paid some time ago. The new owners will start at once to develop the property.

At Phillipsburg Superintendent Babcock of the Golden Scepter Gold Mining Company will put up a 100-stamp mill. Each stamp will weigh 900 pounds. He will also build a six-mile cable road, which is to convey the ore from the mine to the mill, and put in a 900 H. P. electric engine, which will furnish power for the trolley cars and for lighting the entire camp with electricity, and which will also furnish power by which the mill will be operated; a 10-drill air compressor and other necessary machinery.

The Golden Scepter Mining Co. at Bonito has decided to erect a 100-stamp mill and construct and equip an electric road five miles long, from the mine to the mill.

### WYOMING.

The Spring Creek Placer Mining Company, operating placers in the Douglas Creek district, southwest of Laramie City, has disposed of 300 acres of placer ground to Ohio parties for $30,000 cash. The Spring Creek Company is composed of five Cheyenne and Laramie men who worked the placers last season at a profit and were preparing to work them during the coming season. The sale nets them $5000 each over their investment, and they still own several hundred acres of valuable placer ground.

### COLORADO.

The sale of the Niagara mine and Niagara Extension to Pittsburg parties, the consideration being $75,000, of which $25,000 was paid for possession, is reported from Central City. The shipments have been of high grade; returns on a seven-ton lot of unassorted ore gave 6.01 ounces in gold and 9.60 ounces in silver per ton. The whole vein is mined as smelting ore.

Cripple Creek *Mail*: The Elkton produces monthly 334 tons, average value in gold $112.15, with a total output of $39,463; the Garfield-Grouse, 15 tons, $230 values, total output $3,600; the Jack Pot, 19 tons, $600 values, $11,400 output; Victor, smelting, 159 tons, value per ton $255.34 gold, $2.87 silver, mill ore 501 tons, $20 value, with a total output of $51,234.42, last dividend 10 cents; Anaconda, smelting, 126 tons, gold value $72.64, milling 330 tons, gold value $19.86, total output for both, $15,776.58; Cripple Creek Consolidated, 5,085 tons, with an average of $100 per ton to March 1, 1896.

A very interesting and somewhat annoying condition of affairs has arisen in the smelting industry of the State, and has affected the plants all over Colorado. It is, in brief, a silica famine. There is such scarcity of silicious ores at the present time that the Philadelphia smelter of Pueblo has been compelled to shut down several of its furnaces. Some of the Denver plants are also affected, but thus far none of the Leadville smelters have been compelled to close down any of their furnaces, although it has been very close "scratching." The scarcity of the silicious ores is due to the fact that most of the mines which have been supplying this class of ore have practically ceased taking it out. Many of them have, it would appear, run out of the ore, while one or two have closed down.

Cripple Creek *Times*: Statistics from the Pueblo smelter show that the average value of all ore received there from the Cripple Creek district for 1895 was $120.24 per ton.

SUED FOR $450,000.—*Chieftain*: In the suit of A. M. Hendry against the Pueblo Smelting and Refining Company, Hendry sues the smelter for $450,000, and states that in 1892, '93 and '94 certain parties, by force of arms, wrongfully and unlawfully broke into a vein of mineral within the surface boundaries of the Anaconda mining claim, situated in the New placer mining district, in Santa Fe county, N. M., and took out 4000 tons of silver, lead and gold-bearing ore, with an average value of $100 per ton. The parties who took out the ore caused it to be shipped to the defendant in this action, which converted it to its own use. He asks for $450,000 damages and costs of suit. The company admits that it did get some ore from that property, buying it in good faith from the Lincoln-Lucky Mining Company. No such amount as that named in the complaint was ever received and what was purchased was far from being $100 ore, but, instead, averaged between $15 and $18, the highest running in the neighborhood of $40. The Anaconda claim and Lincoln-Lucky claims crossed each other and the two companies had some trouble over their veins, and the suit is probably an outgrowth of that controversy.

### NEW MEXICO.

The Old Abe gold mine at White Oaks caved in last week from the first to the sixth levels, or 700 feet. The miners were out to dinner at the time or there would have been heavy loss of life. The loss is estimated at $50,000. About a year ago the timbering of the mine caught fire and a number of lives were lost.

Silver City *Sentinel*: Bell & Stevens are working men on the Mina Grande mine at Pinos Altos sinking two shafts, seventy feet apart, to the main ore body. The vein is from two to three feet in thickness, is easily mined and carries about $20 in gold per ton. The ore is free milling and will be treated at the Bell & Stevens mill.

The Eberle mine at Mogollon is employing five men on tunneling and development work. F. X. Eberle, the owner of the property, says he intends soon to erect a fine mill.

Work is progressing on the smelter at this place, ore and supplies are being received daily, and the plant will open for a successful run some time during the latter part of the month. The company intended to start the works about the 15th, but upon close examination of the furnace it was thought unwise to blow in until they could procure a new one to take its place. They ordered a new furnace and expect its arrival in a few days.

The Newcomb mill, at White Signal, is nearing completion.

F. R. Brown, manager of the Deep Down mine at Mogollon, has new machinery for the mill. On the 40-foot level the vein runs from 9 to 30 feet wide and has a pay streak from 8 to 10 feet wide. Much of the ore runs $16 per ton. The present cost of taking out ore is $1.10 per ton.

### ARIZONA.

Miners along the Hassayampa are jubilant over the prospect of starting reduction works in Prescott.

The Volcanic mines near Gila Bend are reported to have been sold by Benjamin E. Lower for $50,000. The purchasers are to erect a fifty-ton smelter.

A Prescott dispatch says the first payment by Ohio men has been made on the Blue Dick mine, eight miles from Prescott, and that the new company expects to spend $150,000 at once.

James Douglas and Supt. Cook, representing the United Globe mines at Globe, have decided to build a tramway between the Buffalo mine and the smelter.

At Goldfield the Mammoth people are continuously prospecting, exposing ore in different places, and have sufficient ore ahead to run the mill. The last working of consequence is 1000 feet south of the old shaft, where the work was continued to a depth of 80 feet, which exposed ore of considerable richness. From a point 15 feet from the surface down a drift was run from this shaft, sunk on the hanging wall, to the other wall, about 70 feet through ore.

The Bull Dog mill is running steadily on ore principally from the Highland mine.

South of the Bull Dog the owners of the Cousin claim are sinking a 50-foot shaft, and at a depth of 18 feet free gold was found in pockets. The ore is heavily copper-stained and is from 4 to 6 feet in width.

The Pomeroy mill is being put in order and will be run by N. Wheeler.

The Phœnix *Republican* says there is now a prospect that Harqua Hala camp is soon to regain its ancient glory. The old mine, it is true, is closed down, perhaps for ever, as the diamond drill fails to develop any more such wonderful bodies of ore as were uncovered by Hubbard & Bowers. The mill is now working on tailings from the old dump, and a fair record made by the aid of cyanide. When the tailings are done with then it was proposed to ship the mill to Australia. But it appears probable that the machinery will be soon again running on ore from a near-by strike. Immediately adjoining the Harqua Hala Bonanza group, and exactly parallel, across a little gulch, is a claim owned by Quinn brothers, with whom, however, are associated Sullivan & Hall, the Goldfields miner magnates. This is the mine that is believed to have in it all the elements of a bonanza of the first rank. The Quinn claim is as yet but little developed, yet at an inconsiderable depth has been exposed an ore body 12 feet in width that assays from $15 to $50 to the ton in free milling gold. Unlike the Bonanza, it would appear to have a well-defined ledge, and the profit from its workings is sure to be immense. The showing thus made has encouraged the mine owners of the Harqua Hala and Eagle Tail districts to start development work to uncover the hoped-for underground riches.

GILA COUNTY.

*Silver Belt*: The deal was closed last week by which the New York stockholders in the Kasser Gold Mining Company acquired the interests in that property of R. E. Humphrey and C. H. Hill, and the first payment has been made. Recent developments have proved the value of the property and the ore is said to be now more abundant and of a higher grade than at any time since the company began operations. A pipe line, nearly a mile in length, is to be put in about April 1 to increase the water supply. Considerable bullion has been produced during the past three months and the outlook for future success is bright.

### SOUTH AFRICA.

South African *Mining Journal*, Feb. 8: Mr. Howard Hill, the capable manager of the Sheba Co., has sent his resignation in to his board and it has been accepted. In the meantime the company under his charge is apparently experiencing a return to the palmy days when the yield per ton was reckoned in ounces. Lately 1¼ ounces have been obtained, and during January a record output has been achieved. Sixty stamps crushed 3130 tons, the mesh used being 1600. The gold produced was 7391 ounces 15 pennyweights, equal to 2 ounces 7 pennyweights per ton, and this was supplemented by 2139 ounces 3 pennyweights from the cyanide vats. The total recovered was 9530 ounces 18 pennyweights, and if the 479 ounces, which is the assay value of the concentrates, be added, the total is 10,010 ounces from sixty stamps. This is, perhaps, the highest return yet obtained in South African mining from sixty stamps, and the return clearly shows that there is still good stone in the Sheba. The incoming manager is not likely to be grateful to Mr. Hill for establishing such a record, as unless the quality of the stone is everywhere improving it will be difficult to maintain the figures for January. The total production of the Barberton fields during 1895 was about 60,000 ounces, and this yield of the Sheba is at the rate of twice this quantity from one mine alone. How long will it last?

## Recent Publications Received.

"*A Practical Treatise on Compressed Air and Pneumatic Machinery,*" by Edward A. Rix and A. E. Chodzko, pneumatic engineers for the Fulton Engineering and Shipbuilding Works, San Francisco, manufacturers of mining, milling, smelting and electrical machinery, a handsome brochure of 222 pages, black and gold, elaborately produced in flexible leather binding, the general appearance of the book being the same as Haswell, or Kent's Mechanical Engineers' Pocket Book. It is a California production throughout, including authorship, subject and mechanical detail. It treats of work done by a California firm, by California engineers; the curves, tables and engineering data are original and were specially prepared by the authors; the matter treated of is not theoretical or suppositious, but is a tangible creation in successful operation. While in the abstract the subject is an interesting one to civil and mining engineers and others, the contents are of practical value, and the book goes beyond being a mere addition to current technical literature, as it adds to the sum of knowledge on a scientific subject of present practical importance. Copious illustrations and sectional drawings accompany the discussion of the different types of air compressing machinery. An interesting feature of the work is the reproduction in its entirety of a handsomely illustrated article on "The Pneumatic Torpedo Plant at the Presidio," written by E. A. Rix, and which originally appeared in the *Journal of Electricity*. Mining men and engineers in the west half of America will find the data of practical value, and up-to-date on compressed air and its successful application as a motor. The price of the book is $4, postpaid. It may be ordered from the Fulton Engineering and Shipbuilding Works, No. 213 First street, San Francisco, or from the Rix Compressed Air Machinery Company, 11 and 13 First street, San Francisco.

"*Journal of the Association of Engineering Societies for February, '96,*" the leading article being a paper on "Engineers—Consulting, Inspecting, Contracting: Their Relationship to Each Other and to Their Clients," read by Geo. W. Dickie, of the Union Iron Works, at a meeting of the Technical Society of the Pacific Coast at their rooms in the Academy of Science Building, this city, June 2, '95, with discussion thereon by John Richards, C. E. Grunsky, Otto Von Geldern, Randall Hunt and other prominent members of the society. "Triangulation Preparatory to Alignment of a Tunnel" constitutes the principal remaining contents of the journal, which, with its twenty pages of advertisements, presents a prosperous business appearance.

"*The Engineering Magazine,*" edited by Jno. R. Dunlap, Times Building, N. Y. Special mention is due this industrial publication, and its special value to engineers. Science is simply organized knowledge; art, the application of science; and the science and art of civil and mining engineering finds scope and representation in the pages of this excellent magazine. While the MINING AND SCIENTIFIC PRESS cannot agree with the editorial views of the *Engineering Magazine* as to "sound money" and kindred topics, yet these are largely matters of opinion, influenced by environment, and are to be regarded without prejudice. The inevitable article on "The Roentgen Rays" is of more than ordinary serial importance, being written by M. I. Pupin, who occupies temporary prominence by reason of experimental work in connection with this new radiance. "Prospecting with the Diamond Drill" is of interest and value, and the article reproduced in these columns on the 21st inst., "Practical Assaying at Mines and Works," by a practical man, is also of special value. The *Engineering Magazine* has several features that should commend it to the Pacific coast: it is not hidebound; it recognizes difference of thought and tries to be just without being unduly generous; it every month presents a complete and valuable descriptive index of the leading features of the leading scientific, engineering, mining, electrical and other industrial journals of all English speaking communities, giving the name, where it appeared, what it is about, its length, number of words, and undertakes to furnish the article to any one for a trifling amount, varying from 10 to 25 cents; it has departments edited by skilled specialists, treating of nearly every phase of industrial life, in each of which a happy medium seems to be struck between the intense conservatism of the duller technical publications and the quasi-scientific sensationalism of the daily press, the general impression in the mind of the reader being that the statement is reliable. The price of the magazine is $3 per annum, and it is well worth the money.

"*Sigmogomphius Le Conte, a New Castoroid Rodent from the Pliocene near Berkeley, Cal.,*" by Jno. C. Merriam, is issued by the University of California as a special bulletin, being descriptive of fossil rodent remains and the geological formation in which they were imbedded, with some observations and deductions therefrom. Bulletin No. 12 from the University is on Malignite, a family of basic plutonic orthoclase rocks rich in alkalies and lime, intrusive in "The Contchiching Schists of Poohbah Lake," by Andrew C. Lawson, with full geological and mineralogical details, chemical analysis, and scientific discussion thereon. Among Prof. Lawson's concluding remarks are the following: "The interest attaching to the rocks described in the preceding pages is twofold. To the systematist they furnish new material for any detailed scheme of classification of rocks. To the student of petrogenesis, to whom artificial schemes of classification are liable to be a hindrance rather than a help, they afford another instance of a very sharply defined petrographic province in which the different types of rock are undoubtedly the products of differentiation from a common magna. The most striking fact which a review of the petrographical descriptions discloses is that intensely contrasted mineralogical, structural and textural variations are the concomitants of very moderate changes in chemical composition. This is well illustrated by a comparison of the analyses of the garnet-pyroxene-malignite and the amphibole-malignite."

"*Catalogue of the Brown Hoisting and Conveying Machine Co., Cleveland, Ohio,*" 89 pages, 6x9 in., well gotten up typographically, and descriptive, from the commercial point of view, of the cranes, hoists, etc., manufactured by that company.

## Coast Industrial Notes.

—A sub-port of entry will be established at Santa Barbara, Cal.

—Eastern men propose shortly to complete a $200,000 brewery in San Diego.

—The rock-crushing plant at Folsom will be in operation by the 15th of April.

—Vallejo, Cal., citizens have organized the Vallejo Ferry Co., capital stock, $60,000.

—The Nevada County power company has bought the Grass Valley, Cal., electric light works.

—The expected raise in Los Angeles oil has come about. It is now rated at the exchange at 80 cents per barrel.

—The Capital Electric Light, Motor and Gas Company of Boise, Idaho, will double its capacity. The improvement will cost $20,000.

—The battleship Oregon is about finished at the Union Iron Works, and is now receiving a general going over preparatory to her trial trip.

—New Whatcom and Fairhaven, on Bellingham bay, Wash., are now given out as the probable salt water terminus of the Great Northern.

—Last Saturday the Risdon Iron Works of this city signed a contract with the Harbor Commissioners for the wrought steel work on the new Union Depot building for $188,000.

—The barkentine Behring, the first Russian sailing ship to visit this port for twenty years, arrived last Saturday from Yokohama, to load general cargo for the Russian Sealskin Co.

—To date the San Francisco and San Joaquin Valley Railroad directors have paid out $1,222,250 for construction. The road is built to the Tuolumne river and in another month will have reached the Merced river.

—The contract for 2200 tons of steel beams and girders for the new nineteen-story Spreckels building, corner Third and Market streets, this city, has been let to the Pacific Rolling Mills, the largest contract of the kind ever given out on this coast.

—The South San Francisco pottery, owned by Steiger Bros. of San Jose, has suspended operation. About seventy employes are out of work, and future operations are uncertain, though it is believed that the proprietors, who are honorable men, will be able to adjust all financial matters and resume.

—Eastern Oregon reports being overrun by useless horses, which are becoming wild, and the people are at a loss to know what to do with them. There are 100,000 horses in eastern Oregon that cannot be given away, and they must not be allowed to run wild on the ranges, for they will breed so fast that the country will be ruined by them.

—A new method of hauling logs has been introduced at the camp of McDougall & Jackson, near Arlington, Wash. They employ an endless cable, two miles in length, which is operated by a stationary engine at the landing. The firm cut 12,000,000 feet off of one claim (160 acres) last year, valued at $43,000, said to be the most profitable claim ever cut in the State.

—On the first of March the wages of men employed on the Miller & Lux ranches in Mason Valley were reduced from $25 to $20 per month. The men, including those who were feeding cattle, quit work and published a card in the Yerington *Rustler* in which they say they ask nothing unreasonable, and if Miller will restore the old rate they will go back to work.

—Washington State's lumber shipments by rail for the first sixty days of '96, were 16,399,000 feet as against 8,440,000 for the corresponding period of '95. The shingles taken out of the State in the two months of 1896 were 179,520,000 as against 220,480,000 in the corresponding months of 1895, a falling off in shingles of 40,000,000, while the lumber shipshipments doubled in the two months over those of last year.

—Some ambitious Arizonians last week incorporated at Prescott the Saluda Southern Railway Company, capital $19,755,000, to build 878 miles of road from a new town to be started eighteen miles north of Phœnix upon the land of the Rio Verde Canal Company, which company is now constructing a water-storage system on the Verde river and a canal, and expects in two years to irrigate 200,000 acres in the Salt river valley.

—In 1860 the assessed valuation of what is now the State of Washington was $4,394,735, with a population of 11,694; in 1870 the valuation had increased to $10,642,863, with 23,955 population in 1880 the valuation was $23,810,693, with 75,116 population; in 1892 the valuation was estimated at $400,000,000, with 375,000 population. Now it is estimated at $450,000,000, with the population estimated by Governor McGraw at 415,000, Jan. 1, 1896.

—A colony of 100 Slavonians from the Eastern States led by Rev. Mr. Jeram have secured 40,000 acres in Eden valley, Mendocino Co., and will attempt settlement there on the co-operative plan. There are 100,000 shares of stock at $5 per share. Each settler must have twenty shares. Having fifty shares entitles one to a lot in a townsite. Some one will doubtless make some money in the scheme.

—The Puget Sound, Mount Tacoma and Eastern Railway Company has incorporated at Tacoma, Wash.; capital stock, $2,000,000. G. L. Holmes, P. V. Cæsar, L. R. Manning, I. W. Anderson, T. W. Enos, W. C. Wheeler, trustees. The enterprise is said to be backed by Eastern capital; object, to follow the Hart logging road, of which ten miles are already built, to Mount Tacoma, forty miles away, as a scenic route, and then build eastward to a probable connection with the Burlington.

—In reply to some recent notice herein of local comment on the price of electric power in Sacramento from the Folsom Water Power Co., the *Pacific Electrician* in its February issue, just received, says that the S. P. Co. has contracted for electric power for three of its shops in Sacramento at a cost of $50 per H. P. per year, and that any power user in Sacramento desiring power in large units can get it at that rate. The electric company is supplying about 950 H. P. in that city and earning more than its interest account and running expenses.

—The Western Packing Company of Portland, Or., which commenced the slaughter of range horses some six months ago, closed its abattoir Feb. 24. The company had slaughtered 7000 horses in all, and had a market for pickled horse flesh in Antwerp, but owing to Chicago packers having shipped a lot of flesh from diseased horses there, the Belgian Government closed the country against American horse meat on Feb. 1. Several tons of pickled horse meat were shipped to Japan as an experiment, but no market was found there and the meat was thrown into the ocean. It was found that the receipts from fertilizer made of bones, blood and waste meat, and from sale of hides, tails, etc., would not balance the cost of horses and slaughtering, and as no more meat could be sold for the present the establishment was closed. The company says it may reopen next fall, when the range horses are fat, and if it does it will establish a market in Chicago for the sale of horse flesh, as a number of persons there who have tried the meat have formed a liking for it.

—The decision of the Supreme Court sustaining the AlamedaCo. Supervisors in awarding the franchise from Oakland to Livermore to E. P. Vandercook has removed the last obstacle in the way of the construction of the road. A few months ago Mr. Vandercook went East and received many pledges of support for his road when the cloud on the franchise was settled. Now that the franchise has been affirmed the construction of the road will be pushed with all possible haste. The new road will start at the terminus of the present system managed by E. P. Vandercook at Fruitvale. From there it will go along the foothills toward Haywards, only keeping well to the north of the county road, which is traversed by the Haywards electric line. A branch will run from the main line to Haywards. The line will run to Livermore and thence to the Corral Hollow mines and will be operated by electricity and will be adapted so as to carry both freight and passengers. It will open up much new territory and such a line has been in demand for several years.

—The Manufacturers' and Producers' Association held its first annual meeting in the Chamber of Commerce building, on California street, this city, on the 25th. H. T. Scott, president of the association, occupied the chair. The several reports were read. The report of the secretary, L. R. Mead, has received previous notice herein; the report of Treasurer Sbarboro showed receipts for the year $8249.12, disbursements $8009.45. On motion the annual dues were increased from $6 to $10. The following gentlemen were elected directors: Horace Davis, H. J. Crocker, J. W. Kerr, A. Derham, W. F. Bowers, J. P. Currier, A. Sbarboro, M. J. Keller, M. McGlynn, A. McLaughlin, L. R. Mead. At a subsequent meeting the directors elected the following officers: President, Horace Davis; first vice-president, M. J. Keller; second vice-president, W. F. Bowers; third vice-president, H. J. Crocker; treasurer, A. Sbarboro; secretary, L. R. Mead; assistant secretary, Fred H. Dingle; manager, S. H. Tacy.

## Personal.

CHAS. BUTTERS expects to return from South Africa to Shasta Co. about July 1st.

SAMUEL BLIGHT of Grass Valley succeeds A. Walrath as superintendent of the Old Flag mines, Brown's Valley, Cal.

THE Amador *Record* says F. Pierce, who has occupied the position of foreman at the Oneida mine since work started up, has accepted a position in a New Zealand mine at a salary of $300 per month, and will leave for that country on the first of April. He will be succeeded in the Oneida by Mr. Comstock of Virginia, Nev.

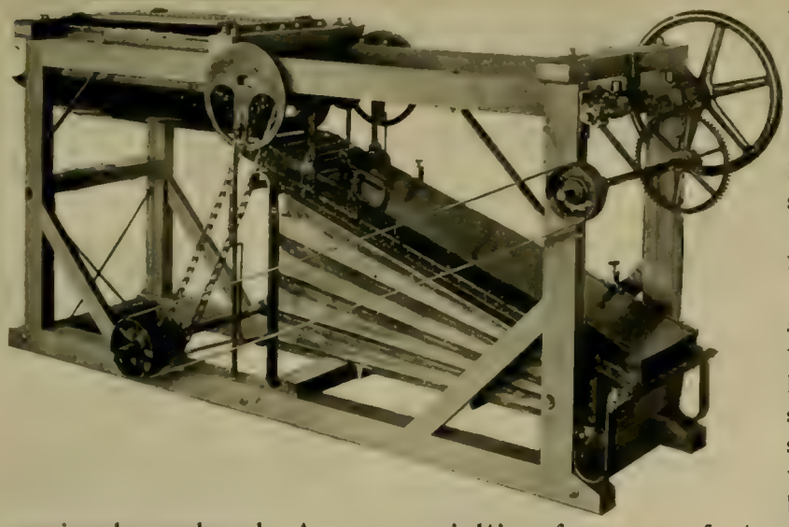
PROF. W. P. BLAKE, well and widely known, who is at present sojourning at Tucson, Arizona, has been invited by the Tucson Scientific Society to deliver a lecture on "Meteorites." As soon as the Professor began to look into the subject and take notes meteors began to fall all over the country—one in New Mexico—and several more are expected from different parts of the country purposely, no doubt, to supply the Professor with abundant material for his paper fresh to hand. It is to be hoped the Professor will not set out to lecture on earthquakes or he might be supplied with data to order greatly to general ill-doing and consternation.

This doesn't happen every day. You can't expect it more than a few times in a lifetime. No one is going to agree and guarantee positively to save you 30 per cent or else no pay unless they know what they are about. You can't expect people to say, "You need not pay for this until you have proved our guarantee," unless they intend to do all that they claim. As a matter of fact, we do more than we claim. We guarantee to save 30 per cent, but actually we save a good deal more.

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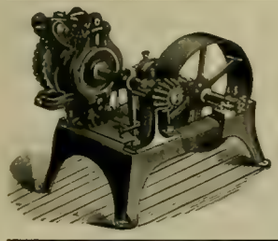
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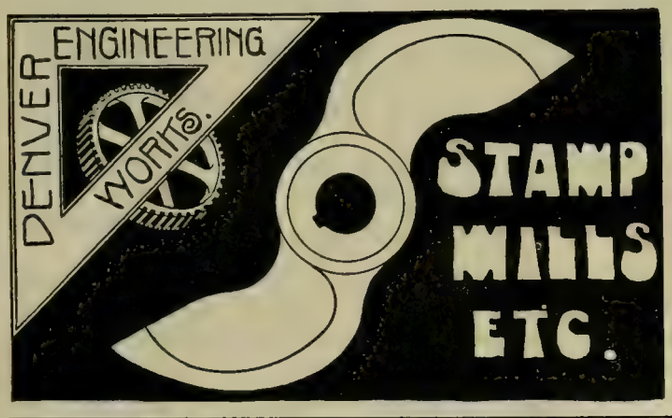


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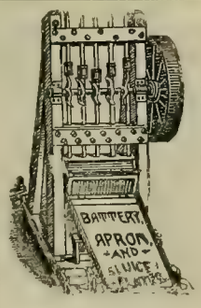
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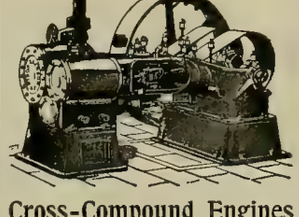
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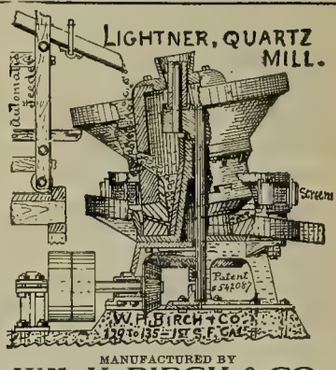
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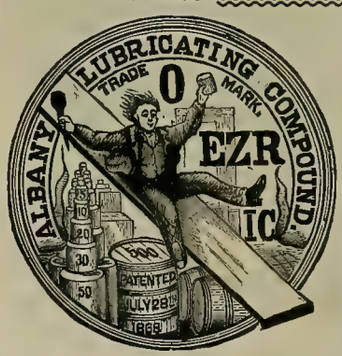
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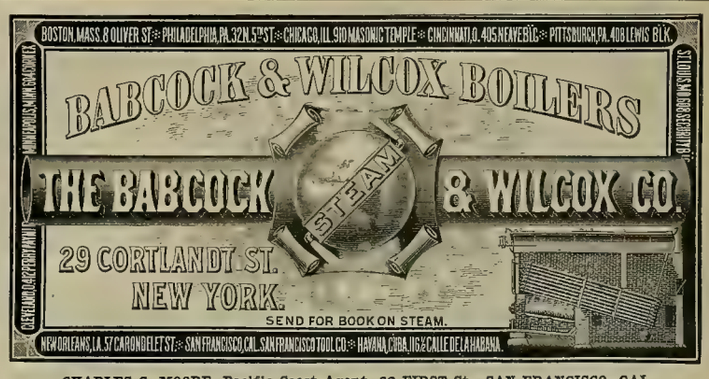
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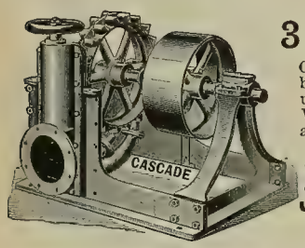
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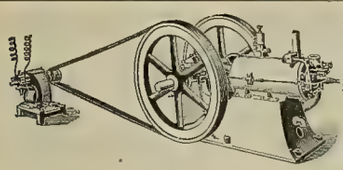
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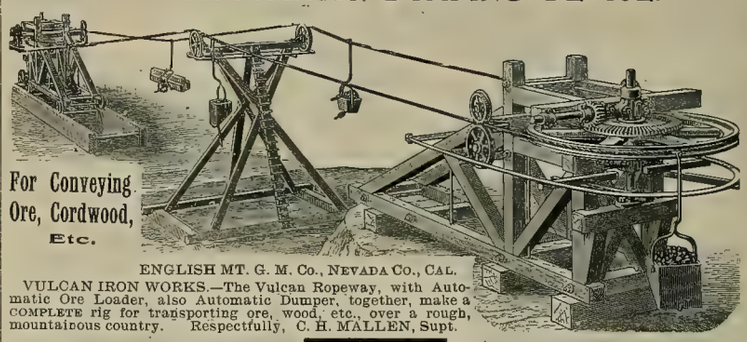
| | |
|---|---|
| Monadnock Building | Chicago |
| Ishpeming | Michigan |
| 1316 Eighteenth Street | Denver |
| Sherbrook P. O. | Canada |
| Apartado 830 | City of Mexico |

H. D. MORRIS & CO., Agents, 141 First St., San Francisco, Cal.

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—WITH—

AUTOMATIC ORE LOADER AND AUTOMATIC DUMPING DEVICE.



For Conveying Ore, Cordwood, Etc.

ENGLISH MT. G. M. Co., NEVADA Co., CAL.

VULCAN IRON WORKS.—The Vulcan Ropeway, with Automatic Ore Loader, also Automatic Dumper, together, make a COMPLETE rig for transporting ore, wood, etc., over a rough, mountainous country. Respectfully, C. H. MALLEN, Supt.

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Manufacturers of Mining Machinery.

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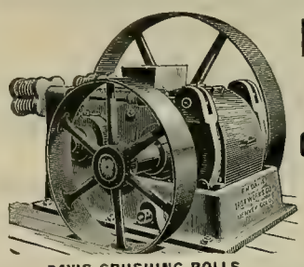
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High Class Machinery and Experienced Modern Engineering.

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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The Largest and Most Completely Equipped Electrical Manufacturing Establishment in the World.

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We furnish complete lines of apparatus for the perfect equipment of ISOLATED PLANTS for Hotels, Office Buildings, Flats and Factories.

STANDARD SYSTEMS

for distribution of light and power in LARGE MANUFACTURING ESTABLISHMENTS, MILLS and MINES.

WESTINGHOUSE ELECTRIC RAILWAY SYSTEM,

the Most Durable, Economical and Efficient on the Market.

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Automatic Cut-Off Engines, High-Speed Engines, Hoisting Engines, Quartz Mills,
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# The McGlew Ore Concentrator Company.

PATENTED SEPTEMBER 19, 1893. CHEAPEST, SIMPLEST, MOST DURABLE AND CLOSEST SAVING CONCENTRATOR IN USE. FRANK BARRERE, Secretary and Manager.

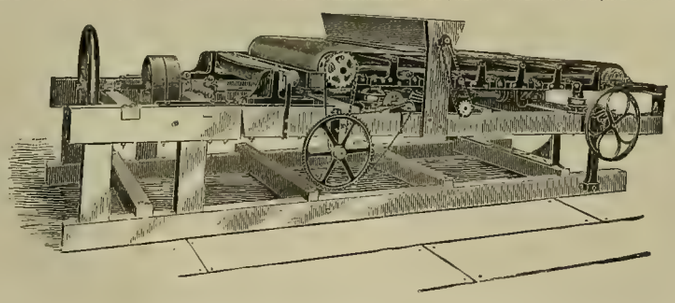
Can be seen in operation at the Company's works, 132 Main Street, San Francisco.

Office, 116 Davis Street.

NINETY-FOUR AND ONE-HALF PER CENT
—SAVED—
ON ORES DIFFICULT TO CONCENTRATE.

A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.
SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION.
CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
Including prepared canvas belt 4 ft. 6 ins. wide.



FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.
THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.
Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.
Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.
You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,
E. L. BALLOU, Propr. Ballou Reduction Works.

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Established 1860.

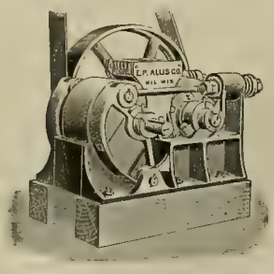
## Mining, Milling and Smelting MACHINERY.

Crushers, Rolls, Jigs, Concentrators,
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Salt Lake City, Utah.....73 So. Main Street.
Denver, Col.....427 Seventeenth Street.
Minneapolis, Minn.....416 Corn Exchange.
Chicago, Ill.....509 Home Ins. Building.
Kansas City, Mo.....43 Armour Building.
Pittsburg, Pa.....German National Bank Building.
New York City.....26 Cortlandt Street.
City of Mexico.....Calle Gante, No. 12.

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NOTICE TO GOLD MINERS!



## SILVER-PLATED AMALGAMATED PLATES
### For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

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—DEALER IN—

Assayers' and Mining Material.

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BATTERY SCREENS AND WIRE CLOTH.

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Hoskins' Hydro-Carbon Assay Furnaces.

# Market Reports.

## The Markets.

SAN FRANCISCO, March 26, 1896.

Rains the past week, with the outlook at this writing favorable for a general rainfall, are creating a feeling of more confidence in trade and manufacturing circles, which is doing no little in offsetting the feverish and unsettled feeling caused by failures among retailers the past winter. The conviction is gaining ground that, with weak firms forced to the wall, those remaining will be in better position and business rest on a more stable footing for the future. There is still free shipment of goods and machinery to Alaska; but with the next month this demand will fall away. From the gold-mining districts on this coast come confirmed advices of general activity. There is a large influx of miners and prospectors. In this city it is stated that there is a good inquiry for mining property, but few sales have been closed, although several are being negotiated.

In the money market there is more money held by the banks than before known; and while they are desirous of placing funds, still the best of security is demanded, which makes it bad for average borrowers to be accommodated. This discrimination is not confined to San Francisco, for the East reports a similar state of affairs. It is stated by the better informed that conditions at the East will change for the better, when the Cuban war talk blows over. Fears of foreign complication invariably have a bad effect. In Europe business has revived, and more activity is reported than for fully five years. The improvement abroad will extend to this country unless we should have a war with Spain, which is hardly likely to occur.

**New York Silver Prices.**

NEW YORK, March 26.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 31 3-16 | 68⅛ | 11 00 | 3 15 |
| Saturday | 31 5-16 | 68⅝ | 11 00 | 3 20 |
| Monday | 31 7-16 | 68⅝ | 11 00 | 3 15 |
| Tuesday | 31¼ | 68¼ | 11 00 | 3 15 |
| Wednesday | 31⅜ | 68⅜ | 10 75 | 3 15 |
| Thursday | 31¼ | 68¼ | 10 75 | 3 15 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.87 |
| London Merchants | $4.85 |
| London Sight Bankers | $4.88 |
| Refined Silver, per oz., 1000 fine | 68¼c |
| Mexican Dollars | 55@56c |

SILVER.—The market has continued to fluctuate. European advices state that the buying is not of a pronounced character and confined largely to India and The Straits. China does not as yet take much. The latter country has placed through the Hongkong & Shanghai Banking Corporation a new loan in England. It is for sixteen million pounds sterling, but the particulars are not likely to be made public for several days yet. What effect this new loan will have on silver it is hard to say. We are informed by a person who is in position to know that it calls for gold, and that the money is already in the hands of the London banks. He says that the money is for the purpose of paying war indemnity, and also building vessels of war and other national purposes. While this may be correct in the main, yet it is not at all reasonable to believe that China does not want to import silver. This demand is likely to come later, and if it does, the market ought to improve.

In the local market the situation is unchanged. Buyers do not appear to compete, which keeps the price fairly steady. The steamer Belgic for China took out the past week $61,650 in bullion.

MEXICAN DOLLARS.—The market holds steady at from 55 to 56 cents. The last steamer for China took out 214,000. Dealers report an improving demand.

COPPER.—The market at the East improved slightly, but was weaker towards the close. The export demand is very heavy, taking over one-half of this country's output. English mail advices state that the continent has been a heavy buyer. A private circular reports the London market as follows: "Locomotive builders are said to be full of orders until the end of the year. For war and mercantile ships much copper is being, and will be, required. Makers of copper wire are very busy (one order for 800 tons having recently been placed), and to-day the Government invites tenders for 800 tons of Wallaroo, Burra, or Lake copper—presumably for the manufacture of cartridges."

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

LEAD.—The market at the East advanced slightly, but towards the close it is weaker. The output in this country is said to be about the same as it was last year, as is the consumptive demand. In our market there is nothing new to report.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—Outside of a good demand for shipment up north, there is nothing new to report.

The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

QUICKSILVER.—The stocks held are reported large, but the combination holds at former quotations. The demand is said to be only fair.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 40 00 |
| West Coast of Mexico, for Export | 35 00 |

BORAX.—The shipments eastward continue to absorb the output on this coast.

The market is quoted as follows:

| | |
|---|---|
| Refined, in car lots | 6½ |
| Refined, in sacks | 5⅞ |
| Powdered, in car lots | 6⅛ |
| Concentrated, " | 5⅝ |

TIN.—There is a light demand for both pig and tinplate. The bulk of requirements for spring purposes has been met. At the East and abroad the markets rule steady. If silver should advance, better prices would rule on speculative buying.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14¼c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

ANTIMONY.—There is a fair Eastern demand. The market is quoted at 9 cents as an outside figure.

COAL.—The general situation is essentially unchanged. Large handlers and consumers do not seem disposed to anticipate wants to any extent. This conservatism is due to fears that the wheat crop will be large, which will send an increased number of coal-laden ships to this coast for outward cargoes. The spot market is steady, with a larger consumption of steam reported.

SPOT FROM YARD—PER TON.

| | | | |
|---|---|---|---|
| Wellington | $7 50 | @ | 8 00 |
| Greta | 6 00 | @ | 6 50 |
| Nanaimo | 6 50 | @ | 7 00 |
| Gilman | 5 50 | @ | 6 00 |
| Seattle | 5 00 | @ | 5 50 |
| Coos Bay | — — | @ | 4 50 |
| Cannel | — — | @ | 8 00 |
| Egg, hard | — — | @ | 13 00 |
| Walisend | — — | @ | 6 50 |
| Scotch Splint | — — | @ | 7 50 |
| Brymbo | — — | @ | 7 50 |

TO ARRIVE—CARGO LOTS.

| | | | |
|---|---|---|---|
| Australian | 5 25 | | |
| Liverpool Steam | 6 25 | | |
| Scotch Splint | — — | | |
| Cardiff | 6 25 | | |
| Lehigh Lump | 9 00 | | |
| Cumberland | 13 50 | | |
| Egg, hard | 10 00 | | |
| West Hartley | 6 50 | | |

COKE.—The spot market is in favor of buyers, which keeps distant or forward shipments inactive.

| | | | |
|---|---|---|---|
| Gas Companies' | — — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 8 50 |
| " in sacks | — — | @ | 9 50 |
| Cumberland | — — | @ | — — |

LUMBER. — The export shipments from this coast continue free, which keep the market strong. In the local market the demand is only fair, but an improvement is looked for soon.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 16 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

NAILS.—The market is quite firm. Considerable buying is reported in anticipation of an advance next Wednesday.

The market is quoted as follows:

| | |
|---|---|
| Wire, carloads, basis per keg | $3 07½ |
| " jobbing, " " | 3 20 |
| Cut, carloads, " " | 2 82½ |
| " jobbing, " " | 2 95 |

IRON.—In our market a good demand is reported. The placing of orders for structural and other purposes is said to be larger this year than for two or three years past. For one building alone over 2000 tons will be consumed by the rolling mill, which secured the order against Eastern bids. Eastern advices continue to note a decrease in the output of the furnaces, but it is still very large. The present weekly output will bring the aggregate for the year up to over 9,500,000 tons.

## Mining Share Market.

SAN FRANCISCO, March 26, 1896.

The market the past week was quite active from Friday to Monday at steadily advancing prices for Yellow Jacket, Crown Point, Belcher and Seg. Belcher. The rest of the market sympathized slightly. As the market began to setback for the above, it strengthened for Sierra Nevada and Union in the north end. When the two latter had advanced about ten per cent, the entire market showed more strength, with free transactions recorded in nearly every stock on the list. The strong market was followed by free selling from the bear contingent, which caused lower prices along the entire line. The largest decline has been in Crown Point, Yellow Jacket and Belcher in the Gold Hill group and in Sierra Nevada and Union in the north end. The advance in the leaders on the up move was slightly over double from the lowest prices for shares in the three Gold Hill mines and about 90 per cent in the shares of the two north end mines. This is the most pronounced up-move that has been made for many months and, as usual, only a few outside operators profited by it, for it is said they became too bullish at the wrong time. At this writing the market looks unsettled, and when this is the case it is dangerous for small operators. All kinds of disquieting rumors are afloat. That which creates the most fear is the turn affairs took at Virginia City when the miners took the law in their own hands and ran the newly appointed superintendent of Hale & Norcross, who is also superintendent of West Con. Virginia, out of that place. Fears are expressed that this may be followed by an appeal for protection, which would precipitate affairs at Virginia City and interfere with the workings of some of the other mines. So far the writer is not advised as to what course will be pursued, for the situation is being discussed and no definite understanding arrived at at this writing. Until this is settled on, it looks as if the market will be subject to slight ups and downs. What will be the outcome is purely guesswork. There can be no doubt that the work done and which is expected to be done in several of the mines is of a favorable character, and if affairs were settled would cause better prices.

An assessment was levied the past week by Gould & Curry, which will be followed within the next thirty days by several more.

The news from the Comstock mines reports continued active work, considering the number of miners employed, in Alta. While this is the case, it points to more time before definite results can be ascertained. In the Gold Hill group Overman and Belcher are still raising some ore, but it is not sufficient in quantity or value to have any effect. The work in Crown Point continues on several levels, but it is of dead-work character, which will be followed later on by exploiting the different levels on which they are now at work. Even with the starting of new work to the east and west, it will take considerable time before reaching the objective points sought. No news is allowed to leak out from Yellow Jacket, but it is reported that some work is being done, but on what level or in what direction it is not stated. In the absence of more definite information these reports may be put out for the purpose of influencing the market. The joint west drift that is being run by Confidence, Challenge and Con. Imperial continues to be driven slowly ahead. When this drift is extended still farther, it is stated that connection will be made with the lateral west drift which has been run by Confidence and Challenge into the Con. Imperial ground. With this connection made, considerable ground will be open for active exploiting. In Alpha more or less dead work to the west is still being made. In Potosi, Chollar and Savage of the middle group active work is still the order, with no particular change in its character. Some ore is being raised, but it does not cut any figure in the market. Work in Hale & Norcross is still suspended pending a settlement with the Miners' Union. The work in Gould & Curry and Best & Belcher is confined to the levels heretofore reported. In Con. Virginia exploiting work is being done on several levels; that under way on the 1000-foot level seems to attract the most attention. There are those who contend that an ore body is liable to be found within the next few months. Their opinion is largely theoretical and therefore may not prove correct, but it is to be hoped that they are right. In Ophir more or less active work is being done, without as yet encountering anything of an encouraging character. In Union and Sierra Nevada the work is not essentially changed since our last week's review. It is expected that the new work started will strike ore. From all that can be learned, it will take considerable time and money before finding out if there is much ore lying in the direction to which they are running. Work in Utah is confined to cleaning out and repairing an old west drift. When this is completed the drift, it is said, will be extended farther west.

From the Brunswick lode our advices continue to state that the work in Occidental is confined largely to extending the drift on the 750-foot level, so as to intercept the ore found above. If it is found to extend down, and is wider and of higher grade than found above, it will do no little in reviving interest in that lode. The work being done by the other companies on the lode is not calculated to excite attention, owing to its being preparatory to exploiting later on. When the latter is started then more interest will be taken in it.

From the Bodie district our advices state that a few tons of ore is being raised each week by Bulwer while prosecuting the work heretofore reported. In Bodie low grade ore is still found. The work in the mines in this district is not calculated to raise the expectation of shareholders that anything of much value is likely to be discovered soon.

The following illustrates the changes of the week:

| MINES. | Mar. 19. | Mar. 26. |
|---|---|---|
| Alpha | ..... | $ 10 |
| Alta Consolidated | $ 16 | 17 |
| Andes | 31 | 33 |
| Belcher | ..... | 28 |
| Best & Belcher | 67 | ..... |
| Bodie | 27 | 28 |
| Bullion | 09 | ..... |
| Challenge | ..... | ..... |
| Chollar | 48 | 48 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 1 65 | 1 65 |
| Consolidated New York | ..... | ..... |
| Crown Point | 41 | 49 |
| Exchequer | ..... | ..... |
| Gould & Curry | 31 | 31 |
| Hale & Norcross | 1 15 | 1 20 |
| Justice | ..... | ..... |
| Mexican | 55 | 55 |
| Ophir | 1 15 | 1 20 |
| Overman | 16 | ..... |
| Potosi | ..... | 42 |
| Savage | 36 | 37 |
| Sierra Nevada | 70 | 72 |
| Union | 61 | 70 |
| Utah | ..... | ..... |
| Yellow Jacket | 46 | 43 |

# MINING SHAREHOLDERS' DIRECTORY.

**ASSESSMENTS.**

| Company and Location. | No. | Amt. | Levied | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Andes Silver M Co, Nev | 42 | 15c | Jan 30 | Mar 6..Mar 28 | J W Twiggs, Nevada Block |
| Bay State M & D Co, Cal | 30 | 2c | Feb 1 | Mar 9..Mar 28 | F E Lutty, 330 Pine |
| Belcher S M Co, Nev | 52 | 25c | Mar 3 | Apr 7..Apr 28 | C L Perkins, Mills Building |
| Bodie Con M Co, Cal | 19 | 15c | Mar 7 | Apr 10..May 4 | M E Willis, 309 Montgomery |
| Bullion M Co, Nev | 47 | 10c | Mar 18 | Apr 22..May 14 | R R Grayson, 331 Pine |
| Bulwer Con M Co, Cal | 12 | 5c | Feb 5 | Mar 11..Apr 3 | J E Jacobus, 309 Montgomery |
| Con Cal & Va M Co, Nev | 6 | 30c | Mar 4 | Apr 8..Apr 28 | A W Havens, 309 Montgomery |
| Gold Bar Con M Co, Cal | 3 | 5c | Feb 10 | Mar 19..Apr 10 | E C Godfrey, 38 Crocker Building |
| Gould & Curry S M Co, Nev | 78 | 15c | Mar 25 | Apr 28..May 20 | A K Durbrow, 309 Montgomery |
| Lady Emma M Co, Cal | 1 | 15c | Feb 26 | Apr 6..Apr 27 | W W Boughton, Mills Building |
| Osceola Con M Co, Cal | 5 | 1c | Feb 11 | Mar 14..Apr 8 | H Smith, 307 Montgomery |
| Sierra Nev S M Co, Nev | 110 | 25c | Feb 3 | Mar 7..Mar 27 | E L Parker, 309 Montgomery |
| Silver King M Co, Arizona | 13 | 25c | Jan 28 | Mar 9..Apr 6 | J W Pew, 310 Pine |
| Summit G M Co, Cal | 14 | 5c | Mar 17 | Apr 20..May 12 | J E Jacobus, 309 Montgomery |

## San Francisco Stock Board Sales

SAN FRANCISCO, March 26, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 400 Alpha | 10 | 100 Kentuck | 06 |
| 100 Alta | 17 | 200 Mexican | 55 |
| 100 Andes | 33 | 500 Occidental | 95 |
| 600 Belcher | 28 | 400 Ophir | 1 20 |
| 30 Chollar | 48 | 100 Savage | 37 |
| 200 C. C. & Va | 1 65 | 200 S Belcher | 09 |
| 400 Con Imperial | 02 | 350 Sierra Nevada | 72 |
| 1950 Crown Point | 49 | 200 Union Con | 70 |
| 50 Gould & Curry | 31 | 600 Yellow Jacket | 43 |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 50 Bodie | 28 | 600 Occidental | 90 |
| 200 Con Cal & Va | 1 60 | 250 | 89 |
| 400 Crown Point | 47 | 100 | 88 |
| 200 | 46 | 850 Sierra Nevada | 70 |
| 700 Eureka | 50 | 100 | 71 |
| 100 H. & N | 1 20 | 400 Union | 69 |
| 300 Ophir | 1 20 | 400 Yellow Jacket | 41 |
| 100 Potosi | 42 | | |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., March 25, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| CALIFORNIA STATIONS. | Total Rainfall for the Week. | Total Seasonal Rainfall to Date. | Total Seasonal Rainfall Last Year to Same Date. | Average Seasonal Rainfall to Date. | Maximum Temperature for the Week. | Minimum Temperature for the Week. |
|---|---|---|---|---|---|---|
| Eureka | 1.44 | 33.91 | 36.42 | 24.20 | 70 | 50 |
| Red Bluff | .30 | 15.49 | 26 54 | 20.95 | 72 | 54 |
| Sacramento | .12 | * | 22.26 | 13.06 | * | 52 |
| San Franc'co | .16 | 15.11 | 23.06 | 20.10 | 72 | 50 |
| Fresno | ..... | 4.93 | 12.32 | 7.77 | 84 | 54 |
| S. L. Obispo | .10 | 14.71 | 23.63 | * | 84 | 46 |
| Los Angeles | .01 | 7.83 | 12.99 | 15.49 | 88 | 52 |
| San Diego | ..... | 4.44 | 11.48 | 5.25 | 84 | 50 |
| Yuma | ..... | .88 | 3.01 | 2.91 | 94 | 48 |

* Indicates no record.

## Recent Mining Incorporations.

Atlas Mining Co., San Francisco; capital stock, $1,000,000, $250 subscribed; J. W. Pew, G. H. Waggoner, F. Avery, J. M. Quay, L. Samuels, San Francisco, directors.

Oro Camero, Blue Cement Gravel and Gold Mining and Milling Co., San Francisco; capital stock, $100,000, $500 subscribed; E. C. Rigney, W. S. O'Brien, Oakland, W. and M. G. Butterfield, Menlo Park, A. M. Hungerford, Sausalito, directors.

Union Gold Mining Co., San Francisco; capital stock, $5,000,000; G. E. Williams, Placerville, G. Lambert, G. H. Hawes, S. R. Stone, A. W. Bell, San Francisco, directors.

Minaret Mill & Mining Co., San Francisco; directors, E. J. Caldwell, G. R. Armstrong, H. J. Gallagher, J. H. Scott, R. C. Braun, J. Bamber, W. J. Tuska; capital stock, $2,250,000; $1200 subscribed.

Clear Creek Mining and Power Company; Redding, Cal.; capital stock, $50,000, all subscribed. E. Markwick, J. W. Hare, Redding; H. F. Eckert, San Francisco; H. R. Sorenson, Berkeley; H. P. Mudd, Shasta, directors.

Avalon Mining Company, San Francisco; capital stock, $1,000,000, $70 subscribed. A. K. Stevens, J. Armstrong, R. N. Graves, San Francisco; C. H. King, F. S. Cook, G. E. King, Berkeley; W. H. Worden, Oakland, directors.

## Recent Mining Dividends.

THE Silver King mine, Utah, paid a $37,000 dividend on the 7th.

THE Isabella Mining Company paid a dividend of 1c on the 25th.

THE Montana Ore Purchasing Company paid a bonus dividend of $1 per share on the 20th.

THE Homestake mine, South Dakota, paid its usual monthly dividend of 25c per share on the 25th.

THE Mercur, Utah, distributed a dividend of $25,000 among its stockholders on the 21st, a total of $425,000.

THE CALIFORNIA DEBRIS COMMISSION—having received applications to mine by the hydraulic process from A. J. McDonald, in the Kanaka Valley Mine, at Salmon Falls, El Dorado Co., to impound tailings in a ravine; from Paris Bean, in the Empire Hill Mine, in North-East Township, Yuba Co., to impound tailings in Empire Creek and in an old pit; from John J. Bailey, in the Badger Hill Mine, near Placerville, El Dorado Co., to impound tailings in a ravine; from B. Guidici, in the Grasshopper Hydraulic Mine, near Pleasant Valley, El Dorado Co, to impound tailings in a ravine; from Mrs. Amalie Hafner, in the Dark Ravine Mine, near Crescent Mills, Plumas Co., to impound tailings in Dark Ravine; from E. D. Hurd, in the Miners' Row Mine, near Michigan Bluff, Placer Co., to impound tailings in a ravine; from Alfred A. Ludwig and William Everest, in the Nellie Bly Mine, near Igo, Shasta Co., to impound tailings in a ravine; and from R. R. Gumbert, in the Duquesne Placer Mine, at the head of Poplar Creek, Plumas Co., to impound tailings in a ravine—gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on April 6, 1896, at 1:30 P. M.

**An Assayer, Surveyor, Bookkeeper and Lawyer**

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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR WEEK ENDING MARCH 17, 1896.

556,608—OILER—T. M. Anderson, New Whatcom, Wash.
556,571—LOG LOADER—Bateman & Lyda, Forest Grove, Or.
556,432—BICYCLE ALARM—L. D. Craig, S. F.
556,735—WATER FILTER—W. B. Farwell, S. F.
556,535—PUZZLE—C. M. Fitz, Oakland, Cal.
556,624—CAR WHEEL—C. W. Flint, Port Townsend, Wash.
556,667—GAS GOVERNOR—G. E. Ford, Golden Gate, Cal.
256,625—LOGGING JACK—J. E. Gilchrist, South Bend, Wash.
556,462—APPARATUS FOR STARTING RACES—A. Gray, New South Wales.
556,737—SADIRON—J. F. Hagerty, S. F.
556,528—HARNESS BUCKLE—S. P. Haney, Ione, Or.
556,466—CRUSHING MILL—F. A. Huntington, S. F.
556,652—PROJECTILE—L. A. Johnson, S. F.
556,583—HORSE POWER—T. F. Marquand, Florence, A. T.
556,434—ELEVATOR—J. Parkinson, Los Angeles, Cal.
556,435—ELEVATOR—Parkinson, Martin & Bowen, Los Angeles, Cal.
556,640—WHEEL BEARING—J. Pettinger, Santa Barbara, Cal.
556,375—FIREPROOF BUILDING—G. Rushforth, Stockton, Cal.
556,501—PHOTOGRAPHS—F. A. Taber, S. F.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BICYCLE CLEANING STAND.—C. A. Wright, San Francisco, Cal. No. 556,076. Dated March 10, 1896. This invention relates to a means for supporting bicycles in a reverse position so that they may be conveniently cleaned. It consists of a framework having an adjustable saddle support at one end, and swivel clamps at the opposite end adapted to receive and lock the handle bars so that the machine, when inverted, is held firmly and can be easily cleaned or attended to. The device stands upon legs of suitable or convenient height, and is provided with a box for containing cleaning cloths, tools, etc., the whole being mounted upon castors so that it can be easily transferred from point to point.

APPARATUS FOR USE IN STARTING RACES.—Alexander Gray of Canterbury, N. S. W. No. 556,462. Dated March 17, 1896. This invention, as its name implies, is especially designed for use in starting horse races. It consists essentially of a barricade and means connected with the same for moving it in a straight line in an upwardly inclined direction ahead of and from the horses. The barricade itself is composed of two side frames from which wires, tapes or other suitable material, are stretched across the track. Tapes are preferred. Each side frame of the barricade is secured to or forms part of the sliding block that can be caused to slide rapidly up an inclined slide by any suitable means. The slides incline upward ahead of the horses, their lower ends being about 4 feet from the ground and their upper ends at an elevation sufficient to carry the barricade to such a height as to be clear of the jockeys' heads as they pass under. Each sliding block is held at its lower position by means of a trigger or other suitable contrivance and both triggers are arranged so that they can be operated simultaneously. Suitable contrivances are employed whereby a tension is produced upon the tapes of the barricade when at its lowest position.

CRUSHING MILL.—Frank A. Huntington, Oakland, Cal. No. 556,466. Dated March 17, 1896. This mill is one in which the rollers are mounted at an inclination upon an axes which are parallel with the plane of the inclined surface of the crushing die, and said rollers are adapted to move bodily to and from the die in a plane at right angles thereto whereby they crush and grind the ore with a force due to their weight and to centrifugal action, and held to accommodate themselves to inequalities and obstructions in the ore bed.

## A Good Belting.

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# Assessment Notices.

MARGUERITE GOLD MINING AND MILLING COMPANY.—Location of principal place of business, San Francisco, Cal. Location of works, Auburn Placer county, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 20th day of February, 1896, an assessment (No. 2 of 10 cents per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 257 Twelfth street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of April, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on THURSDAY, the 30th day of April, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. WINTERS, Secretary.

Office, 257 Twelfth street, San Francisco, California. Office hours from 8 to 10 P. M.

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CON. CALIFORNIA AND VIRGINIA MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of March, 1896, an assessment (No. 6), of 30 cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 47 Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of April, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on TUESDAY, the 28th day of April, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room No. 47 Nevada Block, No. 309 Montgomery street, San Francisco, California.

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FAIRFAX VILLA COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Fairfax, Marin county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 6th day of March, 1896, an assessment (No. 5) of Fifty Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 56, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of April, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 4th day of May, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. STADTFELD, JR., Secretary.

Office, Room No. 56, No. 309 Montgomery street, San Francisco, California.

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GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees held on the twenty-fifth day of March, 1896, an assessment (No. 78) of Fifteen cents (15c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-eighth (28th) day of April, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 20th day of May, 1896, to pay the delinquent assessment, together with the cost of advertising and expenses of sale. By order of the Board of Directors.

ALFRED R. DURBROW, Secretary.

Office—Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 3) levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| John E. Todd | 5 | 2,500 | $125 00 |
| John E. Todd | 6 | 2,500 | 125 00 |
| John E. Todd | 9 | 2,500 | 125 00 |
| John E. Todd | 55 | 2,500 | 125 00 |
| Wm. H. Caln | 7 | 2,500 | 125 00 |
| Wm. H. Caln | 8 | 2,500 | 125 00 |
| Chas. A. Moore | 102 | 7,222 | 361 10 |
| Chas. A. Moore, Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6,000 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore, Trustee | 130 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 160 | 6,667 | 333 35 |
| C. H. Neuhaus | 39 | 100 | 5 00 |
| C. H. Neuhaus | 143 | 120 | 6 00 |
| F. R. Harris | 42 | 1,000 | 50 00 |
| F. R. Harris | 43 | 1,000 | 50 00 |
| F. R. Harris | 44 | 1,000 | 50 00 |
| F. R. Harris | 45 | 1,000 | 50 00 |
| G. B. Libby | 83 | 2,000 | 100 00 |
| N. L. Bell, Trustee | 128 | 250 | 12 50 |
| A. U. Rugg | 16 | 1,000 | 50 00 |
| A. U. Rugg | 67 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 155 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg, Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg, Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 109 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 141 | 1,667 | 83 35 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 133 | 3,193 | 159 75 |
| E. C. Godfrey | 134 | 4,000 | 200 00 |
| Jos. A. Pratt | 3 | 2,500 | 125 00 |
| Jos. A. Pratt | 54 | 2,500 | 125 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Nos. 37 and 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

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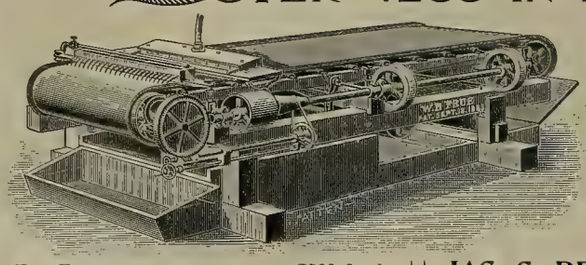
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VOLUME LXXII. Number 14. SAN FRANCISCO, SATURDAY, APRIL 4, 1896. THREE DOLLARS PER ANNUM Single Copies, Ten Cents.

## The Hydraulic Gravel Elevator.

Much interest is now being taken by miners all over the coast, more especially southern Oregon, Idaho, Washington and British Columbia, concerning the hydraulic gravel elevator, and weekly inquiry is received concerning this appliance of hydraulic mining. While this modern system of working gravel deposits where the natural gradient is insufficient has been used in this State in a number of places for several years, it seems little known to the mining fraternity generally. It is accordingly deemed of sufficient importance to deserve illustrated notice. Our illustrations on this page are from recent photographs of operations at North Bloomfield, Nevada county, this State. Fig. 1 portrays the familiar California scene of a giant playing against the bank. Fig. 2 illustrates a hydraulic elevator in operation. Ordinarily in that location the tunnel depicted in the engraving is used. But in accordance with the mandate of the U. S. Debris Commission that tunnel is in disuse. The waste material flows down through the channel depicted in the foreground of Fig. 2, and is there shot up through the elevator into the dam, there to be impounded.




FIG. 1.—HYDRAULIC GIANT IN OPERATION.

The history of the hydraulic gravel elevator began in this State in 1880, and its first introduction was by the Yreka Creek Gold Mining Co. at Yreka creek in Siskiyou county. The pattern was the Cranston patent. The gravel was elevated there about 40 feet, the pressure used was 266 feet, about 800 inches of water was used on the elevator, and two giants piped the gravel to the elevator, using two and one-half and three nozzles. This worked well, but the supply of water was not sufficient to run it steadily without reserving, which made it unprofitable, and work, after two years, was stopped. At McGilvery's, on the Trinity river, in Trinity county, an elevator was used in working a low bar in 1881, the upcast being a wooden box lined with blocks. Made in the style of a sluice, with the top side open and placed on an angle of about 30°, this worked very well where the gravel had only to be elevated a short distance. The same kind of a contrivance was used at Oro Fino, Siskiyou county, by the Eastlick Bros., which was simply a nozzle placed at the lower end of an open sluice, paved with blocks and placed at an angle of 30° or 35°, which acted as a force pump and carried the water and material out of the pit. These crude appliances have been done away with, as it was found to be impracticable when much depth was reached.




FIG. 2.—HYDRAULIC ELEVATOR AT NORTH BLOOMFIELD.

About this time J. H. Martin, a practical miner of Oroville, Butte county, secured a patent on an elevator similar to the Cranston pattern. The Joshua Hendy Machine Works of this city being the owners of the Cranston elevator, secured the Martin and improved upon them both by building one of their own, though they built the Martin pattern when desired. The Miocene mine at Thompson's Flat, near Oroville, was the first to use the Martin elevator, the purpose being to elevate the tailings to a place for impounding, but it was found to be impossible to keep the tailings from getting into the Feather river, and they were enjoined. At the Miocene 1000 inches of water, with a 6-inch nozzle and 300 feet pressure, was used in a 20-inch upcast. The gravel was raised 30 feet, but the pressure here was too great for the height, which made it very difficult to get anything to stand at the top, where the stream was broken down to enter the outer sluice.

R. H. Campbell used a Martin elevator at his Quartz Valley mine for five years, and experimented perhaps more with elevators than any other person in the State. At his mine 1000 inches under 240 feet pressure was used through a 6-inch nozzle and a 20-inch upcast, elevating the gravel and water from two giants, which used 700 inches of water, to a height of 41 feet. This was perhaps the best adjusted plant used, and gave satisfaction, running continuously night and day for four and five months of each year, with very little repairs.

In 1889 the Joshua Hendy Machine Works contracted to erect one of their hydraulic gravel elevator plants at the North Bloomfield for elevating the gravel 96 feet and depositing in the old excavated pit, there to be impounded. This was successfully done with 1500 inches of water under 540 feet pressure, discharged through a 6-inch nozzle into a 20-inch upcast 113 feet long and delivering the material into an upper discharge sluice at a vertical height of 96 feet, from a large giant that was using 800 inches of water against the bank. The only difficulty in operating this plant was caused from the great amount of friction or wear and tear at the throat of the machine where the gravel entered. Considerable experimenting was done which demonstrated the fact that under proper conditions the gravel elevator can be used very effectually and at nominal cost. It is only a matter of time when they will come into general use where natural grade for carrying away the debris is absent and the water under pressure is obtainable.

The question is asked, How much gravel can be elevated in a day with an elevator? which, in general, is as easy to answer as the question, How much can one haul with a team? without stating the number of horses to be used or the kind of a road it is to be hauled over. A hydraulic gravel elevator must be fitted to the conditions, and in order to obtain proper information concerning them the miner should state the height the gravel is to be elevated

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J. F. HALLORAN.....General Manager

San Francisco, April 4, 1896.


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At several points in this State and Nevada lie accumulated heaps of tailings which it is proposed to work over at probable profit by new and improved processes. The fact that this can be done need reflect no discredit on the original workers. In their day and generation doubtless they did the best they could. In many instances, too, it didn't pay to work the ore too close. To expend additionally $1.25 in getting 75 cents return was poor economy. Concentrators, chlorination, cyanide, etc., have now reached that stage of perfection that enables former waste to be handled at a small profit, and in many instances a modest revenue is thus afforded.

The letters weekly received at this office from various sections regarding black sand, and the best methods of gold separation therefrom, illustrate the widespread interest in that form of gold gangue, and the absence of any device that comes up to general expectation. So far as our observation and experience go, the many new processes and inventions are not satisfactory to the practical miner. Those who report the best success use the old-fashioned corrugated plates with mercury. Inventors and projectors of machines to save free gold from black sand, though invariably sincere in their beliefs, often find considerable difference in the degree of success attained in experiments with samples, and the actual work on the ocean beach and elsewhere in situ.

The reorganization of the U. S. Debris Commission is complete, and the new members have begun the work. It is a thankless duty delegated to these gentlemen, as it is simply additional work which devolves upon them without any additional pay. Reference is here made to the commission merely to remind certain gentlemen who imagine that they are in some authority therein that this whole matter of hydraulic mining where any of the resultant debris may find its way into any tributary of a navigable State river, is in the hands and under the authority of the U. S. Debris Commission; that the members of that commission are thoroughly impartial—they care nothing for the barkings of biased newspapers nor the complaints of individuals who hope for continued profit by continuous contention. It is their province and their purpose to administer the law as they find it in the act creating the commission. This they have done and are doing; this is all the miners ask or expect; it should be all that the anti-debris people can reasonably look for. To create discord or continue injustice is not the aim of the commission, nor is it the honest wish of the miners and farmers who are equally interested in the just solution of this question, a question that can only be settled by unity of purpose and sincerity of motive on both sides.

The bill providing that 25 per cent of the proceeds of patented mineral lands shall be given to the several States in which the land so sold is situated, for their mining schools, is in a fair way to become a law. It will be a good thing for several deserving institutions. The mining school at Houghton, Michigan, is supported by the State; the one at Golden, Colorado, is similarly endowed. The passage of the bill encourages Montana to go on with projected work in that direction. In this State the admirable mining department of the State University at Berkeley will doubtless be a beneficiary of the fund. A recent visit to that school shows a degree of practical proficiency and detail that is only retarded from further excellence by a lack of funds. The University regents concede the advisability of increased expenditure, but cannot supply the money. Any addition from any source would be of immediate benefit. The amount accruing will, however, be comparatively trifling, and should be but supplementary to a main addition from State sources.

The lead ore bill has passed the House and receives favorable consideration in the Senate. It provides for the establishment of Government sampling works at El Paso, Texas; Northport, Washington, and Bonner's Ferry, Idaho, and at such other ports as the Secretary of the Treasury may designate. The bill also provides that "in no instance shall a less portion than one-fifth of any importation of ores be sampled and assayed." When ores are imported at ports at which no Government sampling facilities are provided, the importer is required to send one-fifth to the Government sampling works under direction of Government officials. In the opinion of the framers of the bill, if it become a law, it will be impossible to import lead ores except at points where these works are established, and that, with the requirement that a minimum of at least one-fifth of the importation shall be sampled and assayed, the duty levied on lead ore will be honestly and faithfully collected. If so, the lead producers will enjoy some degree of protection.

A decision was reached last week in the case of the Spring Valley mine at Cherokee Flat, Butte Co., Judge Prewitt of Placer Co., in the Court of Equity, deciding against the Bank of California and Rideout & Smith, and in favor of the bondholders. The case is a notable one. The mine has yielded over $12,000,000 gold, and the suit has been going on for eight years, petition for foreclosure of the bonds having been filed in '88. A New York corporation, the owner of the mine, issued the bonds. Some time after the company was reincorporated under the laws of this State. Suit for foreclosure of a mortgage resulted in the intervention of the Bank of California of this city and Rideout & Smith, bankers at Marysville, who had become possessed of the property, and who set up technical defense in opposition to payment of the bonds issued by their predecessors, whose rights they had assumed. That question was decided by the Supreme Court in favor of the bondholders. Then the statute of limitations was set up, this plea now being set aside by Judge Prewitt, who gives judgment for the plaintiffs against the Spring Valley Gold Co. for $151,000 principal and $129,759 interest, and orders that the receiver in charge shall advertise the sale of the mine.

In last week's issue appeared a deserved tribute to the practical value and usefulness of the California State Mining Bureau, written by an old miner. To his remarks it is in order to add that much of the material benefit resultant from the practical operation of the Bureau is due to the efficiency of State Mineralogist J. J. Crawford, who directs the work. Beyond unavoidable delay in securing statistics, arising from circumstances outside of his control, the prompt business character of the work, its practical nature, and the general management of the office, have been in the highest degree satisfactory to the miners and that part of the general public interested in the mining industry. The unprecedented demand from all parts of the mining world for the Bureau's publications show the value of the information secured by Mr. Crawford's assistants in the field and the specialists delegated by him to prepare up-to-date information. The Bureau is an institution wherein party politics should not enter, and in just recognition of this fact the present State administration made no determined effort to change. Mr. Crawford's term of office will expire in about eleven months. The fact that the chief executive of the State is of a different political persuasion, coupled with Mr. Crawford's disinclination to further sacrifice his private interests to the public good, make it unlikely that he will continue in charge after March, '97. The office is not a political gift; it can be secured only upon examination and demonstration of practical fitness, and needs the constant supervision and the combination of technical knowledge and business judgment that the present incumbent has exercised. There are already several applicants or aspirants. The matter is not one of favor, but fitness. The result of the Bureau's work is constantly dependent on its head, and if he be competent and zealous the State is greatly benefited thereby.

As exclusively announced in these columns two weeks ago, the united and harmonious efforts of California's congressional representation has succeeded in having placed in the River and Harbor bill an appropriation of $250,000 for restraining works at Deguerre Point on the Yuba river. This is mainly due to the fact that California representatives made no objection. Apart from the merits of the measure, the unanimity of expressed opinion was so in favor of the appropriation that, despite the fact that Speaker Reed had denied to California representation on the committee, the appropriation was made. Nothing more clearly illustrates the value of unanimity in affairs of this kind, unless it be an illustration afforded this week in the case of southern California harbor appropriations. By hard work $490,000 appropriation had been secured for the improvement of San Pedro and Santa Monica harbors, both seaports for Los Angeles. Then virulent opposition developed, each rival interest saying hard things of the other. The result is that both were believed, two appropriations stricken out and southern California gets—nothing. This is a matter of regret, but exemplifies the usual result of wrangling. This paper does not more than briefly refer to the matter; it fully understands the minutiæ of the case and the railroad complications and the fact that Santa Monica is a pet Southern Pacific project, while San Pedro is the choice of Los Angeles. Recurring to the debris dam appropriation, it is in order to repeat for the benefit of some implacable anti-debris people what has been before pointed out: the $250,000 now to be appropriated by the U. S. Government will unlock the contingent $250,000 already appropriated by the State for the same purpose. That makes half a million dollars for the construction of a debris dam. This structure is not for the impounding of fresh debris or for miners to use as a tailings dump, as is claimed by those who won't see otherwise. It is to stop the seaward movement of detritus mined twenty years ago. Every hydraulic miner in the region affected will have to work under the operations of the Caminetti law, just the same as though the appropriation had not been made. Hydraulic miners must continue to build their own dams and take care of their debris. The public money is to be applied solely for the public benefit—mainly to the aid of the valley dwellers who have so persistently opposed it. The magnanimity of the miners and the sober good sense of the nation's representatives have succeeded in showing Congress that the right way to go about this great work is to take the thrice repeated advice of the Government engineers appointed to inquire into and report on this matter, and begin by impounding debris that has been accumulating since mining began in California. The Mining and Scientific Press is in receipt of an irate communication stating intention to enjoin the State from paying out the $250,000 appropriation made by the California legislature, on the ground that it "is unconstitutional." The writer says he "will not be made a fool of." He is quite right; no one can make a fool of him, nature having denied any one the opportunity. Meanwhile, his attention is commended to the result of the southern California quarrel as briefly referred to herein.

## Concentrates.

THE De Lamar, Nevada, mine, is now yielding $45,000 monthly.

LIGHT SNOWFALL in the mountains this season is the general report received.

THE formal opening of the Gold Mining Exchange will be at 11 A. M., April 6th.

A TELEPHONE line is to be run from Auburn, Placer Co., to Georgetown, El Dorado Co.

MINAS PRIETAS, Sonora, Mexico, is now credited with a monthly gold output of $300,000.

THE Anaconda, Montana, Co. is credited with a production of 12,000,000 pounds of copper in March.

MANAGER COHEN, of the Golden Gate, Mercur, Utah, is about to contract for a mill of 500 tons daily capacity.

SALT LAKE, Utah, men are acquiring valuable holdings on the mother lode in Calaveras and Tuolumne counties.

AT the Niagara mine, Shasta Co., Supt. Henley is adding to the force of men. The mill will be started this week.

URANIUM has been found at Carbonate camp, S. D. It is an emerald-hued ore, and refined, is worth $2.40 per pound.

THE Horn Silver Co., Utah, contemplates increasing its thirty stamps to sixty, by reason of increased water flow.

D. COFLIN has bonded the Canada Hill Con. mines in Nevada Co., Cal., and with sufficient capital can secure good returns.

THE Cornwall Miners' Distress Fund, of Camborne, England, is appealing to Cornish miners employed in this country for aid.

THE March coinage of the San Francisco Mint aggregated gold, double eagles, 77,000, $1,540,000; standard silver dollars, 100,000.

TO OBVIATE confusion, it is in order to say that the name of Kootenay, B. C., is spelled as herein. Kootenai, Idaho, ends with an "i."

"HOW LONG will it be," asks the London *Echo*, "before the yellow man with white metal gets away with the white man with the yellow metal?"

AT Empire, Colo., miners' wages are $3 per day. The local paper says: "Tenderfeet are hired for $2.50 by some who are trying to make $2.50 standard wages."

NEXT Saturday's issue of this paper will contain twenty-four pages. There will be an extra 10,000 edition—that is, 10,000 extra in addition to the usual number.

"MINE TIMBERING," one of the valuable publications issued by the State Mining Bureau, and which is out of print, will shortly be reissued, rewritten and profusely illustrated.

MAINLY at the request of some mine and smelter employes, Utah's Legislature has enacted a law making eight hours a day's work, which other miners and smelter employes ask the Governor to veto.

UTAH MINERS who have secured access to the Uintah reservation, report rich gold, silver and copper ore therein, and declare that when the reservation is thrown open some big mines will be opened.

FROM the *Smelter*, a merry little monthly just begun at Keswick, Shasta Co., Cal., it is learned that the name of that new town, the headquarters of the Mountain Mines Co., Ltd., is pronounced "Kezzick."

THERE is considerable stir at the new State Line mining district, partly in Utah and partly in Nevada. Daily reports are received of strikes, and the new road projected from Salt Lake adds to the prospective value of the locality.

MESSRS. FALKENBERG, BLISS AND KENNY, the new owners of the Lone Jack mine, Little Tahunga canyon, Los Angeles county, have considerable $5 ore and will build a sixty-stamp mill, the largest concern of the kind in the county.

J. MARCHANT, late assistant manager of the Holcomb Valley G. M. Co., claims to have found at Manvel, San Bernardino Co., some very rich gold ore. He proposes to start for London and organize a company to work the mines.

COLORADO MEN are investing in California gold properties and California men are investing in Colorado gold properties. Mining men pay very little regard to State lines, and little newspaper capital can be made out of such investments.

TWENTY-TWO CARLOADS of silver-lead ore have arrived at Pueblo, Col., from British Columbia. The silver ore is admitted free of duty; the charges for the lead amount in this case to $3000. The ore averages ninety-five ounces to the ton, sixty per cent lead.

AT Moscow, Idaho, E. E. Rogers, manager of the Silver White Mica Mining Company, has bonded the Last Chance and is driving tunnels so that a large force can be put at work in the next sixty days. He is about to buy an electrical plant and hoisting works.

THE secretary of the newly organized British Columbia Miners' Association writes the MINING AND SCIENTIFIC PRESS for a copy of the constitution of the California Miners' Association, which is being taken as a guide and model by several similar associations elsewhere.

THE railroad from Trail Landing to Rossland, B. C., will be in operation by the 1st prox. The objective point of the road is Penticton, West Kootenay. The road will be about 180 miles long, will cost $30,000 per mile, and is expected to be completed in about three years.

LIKE the Hale & Norcross, a fight will be made for the control of the Bulwer Consolidated, a Bodie, Cal., mine, at the annual election. New York men, who own 25,000 shares—about one-quarter of the mine—claim extravagant management and want to cut down salaries, etc.

THE recent article in this journal, "Mine Development the Basis of Prosperity," by A. B. Paul, which attracted so much attention, has been reprinted in pamphlet form by the author, and will be sent to any address on request. Address A. B. Paul, 49 Crocker building, San Francisco.

THE Spokane *Chronicle* says the Poorman-Tiger Consolidated (Idaho) Company is taking active steps to rebuild the compressors that were destroyed by fire about two weeks ago. Instead, however, of building two mills it is the intention of the company to put the plant under one roof, to be of about 400 tons capacity per day. It is hardly expected that the mines can start up in full blast again before Aug. 1. At present there are only fifteen miners at work.

J. B. TONKIN, now superintendent of the Iron Mountain mine of Shasta county, says the mine is being worked with great success, shipping 100 tons a day to the smelting works. Private letters from there say there is considerable difficulty and delay. Those in charge are reticent regarding operations.

"THE biggest gold mine in the country" is still being numerously reported from several localities. Meanwhile two or three California properties—the Utica, in Calaveras, the Rawhide, in Tuolumne, the Kennedy, in Amador—monthly turn out hundreds of thousands of dollars, with very little being said about it.

COMMISSIONER OF THE LAND OFFICE LAMOUREUX has finally made a decision that can be endorsed by the miners. He officially announces that "marble is a mineral." Those who have heretofore held to the opinion that marble was a vegetable or an animal should feel ashamed of themselves now that the Commissioner has spoken.

SECRETARY OF THE INTERIOR SMITH, in the case of a protest against the application for patent for placer claim at Gibbonsville, Idaho, has decided in favor of the townsite. This placer, as located, embraced about half of the town of Gibbonsville, and was evidently only located for speculative purposes. This contest was commenced in the Hailey land office three years ago.

IN the case of the S. P. R. R. vs. W. C. Burton, G. W. King et al., to determine the character of certain lands in the White River mining district, which came to trial before Register Patrick of the U. S. Land Office at Visalia last Tuesday, a decision was rendered in favor of the defendants on the grounds that the lands were more valuable for mineral than for agricultural purposes.

IN addition to the $250,000 in the regular River and Harbor bill for the De Guerre point restraining barrier, a Commission to be known as the Sacramento River Commission will be created by Congress, consisting of Federal engineers, whose duty it will be to take charge of the Sacramento river and its navigable tributaries, and restore them so far as possible to the conditions existing thirty years ago.

THE Alaska steamer brings the usual story of "big gold finds." The Alaska transportation companies are working the thing for all it is worth, but it is evident that much misery and suffering will result. Apart from ordinary privation and disappointment, thousands of deluded men rushing north will be in positive danger of starvation. Unless well equipped with money and physically fit to stand exposure and hardship, no one should contemplate the trip.

THIS week the Supreme Court of this State decided that "sections 1 and 2 of the act approved March 31, 1891, entitled 'An act to provide for the payment of the wages of mechanics and laborers employed by corporations,' do not apply to all corporations, but only to those who, while doing business in the State of California, employ laborers and mechanics by the week or month, whose wages, under the terms of their employment, are paid weekly or monthly."

A STATE STATUTE prescribes it to be the duty of every mine superintendent to file weekly and monthly accounts and reports, verified under oath, showing receipts, disbursements, number of employees, and wages paid, reports to be kept in the office of the company, open to inspection of the stockholders and provides that in case of the failure of the directors to have the reports and accounts made and posted as provided, shall be liable to an action by any stockholder, who on proof of the failure shall recover judgment for $1,000 liquidated damages.

SINCE the President's pious strictures on Pacific coast godlessness reform is evident, and Mr. Cleveland will doubtless be delighted that his solicitude for souls has been effective. Already all Sunday work on the Comstock in Nevada has been discontinued, and now the Boston & Montana Company announces that no more mining will be done on Sunday in that corporation's Montana mines. It is hoped, however, that the new religious zeal, though commendable, will not go to the extent of dispensing with necessary pumping work, as the laws of nature are not suspended on the first day of the week.

GEO. V. NORTHEY is securing machinery to work the quicksilver deposit at the Manzanita mine, near Sulphur Creek, Colusa Co. This is the mine that the land officials concluded was "agricultural land," and ordered an agricultural patent issued therefor, despite the fact that a Government official—Dr. Becker, the eminent geologist—made special report thereon, and pointed out its peculiarity as being both a gold mine and a quicksilver mine. But a little fact like that didn't stop the astute land officials in deciding it was not a mine. It continues to yield precious metals, as it has for nearly twenty years.

COMMISSIONER FITZGERALD is of the opinion that deserving men in need of employment could and should go to the mountain counties and work placer mines. The idea is an excellent one. But before starting them the commissioner should adopt some means of educating them, and then provide them with the facilities to make the necessary financial arrangements. A penniless man, unacquainted with the work, would have no chance whatever, no matter how willing he might be. To send such a man to where placer mines are would result in a remonstrance from the county authorities, who would ultimately have to give the poor fellows food and shelter.

THE *Democrat* says the stockholders of the Oregon Gold Mining Company of Louisville, Ky., whose properties were located at Cornucopia, in the eastern part of Union county, and which were recently sold under execution for $9000, although the judgment was for over $300,000, have deeded their interest in the properties to John Dorhofer, as trustee, who has commenced proceedings to redeem. The amount required to do this is $16,784.60, which has been paid into court. The properties were redeemed some time ago by J. R. Farrell of Cornucopia, who had a subsequent judgment against them, but the Louisville people claim this redemption is invalid.

ASSAYERS are the common butt in all mining camps, says the Arizona *Republican*. That's so. And, as a rule, they "get it in the neck" unreservedly. For example, every one remembers that story of Mark Twain's, how the boys up in Utah got hold of a chunk of a Mormon's grindstone and worked it off on the camp assayer. He got an assay of $300 to the ton in silver out of that grindstone and the boys ran him out of camp. That was a true story, and yet that assayer was all right. In the early days the Mormons used to cut their grindstones out of what afterwards was known the world over as Silver Cliff. That cliff was a sand carbonate, and eventually it was discovered to be a wonderful deposit of silver ore. But that was too late to help the poor devil of an assayer who sampled the grindstone.

THE "battery" assay, "car samples," etc., of the Comstock are no more satisfactory than similar discrepancies elsewhere. W. S. Stratton, the Colorado millionaire mine owner, is better situated in this regard than Comstock shareholders, as he is the individual owner of his properties which he absolutely controls. Growing tired of the continual difference between the reports of his assayers and the smelter returns, he has shut down everything that he owns in the shape of a mine, and proposes to resume only when he can handle his own ore from the time it is taken out till the product goes to the mint. He will build reduction works of his own, and under the new system will have the satisfaction of knowing whether up to the present time he has been treated justly by those who have had the reduction of his ores. The present shut-down affects nearly 500 employes, most of whom will, however, find employment under the new regime.

A CHICAGO dispatch of the first says the iron and steel industry is now in the absolute control of a few men who are banded together by the strongest bonds of common interest, and who have, at a conservative estimate, not less than $300,000,000 at their disposal. The steel rail pool fixed a price of $28 a ton on steel rails at Pittsburg, and all other mills sold at the same price, with the freight from Pittsburg added. This meant that the Illinois Steel Company could ask $29 and the Colorado Fuel and Iron Company $33. The mill that could name the lowest freight rate took all intermediate sales. The new pool makes a price of $20 a ton on steel billets at Pittsburg, which is $3 over its former prices. All Western sales agents have been notified of the advance, and also have been notified to guarantee no sales for later than April delivery.

CONCERNING the progress of Oregon in selecting lieu lands, State Land Agent Davenport says "the State is practically shut out of the so-called mineral belt, and unless a modification of the rule can be obtained, there will hereafter be no sales of lieu land by the State within six miles of a mining claim." The ruling referred to requires the State to send a special agent to examine and certify to the character and pay for the advertising of each selection. The cost thus incurred, Mr. Davenport says, for small tracts, is such as neither State nor applicants can afford, and therefore renders the selections prohibitive on the part of this State, and that the Oregon delegation in Congress will be called upon to secure, if possible, such changes as will promote the objects of the Interior Department and permit the State to go on, as heretofore, selecting non-mineral lieu land without, in effect, having levied a tax too onerous to be borne.

THE Hallidie ropeway at Nelson, B. C., has so far delivered 5000 tons of ore. For the week ending March 21st 757 tons were smelted, yielding 30,000 ounces silver. It is the intention of dividing the ropeway into two sections, the upper section covering the deep snow belts, where snow falls from 8 to 16 feet, terminating on a plateau, where ore bins are being erected for the storage of ore; and on this upper section it is proposed to run at opportunities during winter and accumulate the ore, to be delivered in regular quantities to the ore bins at the smelter over the lower section of the ropeway. The upper section will be 2 miles long and the lower section, 2¼ miles, will be comparatively free from deep snow. At the upper end of this ropeway the temperature falls occasionally to 20° below zero. We illustrated this ropeway in our issue of February 1st, 1896. It is about 4¼ miles long, passing over a very rugged country and having a difference in level of the two ends of 4100 feet.

RECENTLY "Concentrates" noticed a statement of Congressman Hyde of the State of Washington, who was credited with intention of having an amendment to the California Mineral Land bill, making its provisions applicable to Washington. The comment was that that would kill the bill and prevent any similar legislation for Washington. The Spokane *Review* objects and thinks that is "a threat," and which "shows a narrow and sectional spirit." It was not so intended, and cannot in justice be so interpreted. What was stated is the exact fact, viz., that the amendments of the character proposed are precisely what the opponents of the bill rely upon to kill it and that once killed any similar attempt at legislation for Washington would meet the same fate at the hands of the common enemy. The *Review* is looked upon in this fight as a friend of the miner and sincere in its advocacy of popular rights, but if it is inimical to such legislation it would be more manly to openly assail it or endeavor to give some reason for opposition than to decry and misconstrue this journal's efforts to secure requisite mining legislation for the coast, in an apparent effort to arouse the very spirit that it ostensibly condemns, and which it is the first to invoke. If the *Review* is sincere it should turn its attention to the enemies of the measure and not attack its best friends.

FROM three different sources this week,—Tombstone, Arizona, Grant's Pass, Or., and Gottville, Shasta Co., is received almost exactly the same response in reply to inquiry addressed residents regarding mineral deposits concerning which information had been originally requested from this office, viz: "the prospector seems afraid some one is going to get his claim away from him and refuses to give any information." It is little use to write to this office announcing in general the discovery of metals (as in these cases of nickel, bismuth and tellurium) and when an attempt is made to get some definite information so that intelligent response of some practical value can be given, to decline any satisfactory answer to the journal's representative. Almost invariably, however, the value and extent of those finds is imaginative. In the case of bismuth, while it is true that it brings $2 per pound, yet fifty tons would flood the market, and twice that quantity at one time would bring the price down to twenty-five cents. So with tellurium: a few pounds of its domestic production would send the price down. Nickel is known to exist at Lovelocks, Nev., and Riddles, Or.; it is difficult to produce commercially, at a profit. But to ask for information and then refuse to give requisite data on which to correctly base an answer is on a par with the lady who wished to send a telegram, but refused to tell the operator what she wanted sent, maintaining that it was none of his business.

## "Invention"---The Indefinable Requirement of the Patent Law.

By W. H. SMYTH, Mechanical Expert and Consulting Engineer, Berkeley, Cal.

The subject of a patent must be not only new and useful, but *must* also be an *invention.*

The courts hold that an improvement is not patentable, if there is no *invention.*

With regard to the first two requirements but little difficulty has been experienced, or is to be anticipated; they relate to matters of fact and evidence. Questions involving them would be decided on the ordinary rules which apply to such matters.

A thing must be considered new if no similar coordination of mechanical or other elements is on record.

So, too, if it does not appear that a device is hurtful, it may for the purposes of the patent law be considered useful. Contrivances which are absolutely negative and inert are sufficiently rare to be left out of consideration; besides, a more positive or active interpretation of this word must presuppose not only a universal range of information, but prophetic insight on the part of those whose duty it is to determine the issue. Further, the patenting of such devices, did they exist, could work no more serious injury than the encumbering of the records.

With regard to the third requirement, a very different state of things presents itself.

It is my intention to show that though the third requirement has always been in the statute, and its meaning substantially the same as the present interpretation, until recently it has practically been a dead letter.

Further, that it is not by any means axiomatic that the third requirement is in any case *possible* of *fulfillment*, but, on the contrary, there are many cogent reasons for questioning whether "invention," like "spontaneous generation," is not a metaphysical myth.

That, even if it be in fact a real quality, *it has never been defined;* nor is it of such a character that its presence can in any case be determined beyond doubt. All authorities agree that "questions of invention proceed upon fine and subtle metaphysical distinctions."

Strangest of all, the law and practice relating to patents, which provides this requirement involving metaphysical distinctions, also provides that decisions relative to these philosophical subtleties shall be rendered by mechanics, chemists, lawyers, etc., but never by expert metaphysicians.

That in effect the Patent Office examiners and judges decide these questions arbitrarily. So the third requirement works injustice in all cases, but particularly in those involving the results of the highest and best form of mental industry, which the patent law was particularly designed to foster.

And that it should be removed from the statute and the idea eliminated from the practice both in the Patent Office and courts.

The phrases descriptive of invention used by the courts are very few, viz: "Inventive genius," "the genius of an inventor," "the inventive faculty," "invention as distinguished from mechanical skill," "invention as distinguished from construction," "ingenuity as contrasted with the judgment of a skilled workman."

These, of course, are not definitions, but simply phrases supposed to be descriptive.

Though the term "invention" has never been defined legally or otherwise, either as a mental process or product, attempts to describe it have not been lacking.

The following will, I think, suffice to show the inextricable confusion and difficulty arising from these attempts.

I quote from Merwin's "Patentability of Inventions," a good authority, though on this point one is as good as another, each being simply a summary of legal decisions:

"An idea is not an invention if it be in the nature of an inference. It is true, of course, that what is plain inference to one man is a sealed book to another. But the inference here spoken of is that which is natural to a man of ordinary intellect, possessing the ordinary skill and knowledge of the art in respect to the inference drawn." This is under the head of "Test of Invention," page 18. Would not such a test simply shift the inquiry from the invention to the inventor? Then, too, the most striking characteristic of mens' minds is the vast difference between them in this very matter of drawing inferences. This it is which makes the difference between the thousand-a-year and the thousand-a-month man.

Again (page 22) "*Invention is imagination*, it is the very *opposite* of *reason* or inference * * * * It is not a sort of elevated reason, it is a faculty, which differs in *kind* from reason, which often in truth is free to act only when reason has been thrust aside, and its conclusions ignored, nay, denied."

Certainly this is to the point, and ought to serve as a guide, but later we come upon this:—

"* * * * * in the last analysis reasoning and imagination are *both* perception of likeness, and reasoning *shades off into* imagination."

Here is another suggestion:—

"* * * * when the mind invents, it starts with the conclusion. The conclusion flashes, so to say, upon the mind * * * * an instance is the case of the barbed wire fence."

This does not appeal to the mind as axiomatic or even beyond question, nor does the illustration necessarily fit the stated conditions.

Is it not much more easy to think of the "barbed wire" as the result of inference from direct or reminiscent observation, than as a conclusion flashed upon the mind, out of nothing as it were?

Let us suppose a case:—

A man is walking through the woods searching for his cattle which have broken through the plain wire fence of their paddock. Suddenly he is brought forcibly, painfully, to a halt by an aggressive blackberry bramble which has grown across the path and attached itself to a tree.

Is it, I ask, necessary to endow that man's mind with an "inventive faculty," "inventive genius," with, in fact, anything other than ordinary reason, that he should be enabled to draw the *inference* from *his* own experience with the bramble: That, were it as strong as his plain wire, it would be more efficient as a fence; or in other form, Had his wire been armed as the bramble, his cows would not have pushed against it.

These quotations illustrate how vague and misty are the criteria of "invention," and Mr. Merwin says in his preface, "His aim has been to make the book essentially practical." And this, undoubtedly, he has done, so far as the subject would permit.

Judge Shepley says: "No more difficult task is imposed upon the court in patent cases than that of determining what constitutes Invention, and of drawing the line of distinction between the work of the inventor and constructor."

A careful reading of the decisions involving Invention, the summaries of Robinson, Merwin, and others, show that to distinguish between so-called "Invention" and the results of other normal mental practices which, according to these same authorities, are "foreign to Invention," if not absolutely impossible, is a task of the most abstruse, subtle and difficult character.

After forty-five pages of such an attempt, Merwin says, under the head of "Conclusion:"

"We are far from thinking that our suggestions are equal to the difficulty of the subject, neither do we fancy that the most thorough and correct analysis would render it easy henceforth to decide upon the presence or absence of it (Invention) in any given case."

This is but repeating in other words the remarks of Justice Brown of the Supreme Court in McClain vs. Ortmeyer, 141 U. S. 419, who, after speaking of the impossibility of defining invention, calls it "that *impalpable something* which distinguishes invention from simple mechanical skill."

Up to comparatively recent times the workers in the field of mechanical improvement were few, and the results scattering and disconnected, but withal great and surprising. It is not, therefore, to be wondered at that to those not directly connected with the day-by-day preparation these results should appear as the work of persons differently endowed to themselves, to whom both process and result alike appeared mysterious. It is the normal action of the human mind to ascribe to occult sources results beyond its present comprehension.

Owing to the comparative fewness and lack of connection between patentable devices at the time referred to, novelty frequently, if accompanied by complication of parts, was considered sufficient evidence of invention, so that, practically speaking, though on the statute books, the present idea of invention as a vital principle in patentability has been a dead letter.

The history of invention and the current decisions make the conclusion almost inevitable that, though theoretically a suppositious "something" other than novelty and utility was and is required, the practical working and effect has always been that apparent novelty in a high degree served to prove the presence of "invention," and a low degree of novelty to show its absence.

This course is pursued deliberately by some judges. Merwin says (page 17): "Certain judges do not even ask if a new function or effect has been produced. They assert that the statute requires only that the thing to be patented shall be new and useful."

This apparently rough and ready, though really scientific, method, whether employed deliberately or not, served excellently, and carried out the undoubted intention of the patent statute, viz: to reward the producers of devices of a high degree of novelty and utility, the result of unusual intelligence or industry. Open and continued practice on the same lines would doubtless continue to prove equally effective in carrying out the spirit of the statute.

*(To be Continued.)*

## Marketing California Produce.

TO THE EDITOR:—The difficulties now contended with are principally in reaching the consumer at reasonable cost. The producer does not receive enough and the consumer pays too much, and all from a lack of system, or proper method of doing the business. The natural laws of trade will in the course of time correct this evil; but life is short, and, if there is a better way, time and human efforts should not be wasted in waiting.

*Past and Present.*—Within my time the sickle has been replaced by the mammoth reaper—the ten-acre wheat fields by the larger ones—the smaller towns by the larger ones. The mechanics and laborers working industriously in the country towns have become absorbed by the large manufacturing centers. The small butchers have given away to the extensive abattoirs, and the small merchants to the large department stores; the money lenders to the great banks of deposit and transportation has been given over to the railroads.

*The Office of Concentration.*—These evolutions have come about along the lines of least resistance—or natural laws of trade—and in the interest of economy, in time, money and labor, to meet the growing necessities of the people, and competition from every quarter; and if we look for the controlling factor in these movements we will find that it is in the concentration of capital and labor and that there must be concentration before distribution. This applies to all human efforts; even these type could not be set up profitably without first being concentrated in regular order. Railroads or factories could not be built without a concentration of money in the banks. Merchants could not do a large business without the concentration of large stocks of goods, nor would professional men be of much utility without the concentrated learning of the schools, and all this must occur before distribution or dissemination is practicable.

The products of California are not concentrated to any extent either here or elsewhere, and are not in a situation to distribute economically or with dispatch, at any price, even if we had the demand for them, as they are scattered everywhere.

*Distribution from a Center.*—There are enough of the products of California, when taken together, to make a specialty of the business on a large scale, and I would suggest that if a full assortment of our products was concentrated at Chicago in one store, under the management of one competent and responsible business man, he could, through the circulation of hundreds of thousands of prices current, reach every consumer of any consequence throughout the Eastern States and furnish him, by the package, at rates for less than half of what is being asked now and yet return perhaps 25 per cent more for the goods than our producers are now getting.

*An Organization Proposed.*—To effect this I would suggest that a California corporation be formed, with a capital sufficient for the business and with stockholders without regard to their being producers or not, which capital should be entitled to 10 per cent per annum interest and a first charge on the profits of the business. Good business directors to direct and solicit consignments from here to be sold for the first season on a commission of 10 per cent, and any profit after paying expenses to be returned pro rata to the consignors and stockholders combined. Consignments should be moderate in quantity at first, so that any serious loss would be avoided, and they should be sent only by permission.

*A Competitive Trial.*—The Chicago agency would prove in a few months, by prices obtained, whether it would be more profitable to consign to it or not, and it would be preferable in all respects to allow the producer perfect freedom to sell or consign his goods where he chose, and depend upon the ability of the company to make better returns than anyone else could. Dealers and consumers would find that no one else could furnish an assortment of California goods, and by trading direct with this company there would be no speculative profit encountered, as the legitimate supply and demand should at all times make the market rates.

*Further Extension.*—If the project proved profitable, other agencies might be established and cold storage houses provided to care for perishable articles, so that train loads of fruit might be held for a market in good shape and avoid the serious loss of a surplusage. These and many other things connected therewith would follow as time and experience would suggest; but the main question is in starting upon well-known business principles without taking any unnecessary risk.

The capitalist in taking stock would perhaps be interested only in getting a reasonable rate for his money, and would not take stock otherwise. His

risk, however, would be greater than the stockholder who is also a producer, as the latter could count on getting much better prices for his produce if sold direct to the retail trade or consumer and avoiding the speculative jobber, so that he could well afford to pay 10 per cent commission, as any profits over expenses would be returned to him.

On this basis, I would—although not a producer for export—take a reasonable quantity of the stock, with the assurance that the business would not only be profitable as an investment but would enlarge the market for our productions to such an extent as to make all our industries profitable.

*In Anticipation.*—It will be admitted that if all the products of California were in the hands of one man, that he could name his own price without fear of competition, and as a good business man he would be careful not to make his prices so high as to interfere with the sale of all his goods in due season, and thus the producer would realize all the market would legitimately bear in price.

By laying down the goods at the door of the consumer at the lowest possible cost, there should always be a good margin for the producer, and yet be in a position to compete with any foreign production.

The producer here would soon learn that his fealty was due to such an agency, for the reason that to consign his goods to any one else would in effect be competing with himself; and being made a partner entitled to a share of the net profits in proportion to his shipments, without taking any risk as to the final outcome, makes the position of the shipper safe beyond question.

Should the agency at Chicago find a larger market than expected, and shippers withhold their goods for higher prices, then goods that were seen to pay a profit could be purchased here, and the profit thereon would belong to those that did consign, and consequently the return dividend might be greater than the ten per cent commission charged shippers.

*Intelligent and Easy Distribution.*—By this method the Chicago agency would soon learn, approximately, the current wants of the trade, and fruits might then be picked later and pushed directly to the consumer in proper condition for immediate use, and thus maintain our reputation for delicious fruit.

The retail dealer of the East, if he desires to sell our goods, would now have to send to a great many dealers in different cities in order to secure an assortment, and as he would not require more than one or two packages of each article at a time, he might have to write ten to twenty letters for a few goods in all, which makes the business so tedious, expensive and slow as to prohibit it altogether.

Under the plan suggested such a dealer, having a current price list before him, with the prices and quantity in each package, could order everything produced in California from one agency simply by marking on the price list the quantity he required of each article, and he could depend upon its being fresh and sound through methods of rapid transit.

*Advantage to Purchasers.*—Probably not one person in a hundred in the East has tasted our fruits in perfection. It has been picked too green, and even dried fruits have become tasteless from delay and exposure to such an extent as to seriously injure the very best of them, and then again the roundabout method of obtaining our goods has so increased the cost as to prevent their sale.

I have an Eastern circular now before me wherein they quote our wines in ten-gallon packages, delivered to the customer, as follows: Sherry wine, $2.75 per gallon; Port, Reisling, Claret, Angelica and Tokay, $2 per gallon, and very fine old Tokay at $4 per gallon. All these could be delivered by an agency of ours at less than half those prices and yet make a large profit.

The first shippers of goods, packed and labeled, would reap a great advantage over later ones because they would be introduced to consumers first; and if satisfactory, the consumer would continue to order them rather than try new experiments.

It would simplify the business to sell by grades as much as possible and have the grading done here, at railroad terminal points, and bills of lading issued accordingly.

There has been more or less concentration of fruits and wines at various places here with good results, but the methods are not complete and too coercive; besides, in massing goods of all kinds under this plan one article will help the sale of others, and I dare say that the convenience of the small dealer and large consumer in being able to order all he wants from one place would prevent him from sending elsewhere for some one or two articles from foreign countries that happened to be a little cheaper than ours.

Temporary building, with good railroad facilities, should be procured at first, and then let time and experience determine what may be needed in the future.

The head office should be in this city, with a good board of directors to represent as many interests as practicable, and with a head manager of known ability and responsibility, there ought to be no difficulty in carrying out this plan successfully.

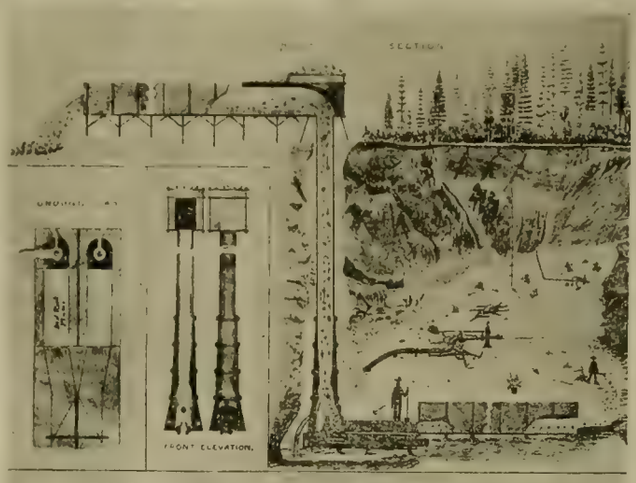
San Francisco. R. G. SNEATH.

## The Hydraulic Gravel Elevator.

(Continued from page 261.)

and the facilities—amount of water, pressure, etc.—at hand.

The hydraulic gravel elevator can be made to serve the miner to great advantage in several different ways. First, in elevating the gravel immediately after being broken up by the giants and discharged in the upper sluice, to be carried away and deposited where it will not interfere with the work in the pit. It can also be used to great advantage in elevating the material after it has been piped by the giants from the face of the bank and washed into a sluice in the pit, as at the North Bloomfield at present. It can be used in low river bars, where no piping is done, for keeping the pit dry and elevating the gravel as it is picked and shoveled, or ground sluiced into it by hand, as at Mammoth bar, on the American river, where it has proved a great success.



R. H. CAMPBELL'S DUPLEX HYDRAULIC GRAVEL ELEVATOR.

There is little cost or trouble with them when once placed in position. It has been found to work best when set perpendicular, or nearly so.

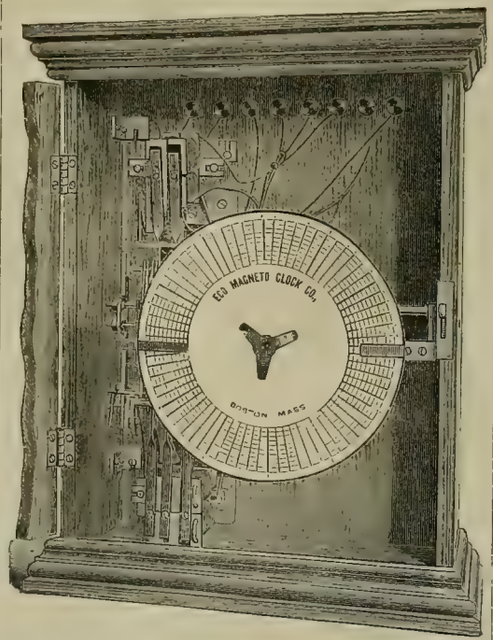
The Campbell elevator seems to be the most improved. It provides for doing its own pumping, and is double, which gives it other advantages.

There is a limit, as in all other things, where the gravel is to be elevated 30 or 40 feet. Where the facilities are at hand, they can be made to elevate 50 or 60 or even 65 or 70 feet and work profitably. Gravel does not seem to cause any material difficulty with the elevator; it is the water it has to lift that regulates its load.

In connection herewith appears an illustration of Campbell's gravel elevator as recently perfected.

## Eco Magneto Watchman's Clock.

A watchman's clock that is simple in construction, not liable to get out of order, requires no battery and is easily adjusted, is herewith illustrated.




The paper dial is daily renewed, and the record is infallible. It is so arranged that it is impossible to tamper with it without being detected. The clock can be seen at the office of the Simonds Saw Co., 31 Main street, San Francisco, and at 85 First street, Portland, Or. Clocks adapted to any number of stations from four to twenty are furnished. The utility and economy of such a device is self-evident.

## The Assay of Silver Sulphides.

A recently published paper by Mr. H. Van F. Furman, Denver, Colo., on crucible assays referred to the use of iron nails in the assay of silver sulphides. When the paper was read at the October, '95, meeting of the American Institute of Mining Engineers, the following discussion took place, which as a part of the entire subject is herewith published:

Albert Arents, Alameda, Cal.: From Mr. Furman's description of his crucible assays I infer that he regards iron nails as a necessary or advisable adjunct. Against such a notion I must beg leave to protest. Nails should not be used in this method of assaying for silver. They not only do no good but may be a cause of loss, especially in operating upon material so rich as silver sulphides. It is difficult to conceive for what purpose iron nails would be introduced into a crucible in such a case except that they may take up sulphur, forming therewith a matte. But any matte so formed will contain some silver, which is thus withheld from the regulus and lost to the assay. Even if no matte is formed, the nails are detrimental because they must be withdrawn, coated with argentiferous lead from the molten contents of the crucible before pouring. This constitutes another loss which might be avoided.

On the other hand, if no metallic iron is employed in the assay, but a sufficient amount of litharge is added to oxidize completely the sulphur in the charge, leaving at the same time some excess of oxide of lead, both the sources of loss above indicated are avoided. The result of such a crucible assay, properly conducted in other respects, would be worthy of comparison with that of scorification. The question of the relative accuracy of the two methods is interesting and deserves further investigation, in which, however, both should be handled with equal care and favor, so that each may accomplish the best results of which it is capable.

H. Van F. Furman, Denver, Colo.: As regards the use of nails in the assay of silver sulphides, I agree with Mr. Arents, that they are unnecessary. The amount of sulphides present is so small that the litharge used will serve all purposes. I cannot agree with Mr. Arents, however, that nails should never be used in the crucible assay of silver ores. In the case of ores rich in sulphur, arsenic, or antimony, I regard metallic iron as most useful flux. With such ores, it becomes necessary to add either metallic iron or some oxidizing agent more powerful than litharge, such as niter. Where litharge alone is used to effect oxidation, a large amount must be used, and, should the ores be rich in sulphides, such a large button will be obtained that repeated scorifications will be necessary before it can be cupelled. Should niter be used, it becomes necessary to determine the reducing power of the ore. This requires a preliminary assay; and the assayer at a modern reduction works has no time for preliminary assays. In our Colorado practice, niter is additionally objectionable as, in order to avoid the bubbling over of the charge, large crucibles are necessary. Large crucibles cannot be used where the fusions are performed in the muffle, as is the Colorado practice. When the ores are rich in sulphides, the use of metallic iron necessarily involves the production of matte. However, this should not result in loss of precious metal, as the matte should be saved and scorified, together with the lead button, prior to cupellation. That the use of nails results in loss from their being coated with argentiferous lead when withdrawn from the crucible, is only true in the most careless work. No careful assayer will withdraw the nails without first carefully washing them off in the slag so as to remove any adhering particles of lead. When the work was carefully performed, I have never known the use of nails to result in loss. It is for the above reasons that nails are almost universally used in Colorado when the ores are rich in sulphides. A nail was added to the charge in the case of the assays under discussion, in order to make the method conform to the usual practice.

As I stated in my paper, these crucible assays were not made because this was considered the proper method for such material as silver sulphides, but in order to draw attention to the relative accuracy of the crucible and scorification methods. Such being the purpose, the assays were made in the same manner as would be pursued in careful commercial work. I am inclined to believe that such material may be preferable assayed by the combination method, as outlined in my paper.

# Mechanical Progress.

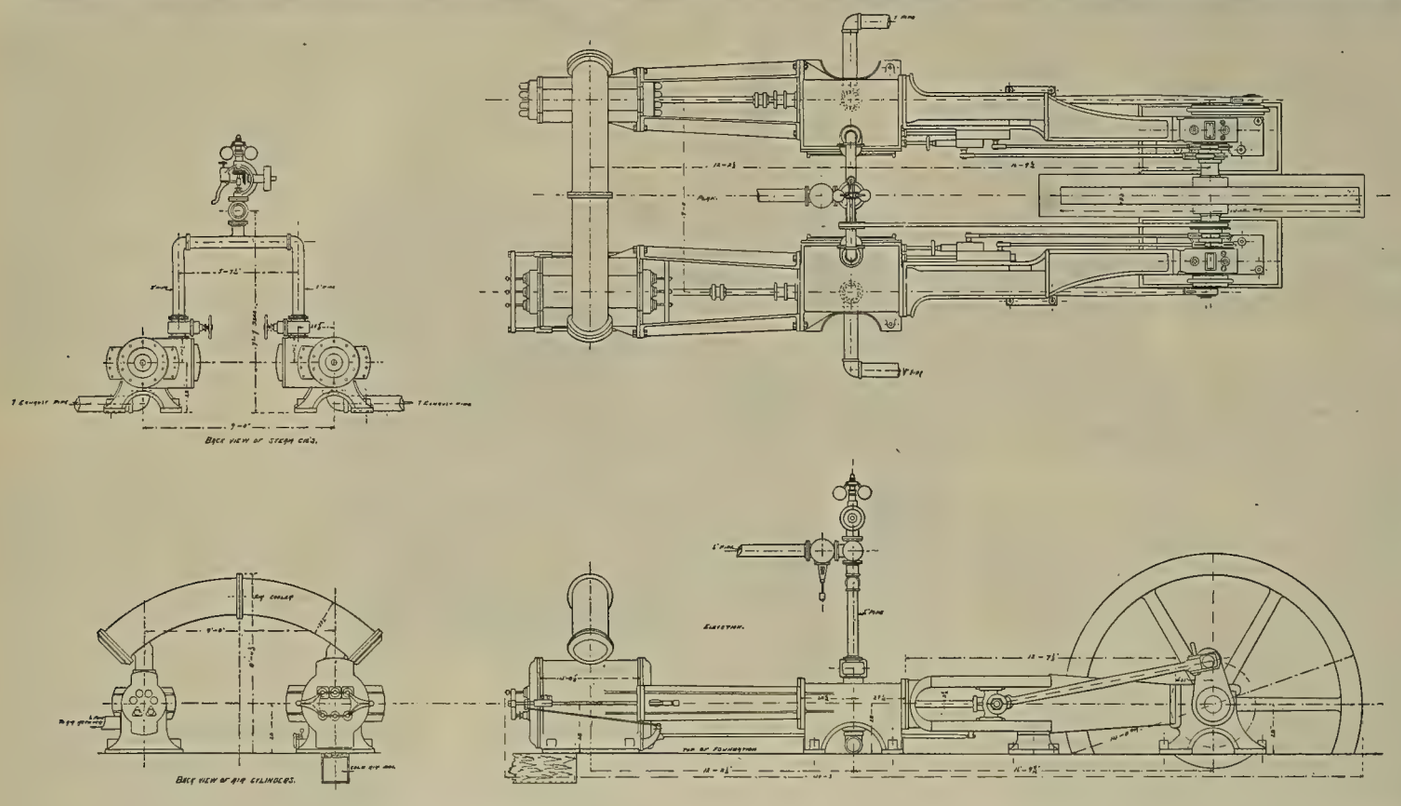
## Air Compressors for Railway Use.

Considerable has been said in these columns regarding the extending use of compressed air, the subject being of particular importance. New uses are constantly being made of compressed air, in railroading as well as mine and other work, and herewith are illustrated two compressors furnished by the Rand Drill Company to the Chicago & Northwestern and Atchison, Topeka & Santa Fe railways respectively. The Atchison compressor has been in use at Topeka for some time. The one for the Chicago & Northwestern has just been delivered.

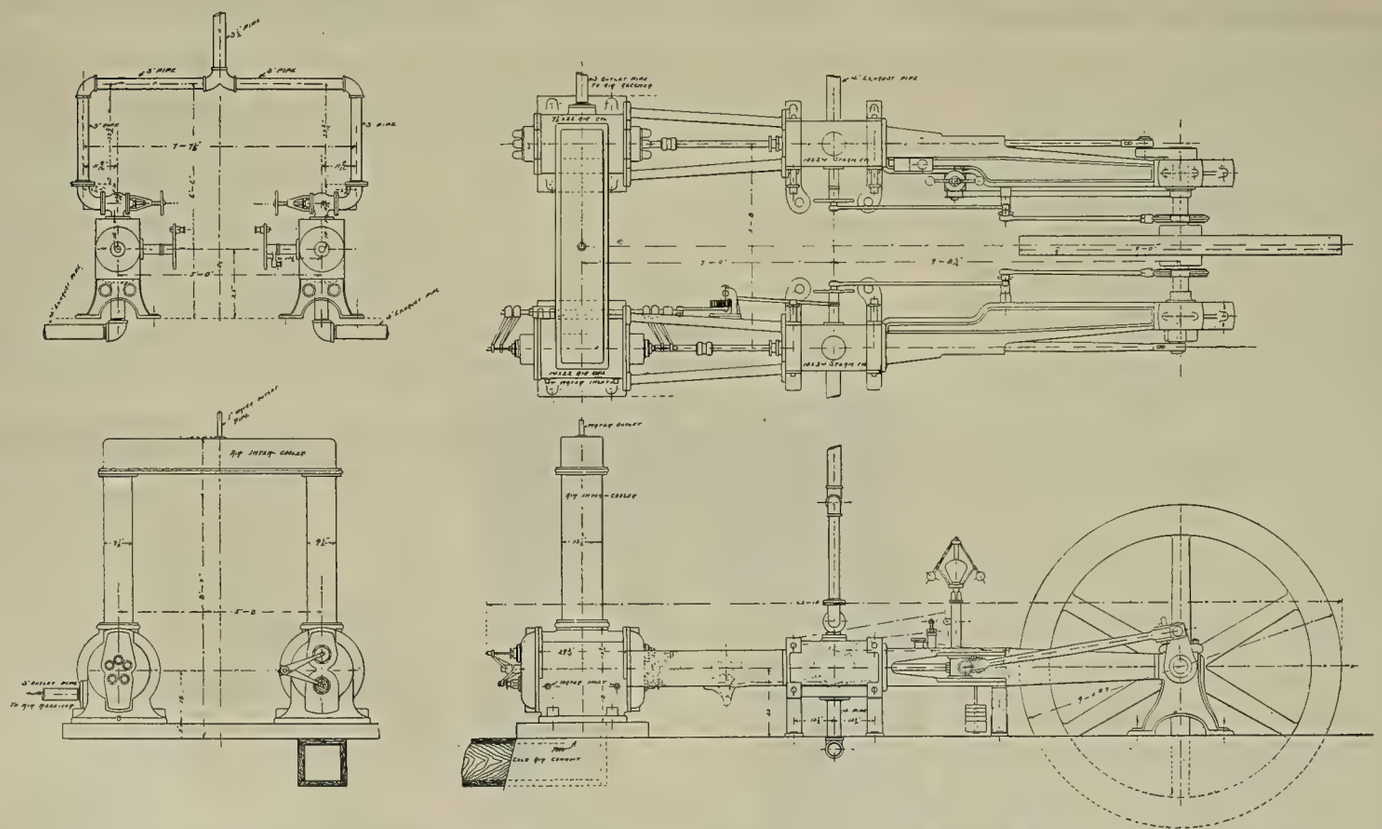
It will be seen from the illustrations that the two machines are of the same general type. The compressor at Topeka has Meyer cut-off engines with 20x48-inch cylinders. The air cylinders are of the Rand patent cross-compound type, 16x48 and 28x48 inches. The cylinders are furnished with an intercooler, which carries the air from the low to the high-pressure cylinder, and effectively cools it in passage. The cylinders are fitted with the Rand new mechanical air valve, which the manufacturers believe to be an ideal valve for the purpose—and the problem of finding a satisfactory air valve with a positive movement has been a difficult one. The conditions in the use of steam and air are very different, and valves which are satisfactory with the former will be found to cut and become leaky in the dry heat of air. Various automatic releasing gears have been applied to air valves, but with indifferent results. Valves of the ordinary poppet form chatter more or less, and they do it because while the air is trying to pull the valve open the spring is trying to pull it shut. In this gear of the Rand Company the valve is released from the pressure of the spring while it is open. The spring is used to close the valve and is strong enough to do it positively, but before the valve opens and while it remains open it is entirely released from the pressure of the spring. It goes wide open and stays there. The device entirely does away with the chattering.

The compressor of the Chicago & Northwestern has a Corliss valve engine, with steam cylinders 10x24 inches. The air cylinders are of the same pattern as in the compressor of the Atchison Company, but smaller, being 7½x24 and 16x24 inches.

The adoption of these improved types of compressors by railway companies has been the result very largely of the campaign of education which the manufacturers have been carrying on for several years. How successful in a general way that has been is shown by the statement of the Rand Company that in and about Chicago alone there are 3,600,000 cubic feet of air furnished to machine, boiler and railway shops a day by this company's machinery; 15,000,000 gallons of water



RAND COMPRESSOR IN THE ATCHISON, TOPEKA & SANTA FE SHOPS.



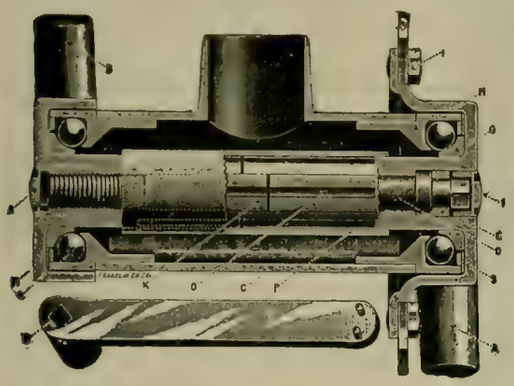
RAND COMPRESSOR FOR THE CHICAGO AND NORTHWESTERN RAILWAY, SHOWING DETAILS OF ENGINE AND INTERCOOLER.

are pumped by them from deep wells daily and over 9,000,000 cubic yards of rock were excavated from the Chicago drainage canal in three years.

Three large compressors of 4000 cubic feet capacity have recently been sold by that company: One to the Woodward Iron Company of Woodward, Ala., which has Corliss engines, 24x48, and compound air cylinders, 22x48 and 32x48 inches; one to the Helena and Frisco mine, with compound condensing Corliss engine, and otherwise the same as the above, and one to the Dominion Coal Company at Cape Breton, which is the same in all respects as that furnished to the Helena and Frisco mine. The use of compounding is a question which has to be largely governed by circumstances. The manufacturers, however, urge it whenever possible, and the tendency to do so among railway companies is increasing. H. D. Morris & Co., 141 and 143 First St., are the San Francisco agents.

### The "Racycle" Narrow-Tread Crank Hanger.

The cycle craze of '95 continues in '96, and "Mechanical Progress" continues to note improvement in this form of locomotion. Among the most recent is the narrow-tread crank hanger which is herewith illustrated, the aim being to obtain a narrow-tread hanger easy of adjustment, and



with bearings from 1¼ to 1½ inches farther apart than in any other narrow-tread machine. Friction is reduced to a minimum by the bearings being placed in the hubs of the cranks, and the sprocket running inside the bearings, instead of outside, the power being applied through the cranks directly on the bearings. The crank and crank axle are in one forging, and connected with a rifled clutch over which is used a rifled sleeve, making an absolutely positive connection. The hanger can be completely assembled or dissected in less than half a minute and without dissecting the chain. The wheel is built by the Miami Cycle Co., of which F. R. Grimes is the Chicago manager.

## Electrical Progress.

### Some Notes on Dynamometers.

As long as motors and manufacturing machinery continue to be made so long will the necessity exist for measuring the power which the first named are capable of producing and which the latter require in order to develop their capabilities, and, in an equal degree, is the need always present of being able to determine by measurement the power required in order to run complete mechanical contrivances which entail the most varied conditions. This existing need has led to the result that in the course of time a stately row of dynamometers of most varied construction have been produced. Generally, dynamometers may be divided into two principal groups. The first may be called that of absorbtion dynamometers. These are such wherein friction resistance is created, which holds an equipoise against the force produced and is capable of being measured. All apparatuses belonging to this group are only available for the measurement of motor power and are generally referred to under the general term of "brake power." The best known apparatus in this class in the universally known Prony Brake Power. This apparatus labors under numerous disadvantages and is not suited to permanent experiments.

The attempted improvements thereon which were made by Wayer, Richmond and Candial, were, however, crowned with little success. Then Imray produced a cleverly thought out apparatus for permanent experiments, in which contrivance the resistance was kept uniform and constant by means of an adjustable friction surface.

A still better and very cleverly contrived apparatus was next produced by Prof. Brauer, which is the one now most widely used, the most suitable for permanent tests and gives very exact results.

In all brake-powers it is the friction resistance which counterpoises the developed power of the motor aud it is, consequently, necessary to take care that, in permanent tests, the heating of the friction surfaces does not become too great, as, if this happens, the exactness of the results is very likely to be diminished. For this reason the friction surfaces must be sufficiently large. It is only with difficulty that greater forces are measured, and then the measurements are only approximately correct.

The second group of dynamometers is that of the so-called transmission dynamometers. Whereas the dynamometers of the first group, the brake powers, are exclusively used in order to measure the power which motors are capable of producing, those dynamometers which belong to the second group are used principally for the purpose of measuring the power required to work a machine, shafting, or a complete set of machinery. In this group it is either the tension of the belts, the pressure of the gearing wheel-teeth, or the deformation of an elastic member of the apparatus which maintains the counterpoise to the running power and measures the latter.

Bauki invented an apparatus intended for the measuring of the tension of the belts, and Thompson produced an apparatus for the like object. These and such like apparatuses are, however, only available for small power and for not long duration, inasmuch as the feathering spokes very easily become useless. Schuckette and Kasalowsky used springs as connections between the loose and the fixed pulleys in their apparatuses.

But all of these dynamometers give inaccurate results, because the centrifugal force acts disadvantageously on the springs. Moreover, in the above named and kindred forms of dynamometers the disadvantage presents itself that the power does not move in the direction of the spring-tension, but acts in a radial one and, for this reason, in every altered position of the spoke-crosses a new power movement arises; consequently, no exactness.

In order to avoid these difficulties Fuess uses a flat spring which is placed between the fixed and loose pulley around the shaft.

But, inasmuch as the alteration in diameter of the spring is very small and the transmission of the same in the drawing apparatus (indicator) takes place from the small levers of the shear to the larger ones and hence, again, proceeds through a short lever on to a long one belonging to the indicator; exact measurements cannot be made with this apparatus.

Fishinger's model may also be mentioned as classed under this group of dynamometers. This apparatus is free from the disadvantages which the elastic members of the above mentioned apparatuses bring with them. But the friction of the levers and belts, which becomes greater in proportion to the increasing dynamic force produced, interferes materially with the result.

Of the dynamometers in which the pressure of the gearing serves as the medium for measuring the force produced, that made by Rieter & Co., of Winterthur, is well known. This apparatus is largely used in Switzerland and South Germany. The same is serviceable for measurements up to 15 H. P. and gives very fine results when in skilled hands.

All previously mentioned dynamometers, of which there are still many other varieties, are limited in the extent of their utility. They are nearly all intended to mark off power lines and do so with more or less precision, but not one of them is available for summarizing the amount of power passed through the apparatus or turned to account.

The latest and most important species of apparatus is that invented by Wilhelm von Pittler.

The following principals were made the guiding basis of this construction, viz: summarizing and reading off the total of the power passed through; a greater stroke for indicating the variation of power, and simplicity in the mechanical parts and in manipulation.

In order to obtain a great stroke the maximum angle of the fixed and loose pulleys to each other was determined as 120°, and for this stroke, as elastic means, a spiral spring was selected which serves to connect the fixed pulley with the loose one, inasmuch as all experiments with screw-springs, such as are used in the apparatus referred to above gave no available results. The spiral spring, however, especially suitable to the desired end, because its measurements allow of determining that, at 120 deflection of the pulleys towards each other, its deflection or deformation only amounts to a small proportion of its elastic limits.

The connection of the spiral spring with the two band pulleys is effected in such wise that the inner end, having a hooklike bend inwards, catches into a slip in the hub of the fixed pulley and passes firmly over and around this hub with its first coil. The feathering end of the spring begins just at this point. The outside end of the spring is bent outwards; this bend catches on behind a noose on the loose pulley to which noose the spring is further secured by screws. Next in order to measure and summarize the total power produced by the band pulleys, which power is conducted through the apparatus, the following contrivance is used, viz: An eccentric is secured firmly to the shaft; this eccentric makes the same motions as the fixed pulley and the inner end of the spiral spring. On this eccentric is set a second eccentric which catches with a pin into a slit into the loose pulley and is thus connected with the latter and with the external end of the spring. Both eccentrics have the same stroke, so that when both strokes are opposite to each other they cancel the other and become O. When the strokes are in the same direction the united strokes will be equal to the amount of both strokes. It will be easily understood from this that the joint strokes of both eccentrics change with the turning of the band pulley against each other, i. e., with the tension of the spiral spring or the variations of the through-conducted power. The stroke of the eccentric is transferred to the registering apparatus, a sort of slide which is coupled with a counting apparatus. This slide (as it is called for want of a better term) consists of an inner disc, firmly connected with the lever, which follows its movements forward and backward. Over this inner disc the summarizing disc is arranged, which moves only in one direction, and is carried along by the inner disc when the lever moves forward, stopping when the lever returns until it again moves forward.

The strokes of the lever can be so fixed as to be of an exactly determined measurement for an exactly specific power. Now, if the summarizing disc is graduated around its edge, with 200 grades, it can be so arranged that, for a certain total power the stroke shall amount exactly to ten grades. If, therefore, the product from the total power of ten grades per the radiance of distance is known, if it would, for instance, amount to 1,000 meter kilograms in one revolution of the summarizing disc, one thousand multiplied by fifty equals 50,000 meter-kilograms and would be the amount of power conducted through the apparatus. As the summarizing disc is directly connected with a counting contrivance, on the counter itself, so soon as the summarizing disc has made one revolution, a figure is pushed forward, so that each figure of the counter indicates the consumption of 50,000 meter-kilograms. This remains constantly correct, whatever the total power may be, for, if the same equals ten grades, then the summarizing disc will have revolved once on fifty strokes of the lever so that the total of the meter-kilograms consumed in one revolution of the summarizing disc must of necessity remain the same. If the aggregate power only amounts to one-tenth so that it equals only one grade, then the summarizing disc will only have completed one revolution after two hundred strokes of the lever.

This apparatus is said to be absolutely the only one which can summarize the whole of the power transmitted or turned to account, and this characteristic raises it far above all previous constructions and causes it to appear on the arena of power-measurements as something entirely new and special. It is this summarizing quality in respect of the expended power which raises it to the position of an actual measure of power and value. Through this apparatus alone, and for the first time, is one placed in the position to ascertain the value or capabilities of each individual machine or of those of a complete set thereof. By means of this apparatus one can ascertain what are the extreme capabilities of a whole establishment on the smallest admissible consumption of fuel, and it furnishes, moreover, a test whereby one can learn whether the capabilities become reduced again and if so, from what cause.

The dynamometer is consequently, of equal value as an instrument of power to lessors and lessees. The expenditure of power is indicated by the figures of the counter and calculated in accordance therewith.

The construction is extremly simple, as all delicate parts are excluded. It is available, as an independent apparatus for the measurement of power either of individual machines, or of a whole establishment. It can also be used as an intermediate countershaft, and as such is in addition to its qualities as a dynamometer, an excellent elastic impulsion, especially for electric motors.

The consumption of motive force, be it fuel in the shape of coal, steam, hot air, oil, etc., water power or electricity can be controlled per absorbed power unit, so that both power lessor and lessee can check off the consumption of power at any time, say weekly, monthly or yearly, in the most precise manner. It may also be added that the Wurttemberg government has decided upon introducing the dynamometer into its locomotive shops.

## Scientific Progress.

A TENDENCY in some quarters to return to the old "vitalistic" theory of living matter has been noticed. Professor Bunge gave the first serious impulse to this movement in a series of lectures delivered several years ago. In his presidential address before the American Microscopical Society last summer, Professor Simon H. Gage said: "It can be stated without fear of refutation that every physiological investigation shows with accumulating emphasis that the manifestations of living matter are not explicable with only the forces of dead matter." This announcement places Professor Gage

among the neo-vitalists also. Sir William Thompson (Lord Kelvin) affirms essentially the same view. Professor Burdon-Sanderson evidently sees in this revival of a modified animism danger to scientific progress, and in a lecture recently delivered before the Royal Institution argues against it. The mystery of vital phenomena he prefers to call still a mystery. He denies that it is a new form of force, but rather an unexplained form of known forces, chemical or physical. The neo-vitalists do not assert that the life force is something spiritual, a *deus ex machina*, as was formerly held. Their contention is that it is another form of force, having its chemical and physical equivalents.

THERE seems to be no end of discoveries in connection with the recent announcement of the remarkable work of the now famous professor of Wurzburg, who, by the way, is now "Baron Roentgen," having just been ennobled by the German Government. The latest addition to our knowledge of what until recently seemed a field of darkness comes from Dr. Emmens, well known in San Francisco as an investigator and the inventor of a powerful explosive, "emmensite." There seems now to be a possibility of reflecting the "X" rays and so concentrating them that photographs instead of mere shadow pictures can be produced. Dr. Emmens is said to have obtained pictures of objects enclosed beneath the vulcanite screen exposed to sunlight for thirty-six hours. Certain outlines and shadows convince him that "X" rays are reflected. Pursuing his investigations and acting upon the theory that "X" rays are universal, an attempt was made with apparent success to collect them from darkness by the aid of various chemical compounds. An instrument which he has invented and calls the photoscope will, it is thought, when completed, enable the surgeon to see with his own eye the interior of certain portions of the body. In this connection reference is again made to Professor Salvioni's method for enabling us to see through solids as through a photographic camera. The apparatus used consists, as previously described, of a cardboard tube, one end of which is closed by a sheet of black paper coated with a layer of fish glue and calcium sulphide or platinum cyanide, either of which compound is very phosphorescent under the action of the "X" rays. The other end of the tube contains a lens giving a clear image of the phosphorescent paper. The plan is to transform the Roentgen rays into ordinary luminous ones before they reach the eye. The paper is thus illuminated in those portions which receive the rays and the silhouettes of the objects appear dark. Professor Salvioni maintains that by the aid of a camera not only the shadows but the images of the objects can be reproduced, facts which appear to have been proven by Professors Battelli and Garbasso of Pisa.

A QUESTION which is often puzzling is asked in connection with photometry. The law of distribution of light is that its intensity varies inversely as the square of the distance from the luminous source. If, then, the distance from the source of light is 2 ft., "I am taught to believe (says a correspondent) that the intensity is ¼, while at 4 ft. it is $\frac{1}{16}$, and so on. But at 1 ft. distance the intensity should be $1 \div 1^2$ or equal to the intensity at the source. How is this?" The reason is that the inverse squares of the distances furnish ratios to the intensity of the light *at unit distance* from the supposed point source, and not at the source itself.


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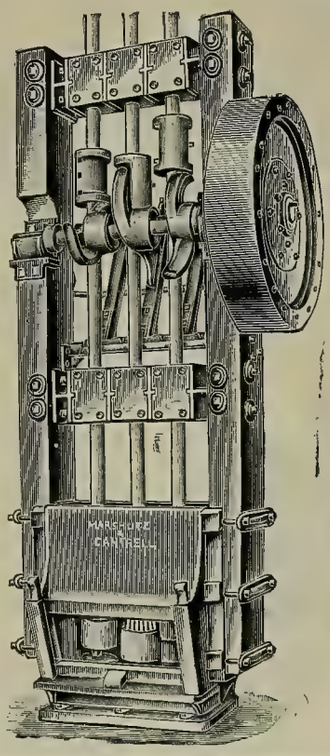
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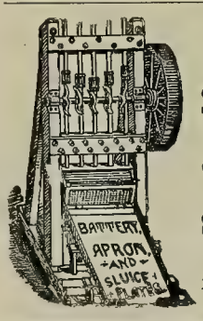
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## Practical Information.

A METHOD for the separation of tellurium from copper residues is described by Prof. Whitehead in the Journal American Chemical Society. In the electrical refining of copper the washings from the gold residues contain the tellurium as tellurous oxide or sulphate. The tellurium may be obtained from these either by precipitation with copper or by passing sulphurous anhydride through the solution. It may be finally purified by distillation in hydrogen. When a solution of sodium tellurite is added to a solution of an ammonium salt, a white precipitate of tellurous anhydride is thrown down, which becomes granular on boiling. A small amount of tellurium or of some metal which can be precipitated by sulphurous anhydride remains in solution, this soluble portion is still under investigation. Potassium ferrocyanide does not react with tellurium chloride at once, but after a few hours Prussian blue is formed. When tellurium is heated with aluminum the two combine with explosive violence, forming a chocolate colored, difficultly fusible compound, which has the composition of $Al_2 Te_3$. It is hard and brittle, and can readily be ground to powder; when exposed to moist air it is decomposed, and hydrogen telluride is slowly evolved. When thrown into water it is rapidly decomposed. Tellurium is readily deposited by an electric current either from an acid or alkaline solution. It has been found possible to separate tellurium from copper by adding an excess of sodium hydroxide and about three grams of potassium cyanide for each gram of copper present, and passing an electric current through the solution, when the tellurium is thrown down as a black, nonadherent precipitate which can readily be filtered off. The solution can then slightly acidified with sulphuric acid, and the copper estimated in the usual way by electrolysis.

A BILL has been introduced into Congress authorizing the Secretary of the Navy to construct cruisers after the Painton design. Placing the present propulsion efficiency of ships at 55 per cent, Mr. Painton claims, by the combination of steam and electrical machinery, to secure an efficiency about four times greater than that of steam engines applying their power without the intermediary of dynamos and motors. The inventor promises that with this system he can develop a speed of forty miles an hour in an ordinary passenger ship, and thirty-five knots an hour in a naval ship, under the usual conditions of sea and wind. The vessel is to have fourteen screw propellers arranged along the side, each to be independently operated from a switchboard. There are two propellers forward and aft at regular intervals. The two stern propellers are located under the overhand of the stern. Each forward and aft propeller consists of two wheels so arranged on the shaft that the blades of the forward wheel are opposite the opening between the blades of the after wheel. It is understood that with this system 1800 revolutions have been reached, and that 800 can be depended upon in service. The inventor says that he can reduce the loss attending transmission of power in a 20,000 H. P ship from 6600 to 2000 H. P. Each propeller is to be worked by a separate motor, the common current being generated by a central plant. Mr. Painton states that this system will enable a ship's speed to be increased say from twenty to forty knots an hour, with slight additional H. P.

AN electric lamp that can be carried in the pocket has been produced in Germany by Herr Bohwinkel. It is made either in cylindrical form or like a flat flask, a small glow lamp in each case forming the upper portion, while the battery is the base. A so-called "revolver battery" of three platinum-zinc elements gives a current of four or five amperes at six volts. The filament is caused to glow by tipping the lamp, and in a lamp of 10 inches in height by 2 inches in diameter continues to give a bright, white light for an hour and a half with one filling. A patent battery fluid is used, of which one quart is sufficient to fill the lamp sixteen times.

LORD KELVIN has been making experiments to discover what the effect of a cannonade of quick-firing guns would be on board the vessel firing and the ship subject to the fire. He finds that after fifteen minutes' firing the survivors of the crews of both vessels would be reduced to a state of mental if not physical incapacity, owing to the concussion of the projectiles on the sides of the vessel and the noise of the guns.


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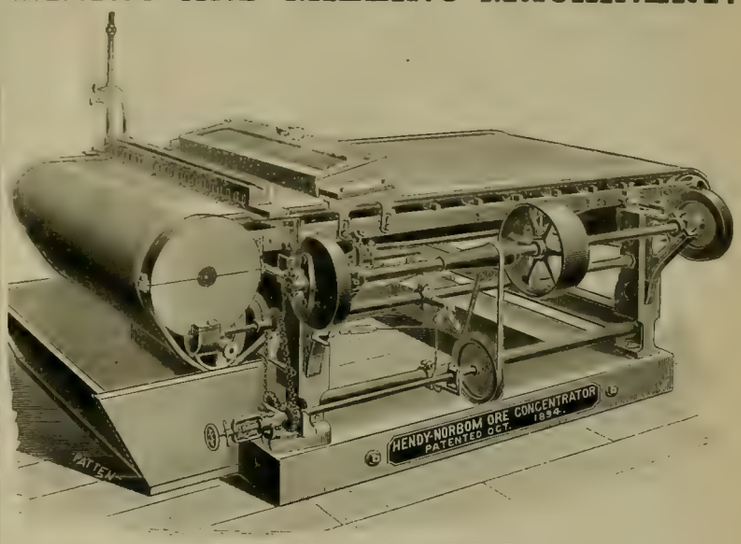
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*Mr. John O. Norbom, San Francisco, Cal.*—DEAR SIR: Replying to your inquiry regarding the working of your Concentrator, I take pleasure in stating that the machine is doing excellent work. The curve springs give the machine a very gentle motion, which makes it mechanically perfect. We are saving our sulphurets very clean and lose a trace only in the tailings. The machine takes pulp from five stamps, handling about nine tons per twenty-four hours with ease. Our ore carries from 3½ to 5 per cent of sulphurets. The latest improved belt gives good satisfaction; it has now run about five months. I expect it will last about fifteen, which speaks well for canvas belts. As for little attention and easy working, I can recommend it to any person as being the best machine I have ever used. Wishing you success, I remain, yours truly, [SIGNED] C. A. BROCKINGTON, Superintendent.

Office of FEDERAL LOAN MINING COMPANY, NEVADA CITY, CAL., Dec. 10, 1895.

*Mr. John O. Norbom, San Francisco, Cal.*—DEAR SIR: Your Concentrator, which has been in use in our mill for the last six months, is still doing excellent work. At present we are running the pulp of ten stamps on one machine, without seeming to be overloaded. I can recommend the machine to do all and more than you claimed for it. Yours truly, [SIGNED] J. VINCENT, Superintendent.

**STAMP MILLS!**

Triumph Concentrators, Hendy-Norbom Concentrators, Rock Breakers, Hydraulic Mining Machinery, Challenge Ore Feeders, Steam Engines and Boilers, Hoisting and Pumping Machinery, Water Wheels.

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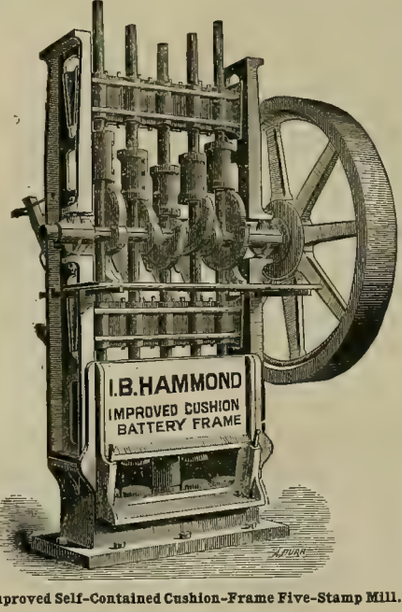
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—MANUFACTURERS OF—

# Stamp Mills, Ore Feeders

**DETACHABLE BUCKET WIRE-ROPE TRAMWAYS,**

**Roller Grinding Pans, Desulphurizing Furnaces, Etc.**




**Improved Self-Contained Cushion-Frame Five-Stamp Mill.**
Patented in the United States and Foreign Countries.

**The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Self-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill**

**FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.**

**SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.**

**THIRD: The Large Amount of Space Saved.**

We refer by permission to Mr. N. A. McMillan, Haines, Oregon, manager of the Blue Mountain Mining Co., at Rock Creek, Or., where ten of our stamp mills are in operation; also to Mr. John S. Miller, Helena, Montana, manager of the Diamond Hill Mining Co., operating one of our forty-stamp mills at their mines at Townsend, Montana.

Send for Catalogue and Price List.

CORRESPONDENCE SOLICITED.

# Mining Summary.

## CALIFORNIA.

### Amador.

At Jackson action began last Tuesday in the $2,000,000 suit brought by the Keystone Con. G. M. Co. vs. the South Spring Hill G. M. Co. The plaintiff claims that the entire works of the defendant are on its lode, it having its apex on the grounds of the first named company.

At the Ironmass mine, in Robinson district, a recent crushing of over 300 tons at the Acme mill averaged $28 per ton, without any attempt to save sulphurets which assay $250 to $290 per ton. The owners contemplate putting in machinery to save the sulphurets in future crushing.

The Alpi, two miles southeast of Jackson, is a patented claim. A shaft has been sunk over 100 feet, showing a strong ore body. The property has been bonded for $20,000, payable in thirty-three months, and a local company has been organized to operate it.

*Record:* Petroleum is now being used as fuel at the Gover mine, and a six-horse team hauls in a big cash of the oil every day. This is poured into an immense stationary tank, which is connected by pipes with the furnace. Two new boilers have been put in at the mine and the mill was started up this week.

The difficulties which have retarded operations at the Mechanics mine have been satisfactory adjusted and work will be resumed immediately. As soon as water can be gotten to the mine the new ten-stamp mill will be started up.

At the South Eureka they are sinking from the 1050 level, intending to go down 200 feet. They are keeping the mill running by stoping in the 950 and 1050 levels. A new level is being opened up down 650 feet so as to reach the ore at that point. The mine is looking favorable.

### Butte.

Prather & Co. are opening a quartz mine two miles from Cherokee. Six men are developing the ledge.

The Portuguese miners are rigging up derricks and preparing to mine opposite the Waldeyer residence. T. L. Vinton has twenty-five men employed near the tunnel.

Theo. Wetzel of the North Bloomfield is operating the Osgood gravel mine at Bangor. Machinery is being placed on the property.

### Calaveras.

Sadie E. Chamberlain has sued the Carson Creek Mining Company for $50,000 damages for the death of her husband, C. C. Chamberlain, who was killed by the caving of a stope in which he was working in that mine.

The Alpine mine, near El Dorado, has been bonded to W. T. Mendenhall for $17,500.

E. H. Brandt has taken hold of the Gottschalk mine, will put up the necessary machinery and sink 1000 feet before doing any other development work.

### El Dorado.

(Special Correspondence.)—Dr. Wagner & Son of Sacramento have begun a tunnel and drift work on eighty acres of gravel near Fairplay, twenty miles south of Placerville.

Amsden & Naughten of Sacramento are opening a claim adjoining the property of Wagner & Son, near Fairplay.

J. Baughman is developing a quartz ledge on the old Fort Yuma property, below Big Canyon mine, and hauling the ore to the Jack Rabbit mill, owned by John Darrow.

Daniel Klaus has bonded a claim to N. G. Gifford, four miles east of Latrobe, and development work is in progress.

Wm. H. Reinbold, at Garden Valley, is sinking a shaft on the Keystone. He has reached 60 feet depth. The ore is low grade and the vein is 4 feet. He is also sinking on the Shenandoah, finding two parallel ledges of free milling ore.

The old Colwell mine, near Lotus, ten miles south of here, has been bonded to Clark McMillan. Lotus is near Coloma.

Properties on the Georgetown divide are coming into activity. These are located to the north of Placerville about sixteen miles.

The old Bob Red mine, owned by Varozza & Alderson, is attracting the attention of Denver people, who are negotiating for a bond.

Negotiations are pending for the sale of a large area of gravel properties, with mills upon them, within three miles of town. New York capital is interested in the deal.

Active development work has been begun on the old Judge quartz mine, near Kelsey. The shaft will be sunk to a depth of 300 feet.

New machinery placed on the Big Sandy is in operation. The water has been taken from the old shaft, which will be carried to a depth of 500 feet.

Much energy is displayed in every direction throughout the county by capitalists and prospectors looking for quartz properties and deep mining propositions. An active revival has struck even old El Dorado.

An additional shaft has been completed on the Larkin, making the double compartment space 4x9, one to be used for the new steam pump and the other for the hoist. The north and south drifts are now each 100 feet. The shafts will be carried down 500 feet. The ore body is not only satisfactory, but of an encouraging quality.

Negotiations are on foot for the old Griffith Consolidated, adjoining the Larkin on the south.

The Bullion has been bonded to C. F. Bryant. This adjoins the three Manzanitas—King, Queen and Princess—on the east.

There is a fair prospect of resuscitating the old Pacific group of mines. These run from Weber creek to the American river, passing under the courthouse. They extend for a distance of four and one-half miles, and are owned by a Scotch company.

Wood, water, climate, large ore bodies, good roads and railway facilities are inherent qualities of the mother lode vein of this county, and capital is gradually ascertaining these facts.

Moneyed men have obtained from Frank Koepfer a bond on his property below Lotus, on the banks of Weber creek.

Senator Jones of Nevada has begun prospect work in this county with considerable vim on the old Roscoe mine.

The advent into the county of Monroe Salisbury and W. H. Crawford of Chicago, who become joint owners of the large Sam Salisbury mining field, is greeted as a foreboding of the influx of large capital. They have secured property of merit and are preparing to erect an extensive plant.

Placerville, Cal., March 31, '96.

A Greenville correspondent of the Placerville *Democrat* says it is ridiculous to talk about hard times when the Indians are making from $2 to $3 per day panning out near the Greenstone mine.

### Lake.

The Abbott quicksilver mine is reported sold to A. T. Buggers, representing Eastern men, for $125,000, one-half cash, balance secured by mortgage. Supt. A. A. Gibson will continue operations.

### Los Angeles.

The Los Angeles Mining and Stock Exchange has incorporated. Two hundred and fifty shares have been voted at $100 each. Twenty-two have applied for charter membership.

### Mariposa.

The Coulterville *Miner* thus disposes of the Merced G. M. Co affair: The Merced Gold Mining Company have laid off some men during the week in their mines. The Bigelow and Mary Harrison still continue development work. The mill has been closed down for the time being. It is expected in a short while this company will resume operations in full blast, and the next important move will be the building of another large mill.

### Mono.

The Bodie *Index* says that a fourteen-foot ledge of $20 ore has been struck in the Lent shaft below water level, and advocates a big electric pumping apparatus to drain that and other mines.

*Miner:* The Standard Co. is now putting up another cyanide plant. It will be erected down the canyon near the old Wagner millsite. It will probably be in running order by May 20th. After this is completed, the Bodie cyanide plants will have a daily capacity of about 410 tons, as follows: Standard Co., 200; Southend, 160; Bodie Tunnel, 25; Parr & Tyack, 25. The snow is nearly all gone, and, unless more falls, it is expected that the different plants will be started up within a month.

### Napa.

John R. Armstrong has leased 500 acres near Napa, where he will bore for oil.

### Placer.

Searing and Bryne are negotiating for the purchase of the Emanuel Polifka ledge, near Last Chance. It is expected that the first installment of the purchase—$5000—will be paid on April 6th.

The Pioneer G. M. Co. is about to add forty stamps to its mill. It is one of the big California gold producers.

*Sentinel:* At the Herman mine the mill daily crushes 35 to 38 tons. The March clean-up was $10,000. The sulphurets are showing well and will justify shipping to San Francisco for reduction.

Ten additional stamps will be placed in the mill next month if the weather remains favorable, thus increasing the output 50 per cent without extra expense for power or management, as the present engine and attachments were placed with a view to increase the number of stamps to twenty if desired.

### Riverside.

The Santa Rosa mine, near Perris, has straightened out its financial difficulties, and resumed operations. C. A. Winters is the receiver in charge of the property. James Noonan is the foreman. Twenty-five men are at work, and the ten-stamp mill is running.

### San Bernardino.

Judge Welborn of the United States Court has appointed John D. Polk Master in Chancery to examine into the accounts of the receiver of the Vanderbilt group of mines.

### San Diego.

At Hedges 300 tons of ore pass under 140 stamps every twenty-four hours.

At Picacho considerable development work is under way.

At the Adsit camp, American Girl, Blossom and Cargo Muchacha a number of men are employed; also at various other places on the desert. The Buena Vista mine, near the river, twenty miles above Yuma, is patented and is the property of the Beaties, who are at present erecting a new stamp mill.

According to the *Express*, J. H. Carpenter of Yuma, A. T., who is manager and agent of the Denver capitalists who bought some mines in the Picacho district, will build a 200-stamp mill and a narrow gauge electric railroad to carry the ore from the mine to the mill, on the Colorado river. The veins developed are from 20 to 150 feet in width, averaging from $6 to $8 a ton. It is the intention to burn crude oil.

### Shasta.

(Special Correspondence.)—Hart's Texas and Georgia keep twenty stamps dropping steadily. The Quartz Hill folks also run twenty stamps steadily. The Central is being exploited by R. G. Hart, who intends working the ore in his mill if it is found in paying quantities. Up at French Gulch the work on the Tom Green has been unsatisfactory to date, and the force is laid off. Ellery Brothers have their mine bonded and a sale about consummated. The Gladstone is shut down; no ore in sight and bills unpaid, with little hope of starting again. At Middle Creek, W. P. Miller is again letting contracts to haul ore to his ten-stamp mill. The Tellurium and the new-process men are trying to adjust their claims in court. Deakin and Taylor are sinking on the old Spanish mine near Shasta. It keeps their steam pump busy to handle the water. They are now down 140 feet, and have four feet of ore that mills $8 per ton. The large placer ditch of the Denver Company at Muletown has been filled with water the last two days, and they are piping off a little ground. When the ditch is completed, a water supply will be insured the whole season.

*Searchlight:* From eighty to one hundred tons of ore are transported daily from Iron Mountain to Keswick, where the smelter is located. About 125 men are employed about the mine proper. Four Burleigh drills are rapidly making headway in the drifts. The men work on eight-hour shifts. Two drifts are at present being run into the great ore body, each 12 feet in width. At Keswick the smelter was closed down for several days last week, and it is rumored that it does not come up to anticipations. General Superintendent Hill visited the big copper smelters at Anaconda, Mont., on his way to London, it is expected for the purpose of comparing the various methods employed.

The *Free Press* hears that R. G. Hart, in his Texas mine, is at work 240 feet below the fifth level. The ledge is from six to ten feet in width and the ore is remarkably rich in free gold. The mill and chlorination works are running steadily to their full capacity. In the Central group, which he controls, a tunnel is being run on the Little Shasta. Considerable development work and much repairing and retimbering is being done in the other mines of this group.

*Free Press:* The Snyder, Last Chance, Little Blossom, Ridge, Old Judge and Clipper mines, near Kennet, Backbone mining district, are sold to Alfonso di Nola, William Axford and James Barron of San Francisco for $7250. They intend to resume work.

### Siskiyou.

*Journal:* The old Allen ledge in Quartz valley is now in operation, and the results are very satisfactory. There is a five-stamp mill on this property, and the machinery is all first-class. It is said that the only hoisting works in the county are on this quartz ledge, and the whole is operated by compressed air. The ledge runs from six to twenty inches in width and pays exceedingly well.

Culver & Co., at the mouth of Barkhouse creek, are sinking their shaft and are making splendid progress.

Vogan and Mathews have bought the Classic mine on Indian creek, near Happy Camp. They have over 300 acres of ground and an abundance of water the year 'round.

At the Spengler mine, at Lower Humbug, the Spengler Brothers intend to open ground in the creek near its mouth at Klamath river.

Howell & Brown are drifting through bedrock at Spring gulch, on Yreka Flats, with expectation of striking a rich back channel.

At the Katie May mine, on Greenhorn, they are running a tunnel on the ledge and have taken out several tons of rock, and a larger amount than usual will be taken out before the next crushing, which will probably be some time in April.

Rills & Young are operating their mine on New York gulch, Indian creek. The ledge is from twelve to twenty inches in width, and the rock has been running from $30 to $40 a ton.

### Trinity.

*Journal:* New machinery has been purchased for the Strode Bros. mine near Trinity Center.

M. Ramin at Deadwood has been working a lease from the Brown Bear Company, near the old Diener works, and has a six-inch ledge carrying rock that is estimated at from $100 to $500 per ton.

Near Trinity Center there are sixty men encamped about the property which the Berlin syndicate recently purchased of J. F. Lyons, awaiting the beginning of operations, and hope to secure employment.

C. Ralston is ground sluicing on Fisher gulch. Place & Wardell have opened a placer mine on Raery gulch. Burger & Hamberger are running a drift mine.

### Tuolumne.

*Independent:* A rich body of ore has been struck in the Tibbitts & Green mine, above Columbia.

"C. H. Swain will open up the old Confidence mine, putting in pumps that will pump 450,000 gallons of water every 24 hours."

### Yuba.

Snell and Walrath at Brown's Valley assume charge of the Hibbert & Burris quartz mine, owned by a San Francisco company. There is now a shaft down 140 feet, and after this has been pumped out sinking will be resumed.

## NEVADA.

### ESMERALDA COUNTY.

The *Miner* says there is hope that Aurora will boom again. An English company contemplates making a move there on an extensive scale. Nothing more than surface work was ever done in the camp and the yield was millions.

### LANDER COUNTY.

The Austin Mining Company will shortly put up a 60-ton mill at Austin, at the mouth of the tunnel, which is now in 5000 feet, and will be driven 1500 feet farther.

### LINCOLN COUNTY.

The Phœnix Reduction Co. at Bullionville has already, says the Pioche *Record*, put through over 300 tons of the Condor tailings. The material, which has been accumulating for years, is said to be yielding reasonably good results, yet not as well as expected, and a new process is to be introduced. The chief difficulty is to thoroughly work the slimes, which, though of comparatively high grade, are so fine as to resist all ordinary efforts at leaching, etc., and this is the main reason why a very large quantity of the Bullionville and Dry Valley old tailing pits have never been successfully handled.

### ORMSBY COUNTY.

F. C. Everett of Wellington is running a 120-foot tunnel on a new mine near South Camp. He calls it the Feverish Hornet. The ledge averages three feet in width, and assays show a value of $15 a ton. He has a five-stamp mill at Wellington, but says he intends to put up a new and better mill immediately.

### STOREY COUNTY.

The addition to the Kinkead mill is now completed, and in a few days the two new grinders will start up.

### WHITE PINE COUNTY.

*Tribune:* David Wood says that since the agitation of the railway new life has been infused and that the developments of 1896 promise gratifying results. At Osceola there is much activity at the present time, the Columbia Co. having resumed work on an energetic scale. Cherry Creek is another camp that is touched by the projected route. There silver predominates, and but for the depression in that metal there is no doubt but Cherry Creek would to-day, as in years long gone by, be contributing to the wealth of the nation.

Ely and White will be, according to the preliminary survey, also on the lines of the new railway.

The great obstacle in the way of successful mining in the camps mentioned, says Mr. Wood, is the lack of fuel. The forests have been devastated, and with the exception of clumps of dwarf cedars here and there but little is left those plucky people who have remained in the country, notwithstanding the hardships that lead and silver have sustained. Mr. Wood says that as soon as dirt begins to fly on the new road ore will begin to pour from the mines of the old Nevada camps, and that those who have struggled there during the day of hard times will contribute as much to the earnings of the new line as will those of any other country through which it passes. He brings with him samples of ore running very high in silver, copper and gold, and says there is plenty of it.

## OREGON.

### BAKER COUNTY.

The Colorado & Oregon Gold Mining Company of Denver has bought the Don Juan and Dodo mines, Robinsonville district, owned by Kelly Bros. & Allen, for $50,000. The new owners will build a 10-stamp mill.

E. B. Jones of Utah, has bought a gold claim twelve miles from Baker City and two miles north of Pleasant valley. The vein varies from 3½ to 20 feet between walls, with porphyry on the hanging and quartzite on the foot. In the development of the claims a tunnel has been driven into the hill 165 feet, at which point the vein was intercepted at a depth of 180 feet from the surface. Upon this the management upraised to the surface, while crosscuts have been run 150 feet in one direction and 100 feet in another. A winze has been put from the floor of the tunnel to a depth of fifty-seven feet. Jones estimates that there are now 15,000 tons of ore in sight, the value of which ranges from $10 to $16 a ton and that amalgamation has demonstrated that 81 per cent of the values contained in the ore may be saved through it.

W. J. Clarke of Helena, Mont., and J. E. Searles of New York, have bought the Last Chance mine, Cornucopia district for $150,000.

### LANE COUNTY.

The Hammond Manufacturing Co. of Portland has taken a contract to build a 20-stamp gold amalgamating and concentrating mill, with electric power, on the Annie mine in the Bohemia district, Cottage Grove. This is the largest mill contract ever let in Oregon, as the weight of the stamps is 1000 pounds, with all other appliances to correspond. The electric motors are to be run by water taken from a mountain stream four miles distant from the millsite where this plant is to be put in operation. The Hammond Co. built last fall a 10-stamp mill on the same ledge, which is owned by the Champion Co., and which is now about to start up, having been shut down for some time on account of snow. The mill built last fall was taken over a long, steep trail, as illustrated herein. It is expected to start the mill June 20th. P. J. Jennings is the superintendent.

## BRITISH COLUMBIA.

The British Columbia Minister of Mines reports mining development of 1895:

In Alberni 141 mineral claims were recorded; development work is going on in the Mineral Creek group, exposing several veins of free gold, the most noted being the Alberni, Missing Link, Mountain Rose, Champion, Ace of Spades and Last Dollar; average assay about $30 per ton.

Quartz mining in Cariboo district is in statu quo, notwithstanding that there are perhaps as many mineral claims held under record at the present time as at any previous date. Hydraulic mining is now assuming vast proportions in the district, not as carried on in the early days, with the use of canvas hose with a small pipe and monitor, with perhaps a two-inch nozzle and 100 feet of pressure, but upon a more extensive scale, similar to the works in operation at the Cariboo and Horsefly mines. There are now about thirty leases of hydraulic ground held on the Quesnelle river, where two years ago there were but five. River dredging is reported as beginning to assume tangible shape and will begin on both the Fraser and Quesnelle rivers in the spring. Gold has been found in paying quantities on Pine and Summit creeks, about six miles northeast of Barkerville, and several thousand dollars taken out during the season. The report closes with a description of the hydraulic elevator process of working creek diggings. Cassiar and Lillooet have not contributed anything worthy of especial mention.

For East Kootenay the report opens with

the statement that 80 per cent of the output of placer gold has been recovered by Chinamen. After estimating the output of gold, it proceeds: Mineral claims have this year, for the first time, become productive in reality. A large quantity of ore is now awaiting the operating of navigation for shipment to smelters. The demand for means of transportation has resulted in the commencement of two new steamers and the enlargement of a third to ply on the Kootenay river. There has been a large increase in the number of prospectors in the southern part of the district.

For West Kootenay, beginning with the Slocan recording subdivision, a number of the leading properties are specifically mentioned and their development traced through the year. The Slocan Star, Noble Five group, Reco group, Deadman, Goodenough, Last Chance, Payne group, Mountain Chief, Maid of Erin, American Boy, Washington, Surprise, Antoine, Ruby Silver, Alta, Best, Rambler, Dardanelles group, Slocan Boy, R. E. Lee, Mountain Chief No. 2, Ruth, Lucky Jim, Ivanhoe, Ruth, Carnation, Eureka, Richmond, Currie, Alpha, Adams, Bradshaw, Beethoven, Elkhorn, Alamo, Idaho, Cumberland, Sunshine, Yakima, Enterprise and Slocan Queen, Mattawa, Kalispell, Howard Fraction and the Exchange.

The report then proceeds: Ore can now be taken from Sandon and other points and delivered at Pilot Bay for $4 per ton. This rate enables the small producer to get his ore out at a small cost and to receive quick returns.

Prospecting during the year has been principally confined to Springer creek, Lemon creek, and their tributaries. A great number of claims have been staked on red quartz lying in the granite. Upon assays being made this red quartz was found to contain native silver and in several cases gold. Prospectors who have been through to Kootenay inlet, from the foot of Slocan lake, have found a comparatively easy route and estimate the distance across to be twenty two miles. Three hundred records have been made from this part of the Slocan subdivision, one concentrator completed and two are under construction. It is confidently expected that 30,000 tons of ore will be shipped from this subdivision during the year 1896.

In the Ainsworth subdivision development work has been done chiefly in the dry ore belt lying between Whitewater and Jackson creeks, Jackson basin and the White Grouse mountain country. Claims have been tested in the Duncan river, East river and Howser lake sections. From these sources about 2000 tons of ore have been sent to the United States and 200 tons to Pilot Bay.

At Ainsworth proper, since the early part of the year, several mines have been working and shipping ore to Pilot Bay. Among these are the Skyline, Number One, Lady of the Lake, Dillie, Mile Point, Highlander and Canadian Pacific Mining Co., while the Little Phil and Black Diamond have sent out 349 tons to the United States.

The Pilot Bay Smelter works were complete enough to commence the treatment of ores in March last. The first shipment of bullion was made March 16, 1895, and from that date to Dec. 30, 1895, 3220 tons of silver-lead bullion have been shipped.

The Nelson subdivision opens with a description of the Hall Mines' properties. Development work during the year has been chiefly confined to the Silver King mine. The company estimates the amount of ore in sight in the various workings at 120,000 tons. An aerial tramway has been erected from the Silver King mine to the smelter at Nelson, a distance of four and one half miles. This line is supplied with 85 buckets of a combined delivering capacity of 10 tons per hour. At Nelson a one-stack water jacket smelter with a daily capacity of 100 tons has been erected. By this method the ore is concentrated into a matte and, on a basis of reduction of seven tons into one, the matte should have a value of 300 ozs. silver, 45 per cent copper and one-half ounce gold per ton. This refers to the low grade ore at present being transported from the mine dump. The sampling mill is supplied with crushers, rollers and samplers and has a capacity of 100 tons daily. It is the intention of the company to build a roaster in the spring in connection with their works and possibly add another stack. This would more than double the capacity, and enable the company to treat outside ores. The company has expended during the year about $140,000 and 100 men are steadily employed.

Other properties mentioned are the Dandy, Grizzly Bear, Ivanhoe, Iroquois, Starlight, Princess and Fern group. A number of gold locations have been made in the belt lying south of Nelson. Placer work has been chiefly confined to Forty-nine creek. There the Nelson Hydraulic Co. made a cleanup of $4000.

In the Trail Creek subdivision of the report the following items are of interest.

The value of the ore produced in this subdivision in 1894 was about $125,000, in 1895 it exceeded $1,000,000, while in 1896 it is estimated that it will be from $3,000,000 to $5,000,000. The railways operating in the subdivision in 1894 were the Nelson & Fort Sheppard railway and the Columbia and Kootenay railway. Now, at Trail, a narrow gauge railway is in course of construction, for the purpose of connecting that town with the mines at and near Rossland.

The War Eagle and the Center Star Companies have announced their intention of erecting smelters of their own at or near Rossland, which will together have a capacity greatly in excess of that built at Trail. It is almost certain that two more railroads will be built into Rossland during the coming year—the Red Mountain road, from Northport, Wash. (a branch line of the Spokane Falls & Northern), and a branch of the C. P. R. from Robson. About forty miners were employed in the shipping mines of Rossland in the winter of 1894-5. About 500 men are now at work in the same localities. During 1894 no properties were being worked except the Le Roi, War Eagle, Josie, Nickle Plate and O K, all situated within a short distance of the town, except the last named, which is about one and one half miles west. Throughout 1895, and at the present time, dozens of mines are employing men, ten or fifteen of which can ship ore, if they desire. These mines lie in all directions from Rossland, and some of them across the Columbia. Properties outside the immediate vicinity of Rossland are probably employing 200 men at the present time.

Reports of a more or less encouraging nature from the minor districts complete the document.

The output in the various districts is estimated as follows:

| | |
|---|---|
| Trail ... | $ 1,000 |
| Caesar | 22,575 |
| Lardeau .... | 4,000 |
| East Kootenay placer gold | 15,750 |
| East Kootenay silver-lead ore | 255,270 |
| West Kootenay ore and placer gold | 25,000 |
| West Kootenay gold, silver, lead, copper ore | 2,475,000 |
| Yale placer gold ... | 48,148 |
| Osoyoos, placer gold .. .. | 12,500 |
| Total output ..... | $2,907,221 |

### IDAHO.

At Burke the Peorman-Tiger has rigged up one of the boilers of the burned Peorman mill and is using it to help run the pumps.

At Gem the recent increase in water has given the Gem ample power to run its hoist, and it is again working a full force of 125 men. The Frisco is also running full blast.

The new flume taking water out of Canyon creek, midway between Burke and Wallace, for the Standard mill, is being pushed to completion. The water will be used to run a dynamo and the power thus generated used to run the drills in the Standard tunnel and in such other ways as may be profitable.

The Florida Mountain Mining Company of Pittsburg, Pa., will erect a twenty-stamp mill at Boundville this spring. W. H. Dewey is the manager.

### UTAH.

The *Tribune* says there has never been a period in the history of the Ontario Mining Co. when its ground was more productive. During eight days in the present month the mine produced 46,430 fine ounces of silver, and to-day exposes larger ore bodies than at any time in its history.

The Daly Mining Co. is making a very pretty record the present month, the bullion record for ten days showing 38,053 fine ounces silver, while the output continues steady. It is estimated that in the treasury at the present time is nearly $400,000, the last statement made by Supt. R. C. Chambers showing cash and product that has since been settled for amounting to $330,000.

The *Tribune* says: W. Quigley, who, with his associates, has put nearly $60,000 in a Chicago plant for the handling of Utah pumice stone, has closed a contract for the entire output of the deposits in Millard county for the next year. He reports the plant in Chicago now complete. It is 345 feet in length and from two to four stories in height, and has a capacity for handling from 10,000 to 12,000 tons of stone a year. Its mechanical features are perfect, a dryer having been put in at an expense of nearly $7000, while the whole has a capacity for turning out the stone in eight different grades. A sawing plant has also been erected, through which the rock is converted into bricks of all sizes, and which are in use for scouring purposes. With these it is proposed by the company to do away with the imported article, in which Mr. Quigley says there is not an atom of pumice, and the industry promises to become one of the most important in America. The imported article now sells at the rate of 6 cents a pound, wholesale rates; the powdered at 1¼ cents, and the material in brick form at 6 cents a pound. In the contract with the owners of the deposit it is agreed that they keep at all times 100 tons in readiness and that they will be prepared to deliver that amount on demand.

(There are pumice stone deposits in Shasta, Modoc and Sonoma counties, this State, but the lack of transportation facilities and commercial demand has so far kept them from being worked.)

### MONTANA.

*Inter-Mountain*: A Boston authority claims that the Boston & Montana will this year pay $8 per share in dividends and carry a million to the surplus account. It should be understood that the management of the Boston & Montana and of the Butte & Boston has always been entirely different. The former is now quoted at $80 and the latter at $2. It is the general belief in Butte that the Butte & Boston has some fine properties which the receivers will successfully open. It was the management, and not the mines, that caused the collapse.

### SOUTH DAKOTA.

DEADWOOD-TERRA RESULTS.—The Deadwood *Times* says that since work was resumed on the Deadwood-Terra mine a year and a half ago, the 160-stamp mill on the property has treated 500 tons of ore per day of an average value of $1.78 gold per ton, at a profit of $6000 per month, the entire cost of mining and milling the ore being $1.38 per ton. The last report of the Homestake Company on their other properties gives the average value of ore at $4.68 per ton and the cost of treatment at $2.68. The Deadwood-Terra was for a long time shut down, as the mine did not pay expenses, and when work was resumed the miners agreed to work for $3 per day, while other properties pay $3.50.

Black Hills *Times*: At the Deadwood-Terra M. Co., since work was resumed in the mine about a year and a half ago, after a long shutdown, the mill (160 stamps) owned by the company has treated on an average 500 tons of ore per day, the average value being $1.78 gold per ton, yet out of this low-grade material a profit of $6000 per month has been made and put aside for dead work. The last report of the Homestake Company, June, 1895, shows the average value of the ore treated for the preceding year to have been $4.68 per ton, while the cost of reducing it was $2.68 per ton. Owing to the low grade of ore in the Deadwood Terra, the men now at work in it agreed to a reduction of 50 cents per day in order that the mine and mill could resume and continue in operation. The cost of milling ores here in the Black Hills ranges from 40 to 75 cents per ton. A twenty stamp mill can treat ores at from 40 to 60 cents at the former rate where a water right is owned by the milling company, and at the higher rate where the necessary water has to be purchased.

### WYOMING.

At Green River the Green River Fuel Company is boring for oil as reported to have struck at a depth of 620 feet a most pure sodium carbonate. The value of this carbonate is not less than $25 per ton, as it crystallizes by natural evaporation.

A local paper says excitement over the discovery of tin ore in the Big Horn mountains, near Sheridan, continues. "Assays show an average return of twenty four pounds of pure tin to the ton. Manager Holdredge of the Burlington Railway has interested himself in the discovery to the extent of employing an expert mineralogist to make a report on the property. Upon this report will depend the erection of mammoth reduction works at or near the mines. The ore exists in immense quantities. The vein is perfectly defined, and is from 60 to 75 feet in width between granite walls and extends for a distance of four miles."

The Green River *Star* says notices of location covering thirty-two mineral claims about Green River have been filed. C. F. Davis, a Union Pacific civil engineer, is among the locators. Over 5000 acres of mineral land have now been filed upon in that vicinity.

### COLORADO.

*Mining Industry and Review*: The Colorado and Philadelphia Reduction Company has formed and $350,000 subscribed for the purpose of building 250-ton reduction works at Colorado City, between Colorado Springs and Manitou. The directors of the company are Charles L. Tutt, Spencer, Penrose, C. M. McNeill, George W. Pierce, of Denver, and Wendell B. Bowman, of Philadelphia. Mr. Pierce is heavily interested in the Golden Fleece mine. Messrs. Tutt and Penrose are heavily interested in Cripple Creek and are at the head of the Cripple Creek sampler, and Mr. McNeill is a practical millman and is interested in the Victor samplers. It is proposed to begin work immediately with the expectation of completing the plant within five months. The process to be used is chlorination.

The Lamartine tunnel, constructed to drain the Lamartine mine, which has produced over $3,000,000, was finished March 28. The tunnel is nearly a mile long and cost $60,0000.

### NEW MEXICO.

The Silver City Smelting and Refining Company is incorporated; Geo. S. Cartwright, secretary and treasurer; S. E. Bretherton, general manager.

Las Vegas *Optic*: The Washington mine, in the Cochiti mining district, has nine cars of high-grade ore on the track and will ship this week to smelters. Some of this ore runs as high as $500 per ton, mostly gold. The Albemarles mine, Cochiti district, has two cars on track to ship to smelters, also. These two mines will be steady producers now and will ship from six to ten cars per week. There is a rich strike in the Santa Rosa, in Peralta canyon, of ore carrying gold, silver, copper and lead, assaying over $400 per ton. Other strikes are constantly being made of from $10 to $40 ore, all over the district.

### ARIZONA.

Mr. Davies, a Chicago capitalist, has bought the Silver Trial mine, in the Hassayampa district, Ariz., the ore from which is said to mill $75 per ton. The mine has been worked at intervals for a long time and is developed by about 1000 feet of work. The new owner will have a road built to the mine, erect a ten-stamp mill and make the property a producer.

### WEST AUSTRALIA.

Several California papers are giving constant insertion to an advertisement telling California miners how they can quickest get to Coolgardie. Chas. Taylor, a Montana miner, writes from the Broad Arrow district: "Of all the God-forsaken places, this is the worst, although without doubt it is going to be the greatest gold-producing district in the world, when a good railroad is built to haul the ores to the sea. The place is simply a howling desert as yet; water sells for 25 cents a gallon, and every drop of it is condensed. It costs me $5 a day for my horse in water alone. Living is very high; eggs 25 cents each, potatoes 30 cents a pound, and nothing but canned meats to live on. Freight from the present terminus of the railroad (seventy miles) is $175 per ton. Water at the terminus for the freight horses and camels has to be hauled 300 miles on the cars, and when I passed there over 1000 horses and 500 camels were waiting for a drink; some of the horses did not have a drop for three days, and were dying by the score on account of hot weather and no water. The thermometer averaged from 100° to 117° in the shade for the first ten days I was here, and the dust was simply frightful; for forty miles we could not see the leaders on the coach, and now I almost wish I was back again in Butte. I have a lot of traveling around to do, so I have a good chance to see the different mines, and there are some splendid ones, but they cannot do any crushing on account of no water. The Hill-End mine, adjoining one of the properties I am in charge of, has two 3-stamp prospecting mills, crushing three tons a day, paying $525 in gold. Their water costs them $6000 a month. Another mine—The Great Boulder—running five stamps averages $125 through eight feet of ore. The only solution will be a good railroad, as there is no fuel nor mining timber and absolutely no water. I am going out to look at a copper property, seven feet wide, 60 per cent copper and two ounces gold per ton."

### NEW SOUTH WALES.

Sydney authorities have a practical way of dealing with their unemployed. They give a railway pass and a miner's right of credit to each suitable applicant, which enables him to proceed to one of the gold fields owned by the county government, where he may have a chance of earning his living by "fossicking." The number of passes issued in 1894 was 9,572, and since the inauguration of this scheme the quantity of gold obtained in the colony has risen from 179,288 ounces in 1893 to 324,787 ounces in 1894.

### SOUTH AFRICA.

South African *Mining Journal*: Managers report that natives are becoming less efficient in the mines, the amount of work done per man being less now than it was a few months ago. In one case it is found that 900 boys are now required to perform the work for which 600 were formerly sufficient, and the complaint is general that this is not an uncommon case. It is stated that one of the chief causes why the boys have deteriorated is the neglect of the white overseers to properly supervise the gangs under their care, causing the boys to become careless and lazy. This want of supervision is partly due to the disturbing effects of recent events, which have to a certain extent demoralized the white labor, and the native has taken advantage of this to limit the amount of work done by him. Many instances have occurred recently of neglect of duty by white miners, and in one or two mines managers are casting about for new methods which will make them less dependent upon the supervision of the latter. It has often been pointed out that the white refuses to work in South Africa, and the men upon whom the actual work of superintendence falls are no exception to this rule, but very frequently shirk their work.

## Additions to the State Mineral Collection.

The following are some of the recent additions to the mineral collection of the State Mining Bureau:

Opal.—Douglas county, Washington. M. Braverman.

Green Muscovite crystals.—Lincoln county, North Carolina. M. Braverman.

Aragonite (onyx marble).—Lake county, near Zem Zem, in Napa county, California. Mr. Gilbert.

Feldspar crystals.—Nye county, Nevada. Hon. A. T. Hatch.

Marbles.—Six polished specimens from the Walker river quarries, Mono county, California. E. W. Lindsey.

Granite, occurring in thin slabs, coated on one side with molybdenite, and on the other side with chalcopyrite and bornite.—Skykomish, Washington. M. S. Davis, per G. F. Davidson, C. E.

Talc, showing free gold.—Red Point mine, Washington district, Nevada county, California. Wm. Yeaw.

Very large Indian stone pestle—Susanville, Lassen county, California. T. B. Sanders.

White talc, thought to be suitable for industrial purposes.—Perris, Riverside county, California. Frank Mott.

Native sulphur.—Geysers, Sonoma county, California. J. Z Davis.

And sundry other specimens, ores, etc.

HENRY S. DURDEN, Curator.

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING MARCH 24, 1896.

556,859.—CAN-WIPING MACHINE—A. Corruti, S. F.
556,961.—FIRE ESCAPE—G. W. Cleveland, Little Rock, Wash.
556,974.—WINCH—H. Ekrem, San Pedro, Cal.
556,741.—REFRIGERATOR—J. V. Frost, Los Angeles, Cal.
556,816.—BINDER—E. S. Glover, S. F.
556,982.—FLY CAGE—D. K. Howe, Portland, Or.
556,826.—FRUIT-DIPPING APPARATUS—Lynam & Russell, San Jose, Cal.
557,080.—CULTIVATOR—A. J. Morley, Chula Vista, Cal.
557,028.—CAN CRIMPER—H. Schaake, S. F.
557,029.—CAN DRIER—H. Schaake, S. F.
556,778.—HORSESHOEING STALL—J. E. Schneider, Lancaster, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Washington State Incorporations.

The following companies incorporated in the State of Washington last week:

Macrina Mining and Milling Company, Ellensburg; capital, $250,000; W. Lewis, C. H. Flummerfelt, G. A. Swain, trustees.

Aragon Gold Mining Company, Spokane; capital, $500,000; G. Turner, A. Brown, A. L. Davis, C. H. Wolf, F. L. Williams.

Wheeler Company; general mining business; Seattle; E. K. Davis, R. M. Davis.

Gray's Harbor and Northern Railroad Company; capital, $50,000; Hoquiam; G. H. Emerson, H. C. Herman and C. A. Congdon.

The '95 Mining Company, Everett; capital, $200,000; S. Vestal, J. McRae, P. Ligne.

MR. HIRAM S. MAXIM has consented to write a series of important illustrated articles on the evolution and manufacture of automatic firing guns, the first of which appears in the current issue of *Industries and Iron*.

## Coast Industrial Notes.

—Redwood lumber dealers have organized and advanced the price $1 per M.

—The total southern California orange crop is 3,200,000 boxes, of which 2,400,000 boxes have been shipped.

—James Touhey has a $60,000 contract for paving the streets around the Capitol building at Sacramento.

—A company is organizing at Kingman, Arizona, to build electric lines to the mining camps in that vicinity.

—The San Francisco Terminal Company proposes a cantilever steel bridge built between San Francisco and Oakland.

—The British Columbia salmon pack last year was 566,395 cases—72,024 more than in 1894; 22,834 less than in 1895.

—At Mare Island two twenty-eight-foot steam cutters are building for gunboats 14 and 15, being built at the Union Iron Works.

—The electric line from Los Angeles to Santa Monica was formally opened last Thursday. It is an extension of the Pasadena road.

—Dogs are at a premium in western Washington by reason of the Alaska demand. A good sized canine of any breed is now worth $20 in Seattle.

—From St. Helena a wine sale is reported of 200,000 gallons to C. Schilling & Co. of San Francisco, at 20 cents per gallon, the highest price obtained for years.

—It is about decided that the stone for the Union depot building at the foot of Market street, this city, will be from the Sites quarry, Colusa county, Cal.

—Nearly sixty miles of the San Joaquin Valley road are now in operation. Track is being laid southward toward the Merced river at the rate of two miles a day.

—The Seattle, Lake Shore and Eastern Railroad will be sold under foreclosure proceedings on May 26th by Chancellor Eben Smith at Seattle, Wash. There is an indebtedness of $6,000,000 against the road, which is 227 miles in length.

—The Market-Street Railway Company of this city declared a 60-cent dividend for the three months ending March 31st, being about 5 per cent on the present value of the stock—$47 a share. The number of shares on which this dividend is paid is over 180,000.

—The new board of directors of the Manufacturers' and Producers' Association met last Tuesday and discussed the proposed autumn exposition of home products. It is thought some mutual arrangement can be effected with the directors of the Mechanics' Institute.

—The Navy Department has set May 10th as the date, and the Santa Barbara channel as the place, for the official trial of the battleship Oregon. The vessel will be required to make fifteen knots. For every quarter of a knot over that rate the Union Iron Works will get a premium of $25,000.

—The Northern Pacific Railroad will do more sluicing along the main line in the Cascades, Washington, this season than ever before, and seven bridges between Easton and Weston will be filled beneath. These bridges run from 50 to 80 feet in height, and are 400 to 500 feet in length. Work will begin the middle of April and continue as long as water for sluicing is obtainable in the mountains.

—The Southern Pacific Railroad Company is reported to be preparing to ask a rehearing before the United States Supreme Court in the suit in which the right of the State of California to tax the franchises of the Southern and Central Pacific roads was last week affirmed. The effect of the decision was to compel these two roads to pay to the State in taxes for the year 1887 the sum of $750,000.

—Patents were granted last Tuesday to George Armstrong, San Francisco, mold for pipe covering; Martin P. Boss, San Francisco, boiler; Charles A. Conger, San Francisco, buckle; John F. Daly and W. L. Corson, San Francisco, gas engine; Henry P. Holland, Oakland, ore crushing mill; Leitz Adolph, San Francisco, mathematical instrument; August H. Scherholz, San Francisco, air valve for water pipes; Benjamin E. Stevenson, Redding, wagon jack; Henry S. Wood and R. S. Perry, San Francisco, dredging apparatus.

—The terms upon which an American company will be permitted to land a cable on the Hawaiian islands are embodied in an act passed by the Hawaiian Legislature last August. Upon application from Col. X. Z. C. Spaulding, the Hawaiian Legislature offered to let him land a cable on any of the islands and in addition give him a subsidy of $40,000 a year, providing he should obtain an equal subsidy from the United States Government. Other minor stipulations were mentioned, including a certain number of Government messages which should be transmitted without cost. Under the terms by which the United States Government obtained the use of Pearl harbor as a coaling station, it is said that this Government has a right to land a cable at that point.

—A Nevada stockman who has been experimenting, says beef cattle driven twenty-five miles without water will shrink fifty pounds per bullock, allowing feed and drink at the end of the journey before weighing. A bullock driven five miles and allowed to stand two hours without feed or water will not shrink any. A bullock driven fifty miles and allowed to drink frequently during the drive will shrink twenty pounds. A bullock driven twenty-five miles and allowed to drink frequently during the drive will not show shrinkage, if allowed to eat and drink for three hours at the end of a drive. A bunch of 600-pound bullocks driven fifty miles with care and allowed to drink frequently on the drive and at the end allowed to eat and drink for six hours, showed fifteen pounds shrinkage to the animal.

—The International Pacific Railway Company has incorporated at Topeka, Kansas, to construct a railway from Guaymas, on the Gulf of California, in Sonora, Mexico, northeast 115 miles, to Barranca. The road will be tributary to the mines in Sonora and Chihuahua, which it proposes to develop. The charter also provides for building a line north to the boundary line of Mexico and the United States at Bisbee, Arizona, and on to a connection with the Atchison and Southern Pacific at or west of Deming, N. M. The mines in the Sierra Madre mountains are rich, but are inaccessible, and little is known of them. The famous "Boss Shepherd" mine is in the district. H. T. Richards, who is one of the promoters of the enterprise, was formerly assistant general manager of the Sonora railway, a branch of the Atchison system, for several years and is personally familiar with the resources of Sonora.

## Personal.

DR. SCHIEDEL is at present sojourning in Coromandel, N. Z.

F. H. LE BONTE will superintend development work at the Bell group, Sunny Hill, Shasta Co.

GEN'L MANAGER HILL of the Mountain Mines, Limited, Shasta Co., is visiting the Butte smelters.

A. J. SHOEMAKER succeeds H. A. Kellar this week as superintendent of the Parrott, Montana, smelter.

SUPT. F. BRIGHTMAN of the Gladstone, French Gulch, Shasta Co., expects to shortly resume operations there.

JNO. HAYS HAMMOND has been permitted to leave the Transvaal on account of his health. His bail was increased to £20,000, and he is at Capetown. The other arrested members of the committee are still under guard at Pretoria.

MILTON B. CASE, who claimed to be the owner of a one-third interest in the Comstock, Virginia City, Nev., died at Grand Junction, Colo., last Friday. He claimed that Comstock sold him half of the claim which afterward made several millionaires for $700. Later Mackay was given a third interest for $15. Case lost his portion of the property before its great value was established.

## Commercial Paragraphs.

E. A. BROOKE RIDLEY, 10 Front street, agent Siemens & Haiske Electric Co., has a rotary electric drill that is claimed to successfully meet the objections heretofore urged against drills of this class. A flexible shaft is applied, which, with an automatic feed arrangement, gives increased efficiency.

GEO. E. AMES of the Union Iron Works has returned from Butte, Mont., where he contracted with the Anaconda Copper Mining Co. to supply them with two hoisting engines, thirty-two inches diameter of cylinder, seventy-two-inch stroke, steam-jacketed, automatic cut-off, clutched brakes, and reversing gear actuated by steam, overwinding preventive, including the latest improvements. The shipping weight will be about four hundred thousand pounds.

THE Chicago *Journal of Commerce* says: "Robert W. Hunt & Co., 1137 the Rookery, Chicago, are inspecting the construction of 150 cars at the works of the Ensign Manufacturing Company, Huntington, W. Va., for the San Francisco & San Joaquin Valley Railroad Company."

## Literary Note.

The General of the Army, the General commanding the U. S. Corps of Engineers, Vice-Pres. Webb of the New York Central and John Jacob Astor compose *The Cosmopolitan Magazine's* Board of Judges to decide the merits of the horseless carriages which will be entered in the May trials, for which *The Cosmopolitan* offers $3000 in prizes. This committee is undoubtedly the most distinguished that has ever consented to act upon the occasion of the trial of a new and useful invention. The interest which these gentlemen have shown in accepting places upon the committee is indicative of the importance of the subject and that the contest itself will be watched with marked interest on both sides of the Atlantic.

## Recent Mining Dividends.

THE Ontario, Utah, mine paid a 10c per share dividend, aggregating $15,000, on the 31st ult.

THE Morning Star Mining Company, Colfax, declared a dividend, No. 64, of $4 per share on the 30th ult.

THE Napa Con. Quicksilver Mining Co. paid a quarterly dividend of 10c per share, or $10,000, last Monday.

## Recent Mining Incorporations.

Savannah Mining Company, San Francisco; directors, L. H. Sharp, I. R. Hall, A. E. Bolton, C. L. Hovey, R. H. McGowan; capital stock, $500,000.

### A Change of Name.

The name of the *Pacific Coast Bullion*, published in Los Angeles, Cal., has been changed to *The Mining and Metallurgical Journal*, the proprietor's reason for changing the name being that the old name never fully conveyed the proper idea of the subjects treated or the territory covered.





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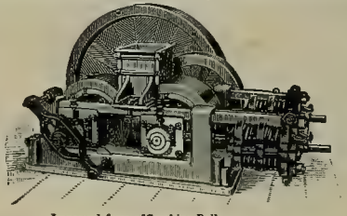
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Have you ever heard of a Double Pipe Air Compressor? It has one disadvantage. It needs twice as much piping as is needed with the ordinary makes of Air Compressors. On the other hand, it has more real, genuine advantages than you can shake a stick at. It will do the same work as the ordinary Air Compressors, such as are in general use throughout the mines on this coast, on 30 per cent less power. We will guarantee this and prove it to your satisfaction, else you need not pay for the Compressor. It weighs less than half as much as the ordinary Air Compressor. It costs less for freights and is more easily carried up into the hills. It shows the same high efficiency at all altitudes, high or low. It takes no more fuel to do the work if located on the highest peak of the Sierras than it would take if located at the sea level. It enables you to buy a smaller boiler than you can use with any other Air Compressor to do your work. It does not overheat the air at the Compressor and freeze it at the rock drill. In short, it is the ideal Air Compressor. It has been tried in practice, and we can show you the highest recommendations and endorsements. We sell it on a strict, positive, iron-clad guarantee. If your power costs you anything, you want the Double Pipe Air Compressor, because you can buy it on a guarantee that it will run on 30 per cent less power than any other make of Compressor. If you have to take a Compressor to your mine over bad roads, you want the Double Pipe Air Compressor, because it weighs less than half as much as any other Compressor. It is cheapest to buy, cheapest to run, cheapest to transport, cheapest to carry anywheres. For pumping it beats the world. You can run it with steam or water.

Write to the Pneumatic Power Co. for further information. If you are in the city and want a compressor, call and see them. They will show you the Double Pipe Air Compressor in operation. Remember you run no risk. We claim wonders, but we have to perform wonders in Air Compression, or else you don't have to pay for the machine. We are ready. Are you?

Pneumatic Power Co., 306 Pine St., Room 10, San Francisco, Cal.



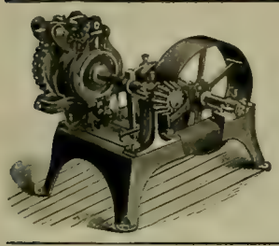
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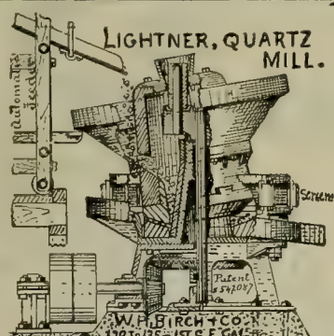
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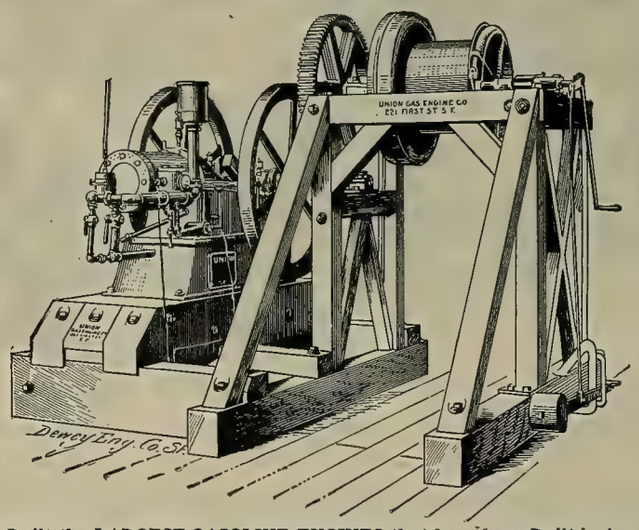
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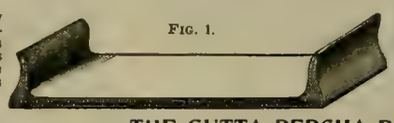
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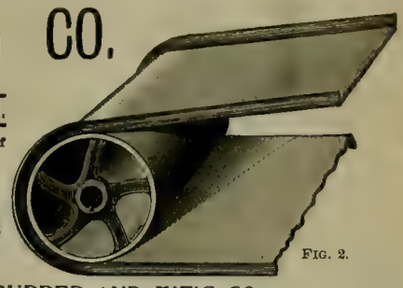
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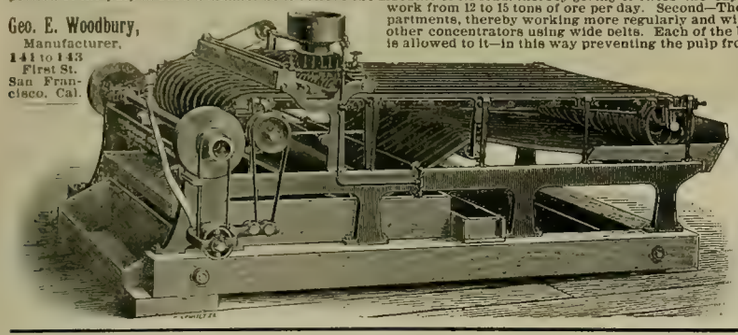
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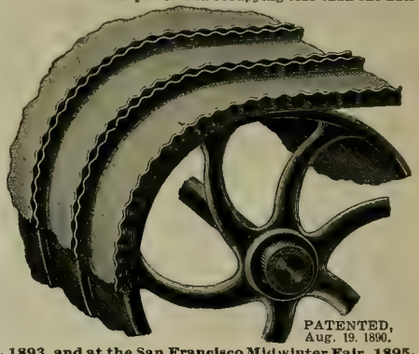
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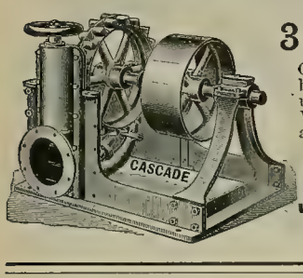
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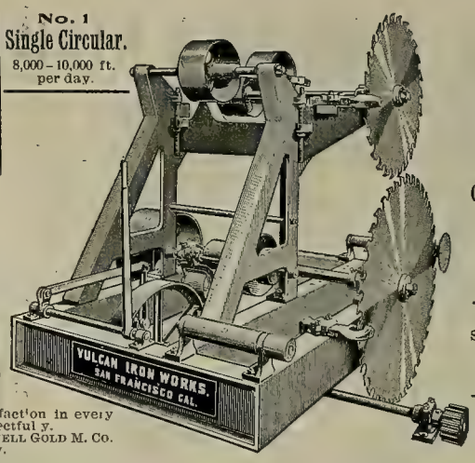
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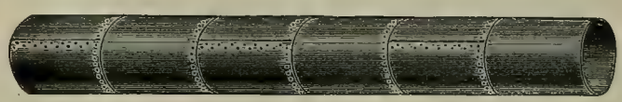
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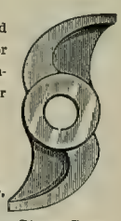

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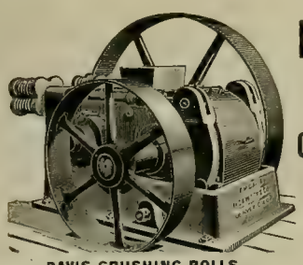
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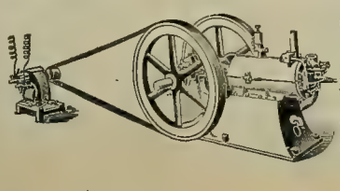
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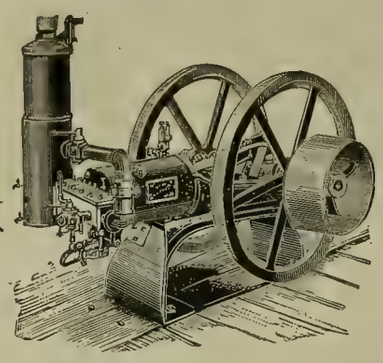
Used for making Electric Light or furnishing power for any purpose required. Specially adapted for electric light in private enterprises. The latest great invention of this progressive age. Built in from 2 to 50 horse power. Stationary or portable. Is the simplest power on the market. A dwarf in size, a Samson in strength. Costs but little to run it. Has no equal for even speed and durability. Send for catalogue.

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# THE "DANIEL BEST" CRUDE OIL ENGINE

FOR POWER.

THIS IS WHAT THEY CAN DO:

**Will furnish power for one-tenth of a cent per horse power per hour. It is the cheapest power ever produced, as shown in the following table, and which is based upon a test of ten hours' run with one of our five-horse power Gasoline Engines,** using gasoline (74°), coal gas, common domestic coal oil, crude petroleum, asphaltum base, crude petroleum, paraffine base, as follows:

| | |
|---|---|
| Coal Gas, ten hours' run, 1000 feet | $2 00 |
| Gasoline (74 deg.), ten hours' run, 8¾ gallons @ 14c. | 1 25 |
| Coal Oil, ten hours' run, 7½ gallons @ 10c | 75 |
| Crude Petroleum, asphaltum base, 16 gallons @ 3c | 48 |
| Crude Petroleum (36 deg.), paraffin base, 13 gallons @ 5c | 65 |

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon—21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ⅛c per horse power per hour; on domestic coal oil, 1⅛c per horse power per hour; and on gasoline, 2½c per horse power per hour.

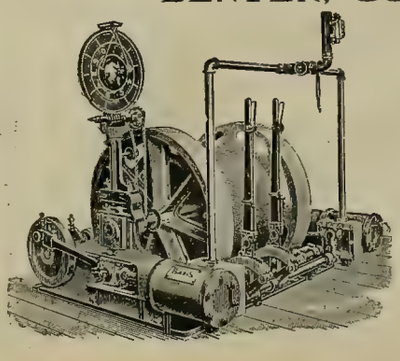
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THE BEST M'F'G CO.,

San Leandro, Cal.

# Hendrie & Bolthoff Mfg. Co.,

DENVER, COLORADO.



LATEST IMPROVED

Patent Friction Hoisting ENGINES,

— WITH —

Automatic Alarm Bell and Indicator.

IMPROVED GOLD STAMP MILLS.

General Mining Machinery and Supplies.

# Market Reports.

## The Markets.

SAN FRANCISCO, April 2, 1896.

The general situation has been further improved by a general rainfall in this State, with the heaviest precipitation in the southern part of the State, where it was needed the most. General trade continues good with the mining districts, but only fair in the agricultural sections on the coast. With continued favorable crop weather, it is only reasonable to assert that the call for goods and harvest machinery will show a steady enlargement and aggregate larger in volume than for two years past. The banks report for the month of March less business in their lines than has ruled in that month for several years past. This has been largely due to the very light movements of produce to the East, uncertainty regarding crop prospects and a lessened trading in speculative channels. At this writing they speak very hopefully of the future. They seem to be encouraged by a continued increase in the gold output, with a steady increase in the interest of gold mining, and the outlook favorable for a good outturn of wheat and better average prices than for two years past. From all we can learn they are relaxing somewhat from their antipathy to putting out funds except on gilt-edge security, and when this disposition becomes more pronounced a much better condition of affairs will set in. At the East the money stringency is relaxing owing to the action of the Government in affording relief to the banks in the Central States.

In this city there is a continued good inquiry for gold mines, and the better class of mining experts and said to be busy reporting on the many propositions on the market. As a rule the mines offered are not sufficiently developed to encourage buying. That the gold mining industry on this coast is steadily increasing can be seen by the following refined bullion returns of the Selby Smelting & Lead Co. which handles the most of the bullion sent to this city. In 1893 the returns aggregated $13,841,634.64, in 1894, $13,890,827.32 and last year $16,309,637. The gain in 1895 was nearly 20 per cent over 1894. It is expected that 1896 will show a good increase over that of 1895.

**New York Silver Prices.**

NEW YORK, April 2.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | 31⅛ | 68 | 10 75 | 3 12½ |
| Saturday | 31⅛ | 68⅛ | 10 75 | 3 12½ |
| Monday | 31¼ | 68⅜ | 10 75 | 3 12½ |
| Tuesday | 31¼ | 68⅜ | 10 62½ | 3 10 |
| Wednesday | 31⅛ | 68⅛ | 10 62½ | 3 10 |
| Thursday | 31⅛ | 68 | 10 62½ | 3 10 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.88 |
| London Merchants | $4.86 |
| London Sight Bankers | $4.89 |
| Refined Silver, per oz., 1000 fine | 68½c |
| Mexican Dollars | 55@56c |

SILVER.—Fluctuations the past week have been small, closing to-day lower at New York. In our market the demand is light and confined almost entirely to China and Japan. These two countries' requirements seem to be light for the time being. India has been the principal buyer so far this year, but her wants are chiefly met at the East and in London. The movements in silver bullion at this port for the past three years can be largely gauged by the returns of refined silver bullion by the Selby Smelting and Lead Co. of this city. They compare in ounces as follows: 1893, 6,377,311.25; 1894, 7,990,602.85; 1895, 9,488,460. So far this year the outturn by that company has been light, owing to a light demand for the bullion in this city. When this takes place, the bullion shipments go eastward and not to this city.

MEXICAN DOLLARS.—The market is unchanged. The demand is light at from 55 to 56 cents. The latter price is only obtained for small quantities by brokers.

COPPER.—In our market prices are not quoted lower, but it is understood that a slight shading can be secured by the larger buyers. Our Eastern advices state that the market under bear selling and increased receipts, in the absence of liberal consumption buying, has been receding. It is expected that an improved demand will set in soon, as the large quantities taken by Europe go into consumption. The consumption abroad and also in this country is not only very heavy, but seems to be increasing, particularly in Europe.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

LEAD.—The market is easier but no lower. At the East prices have declined under fair offerings and a lighter demand. The inclement weather there is against corroders; with better weather they will take more pig lead.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—The demand is fair for all sizes. The market is quoted as follows:

| | | | |
|---|---|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and larger sizes, | " | " | 1 65 |
| Buck, Balls and Chilled, do, | " | " | 1 65 |

QUICKSILVER.—The market is lower. There is a fair demand. The exports from this city for the first three months of the year compare as follows: 1894, 8,186 flasks; 1895, 5,222, and 1896, 12,701.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| West Coast of Mexico, for Export | 34 00 |

BORAX.—The market is firm at quotations. The shipments for the first three months of the year compare as follows, in pounds: 1894, 2,824,455; 1895, 1,462,861; 1896, 3,597,093. In the latter the railroad shipment for March is not included; it will aggregate over one million pounds.

The market is quoted as follows:

| | |
|---|---|
| Refined, in car lots | 6½ |
| Refined, in sacks | 5⅝ |
| Powdered, in car lots | 6⅛ |
| Concentrated, " | 5⅝ |

TIN.—The market is unchanged. The demand for all kinds is reported slow. At the East the tone is reported steady to firm for pig.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

ANTIMONY.—Our market is reported steady at 9c. The New York market is quoted as follows: Cookson's, 7⅞@8c; Hallett's, 6⅞c; Japanese, 6¾c.

COAL.—The market is reported easy for most kinds. If coal miners at Newcastle, N. S. W., strike it will delay shipments from that port and have an influence on our market. The output of the coast collieries is said to be about the same it was in 1895. The registered tonnage on the way from and loading at Australian ports aggregates 16,434 tons.

SPOT FROM YARD—PER TON.

| | | | |
|---|---|---|---|
| Wellington | $7 50 | @ | 8 00 |
| Greta | 6 00 | @ | 6 50 |
| Nanaimo | 6 50 | @ | 7 00 |
| Gilman | 5 50 | @ | 6 00 |
| Seattle | 5 00 | @ | 5 50 |
| Coos Bay | — | @ | 4 50 |
| Cannel | — | @ | 8 00 |
| Egg, hard | — | @ | 13 00 |
| Wallsend | — | @ | 6 50 |
| Scotch Splint | — | @ | 7 50 |
| Brymbo | — | @ | 7 50 |

TO ARRIVE—CARGO LOTS.

| | | | |
|---|---|---|---|
| Australian | 5 25 | | |
| Liverpool Steam | 5 25 | | |
| Scotch Splint | — | | |
| Cardiff | 6 25 | | |
| Lehigh Lump | 9 00 | | |
| Cumberland | 13 50 | | |
| Egg, hard | 10 00 | | |
| West Hartley | 6 50 | | |

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — | | — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — | @ | 8 50 |
| " in sacks | — | @ | 9 50 |
| Cumberland | — | @ | — |

LUMBER.—Redwood millmen have formed an organization and talk of advancing prices.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 16 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

NAILS.—The expected advance of 25 cents will, it is now said, take place on May 1st.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Wire, carloads, basis per keg | | | $3 07½ |
| " jobbing, " " | | | 3 20 |
| Cut, carloads, " " | | | 2 82½ |
| " jobbing, " " | | | 2 95 |

IRON.—Eastern advices point to firmer prices. Japan has taken 26,000 tons of rails, while England is an active buyer of scrap and other old material from sections which have heretofore sent to Philadelphia. The Philadelphia *Ledger* reports as follows: Export business has been active of late. Locomotives have gone to Russia, rails to Japan, rolley cars to South Africa, and bridge work to Central and South America. The increased activity in British and continental iron markets will have a tendency to bring additional business to this country.

## San Francisco Stock Board Sales.

SAN FRANCISCO, April 2, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 400 Andes | 32 | 200 Hale & Norcross | 1 15 |
| 450 Belcher | 23 | 300 Occidental | 86 |
| 100 Best & Belcher | 62 | 300 Sierra Nevada | 66 |
| 200 Chollar | 45 | 200 Union Con | 63 |
| 250 C. C. & Va | 1 65 | 500 Utah | 09 |
| 800 Crown Point | 42 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 100 Mexican | 50 | 300 Belcher | 21 |
| 200 Gould & Curry | 27 | 100 Sierra Nevada | 65 |
| 100 | 27 | 300 Utah | 08 |
| 100 Best & Belcher | 61 | 100 Occidental | 88 |
| 60 Con Cal & Va | 1 60 | 600 Overman | 13 |
| 100 Potosi | 39 | 150 Union | 61 |
| 1200 Crown Point | 38 | 100 Bulwer | 35 |
| 300 Yellow Jacket | 35 | 100 | 36 |
| 50 | 36 | | |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., April 1, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| CALIFORNIA STATIONS. | Total Rainfall for the Week | Total Seasonal Rainfall to Date | Total Seasonal Rainfall Last Year to Same Date | Average Seasonal Rainfall to Date | Maximum Temperature for the Week | Minimum Temperature for the Week |
|---|---|---|---|---|---|---|
| Eureka | 2.06 | 35.97 | 37.74 | 25.46 | 58 | 32 |
| Red Bluff | .70 | 16.59 | 27.72 | 21.58 | 70 | 38 |
| Sacramento | 1.02 | * | 22.74 | 13.60 | * | 42 |
| San Franc'co | .26 | 15.37 | 23.86 | 20.70 | 64 | 48 |
| Fresno | .44 | 5.37 | 13.16 | 8.11 | 78 | 36 |
| S. L. Obispo | .70 | 15.41 | 24.90 | * | 74 | 36 |
| Los Angeles | ..... | 8.88 | 15.45 | 16.04 | 80 | 44 |
| San Diego | ..... | 5.68 | 11.90 | 5.54 | 80 | 50 |
| Yuma | ..... | .88 | 3.01 | 2.96 | 98 | 48 |

* Indicates no record.

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied. | Delin'q't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Belcher S M Co, Nev | 52 | 25c | Mar 3 | Apr 7..Apr 28 | C L Perkins, Mills Building |
| Bodie Con M Co, Cal | 19 | 15c | Mar 7 | Apr 4.....May 4 | M E Willis, 309 Montgomery |
| Bullion M Co, Nev | 47 | 10c | Mar 18 | Apr 22..May 14 | R R Grayson, 331 Pine |
| Caledonia S M Co, Nev | 46 | 5c | Apr 1 | May 6..May 27 | A S Groth, 414 California |
| Challenge Con M Co, Nev | 21 | 5c | Mar 27 | Apr 29..May 20 | C L McCoy, Mills Building |
| Con Cal & Va M Co, Nev | 6 | 30c | Mar 4 | Apr 8..Apr 28 | A W Havens, 309 Montgomery |
| Crown Point G & S M Co, Nv | 67 | 20c | Apr 2 | May 6..May 26 | J Newlands, Mills Building |
| Gold Bar Con M Co, Cal | 3 | 5c | Feb 10 | Mar 19..Apr 10 | E C Godfrey, 38 Crocker Building |
| Gould & Curry S M Co, Nev | 78 | 15c | Mar 25 | Apr 28..May 20 | A K Durbrow, 309 Montgomery |
| Lady Emma M Co, Cal | 1 | 15c | Feb 26 | Apr 6..Apr 27 | W W Boughton, Mills Building |
| Occidental Con M Co, Nev | 22 | 10c | Apr 2 | May 6..May 28 | A K Durbrow, 309 Montgomery |
| Ophir S M Co, Nev | 68 | 25c | Mar 17 | Apr 20..May 11 | E B Holmes, 309 Montgomery |
| Osceola Con M Co, Cal | 5 | 1c | Feb 11 | Mar 14..Apr 8 | H Smith, 307 Montgomery |
| Silver King M Co, Arizona | 13 | 25c | Jan 28 | Mar 9..Apr 6 | J W Pew, 310 Pine |
| Summit G M Co, Cal | 14 | 5c | Mar 17 | Apr 20..May 12 | J E Jacobus, 309 Montgomery |

## ANNUAL MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Champion M Co, Cal | J F Holling, Crocker Building | April 14 |
| Jamison M Co, Cal | Sam W Cheyney, 120 Sutter St | May 4 |

## Mining Share Market.

SAN FRANCISCO, April 2, 1896.

The past week has been devoid of special interest so far as outside operators are concerned, but to the little pools that reports credit the movements in the market it has been of considerable interest. Prices for the leaders in the Gold Hill and the north end groups were sent to still lower figures. The downward trend continued to Monday, when a slightly better feeling set in in the shares of both Sierra Nevada and Union. This improvement imparted a steadier tone to the entire list. Since then there have been small fluctuations, with the shares in two of the middle group mines showing more activity. The highest advance in Sierra Nevada, Union, Chollar, Potosi and Crown Point has been about 12 per cent from the lowest figures touched on the down grade. Even Con. Virginia, Ophir and Hale & Norcross seemed to be stronger, but they only sold at 3 per cent advance on the lowest bids. The market acts very much as if it will do better, but how much it is quite impossible to say, for those reported to be manipulating it have not a sufficient moneyed backing to make much of a pronounced up move in the absence of dividend paying propositions. While the Comstock leaders were reaching their low figures Bulwer, in the Bodie district, began to move up. It advanced from the low figure about 33⅓ per cent. In this move Bodie sympathized, but the other stocks in that district were inactive. Occidental had a slight decline. It sold down to 76 cents under bear reports, but recovered about 15 per cent on reports of the drill having run into ore. At the close the market for Occidental and shares in the Comstock mines, while having an unsettled, feverish appearance, looks as if the small pools are operating to send prices up so as to unload the holdings taken in on the down turn. In this move they will be assisted by the situation at the mines, for the work going on in several is liable any day to be of a more promising character, although it is not likely to continue long. This opinion is based on the work under way, and also that more assessments must be levied soon, and that several assessmeets fall delinquent within the next ten or twelve days. It takes money to pay assessments, and it is not at all likely that managers will levy them if convinced there is a large body of ore near at hand.

The affairs of the Hale & Norcross Company are still in an unsettled condition, but more or less work is said to be doing so as to straighten them out. Nothing, at this writing, is allowed to leak out by which a correct opinion can be formed as to what will be the outcome.

From the Comstock mines our advices indicate that in Alta they are still fooling around the Keystone lode, with the future not clearly defined. The work in the other mines in this group, if any is being done, is not made public. In the Gold Hill group the work is essentially unchanged. Seg. Belcher, Overman and Belcher are raising some ore, but it does not cut much of a figure in the market, notwithstanding there is an increase in the number of tons of ore raised by Belcher. This is probably due to assays of the latter being lower. From Yellow Jacket no news is at hand. The joint west drift of Challenge, Confidence and Con. Imperial is still going forward at a snail pace, although it was extended eight feet the past week, which is two feet faster than reported three weeks ago. In Alpha the work points to more time, as it does in Bullion.

In the middle group Hale & Norcross is still shut down, but in Potosi, Chollar and Savage the work reported is on two or more levels. It is practically unchanged since our last review. Some ore continues to be raised, but not enough to cover running expenses. In prosecuting the work under way they are liable to report an improvement at any time, but as far as can be learned it will not create more than a ripple in the shares of the mine in which it is reported. The long west drift in Gould & Curry continues to be pushed ahead, but it does not make much progress, owing to its distance and the character of the ground through which it is being run. From Best & Belcher nothing new comes to hand. The work in Con. Virginia continues on several levels. From the nature of the work going on, it ought not to cause surprise if an improvement should take place before long. This opinion is based on the direction in which the work on one of the levels is being done and also that this mine has been prolific in surprises. While saying this, it must not be inferred that a large body of ore is expected to be uncovered, only a sufficient quantity to give more life to the shares. In Andes the work under way is on two levels, but as yet it is unimportant. From Ophir, Mexican, Union, Sierra Nevada and Utah our advices regarding the work are about the same as heretofore reported. As has been the case for months, if not several years, past some of the more enthusiastic stock operators speak quite encouragingly of it. They are still hopeful of good results. It is to be hoped that they will not be disappointed and that the companies will find something more than assessments. Considering the work under way, it would seem as if some stringer at least ought to be found before long.

From the Brunswick lode our advices report continued active work in Occidental. It would seem as if the management has tired of running for the downward continuation of the ore found on the 550-foot level and has started to drilling for it. While this is an expeditious method of finding out what is ahead, still is more or less deceptive and not entirely reliable. Work on the Edwards shaft is still continued. The work being done by the other companies on the lode does not indicate any change from that heretofore reported in these columns.

From the Bodie district our advices are not of a very encouraging character. The ore found is either of too low grade when wide or else is too narrow when rich to attract attention or to raise the hopes of stockholders.

Assessments levied the past week were: Caledonia and Challenge Con., 5 cents each; Occidental 10 cents, and Crown Point 20 cents.

The following illustrates the changes of the week:

| MINES. | Mar. 26. | Apr. 2. |
|---|---|---|
| Alpha | $ 10 | ..... |
| Alta Consolidated | 17 | ..... |
| Andes | 33 | $ 32 |
| Belcher | 28 | 23 |
| Best & Belcher | ..... | 62 |
| Bodie | 28 | ..... |
| Bullion | ..... | ..... |
| Challenge | ..... | ..... |
| Chollar | 48 | 45 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 1 65 | 1 65 |
| Consolidated New York | ..... | ..... |
| Crown Point | 49 | 42 |
| Exchequer | ..... | ..... |
| Gould & Curry | 31 | 27 |
| Hale & Norcross | 1 20 | 1 15 |
| Justice | ..... | ..... |
| Mexican | 55 | 50 |
| Ophir | 1 20 | ..... |
| Overman | ..... | 13 |
| Potosi | 42 | 39 |
| Savage | 37 | ..... |
| Sierra Nevada | 72 | 66 |
| Union | 70 | 63 |
| Utah | ..... | 09 |
| Yellow Jacket | 43 | 36 |

THE CALIFORNIA DEBRIS COMMISSION—having received applications to mine by the hydraulic process from A. J. McDonald, in the Kanaka Valley Mine, at Salmon Falls. El Dorado Co., to impound tailings in a ravine; from Paris Bean, in the Empire Hill Mine, in North-East Township, Yuba Co., to impound tailings in Empire Creek and in an old pit; from John J. Bailey, in the Badger Hill Mine, near Placerville, El Dorado Co., to impound tailings in a ravine; from B. Guidici, in the Grasshopper Hydraulic Mine, near Pleasant Valley, El Dorado Co., to impound tailings in a ravine; from Mrs. Amalie Hafner, in the Dark Ravine Mine, near Crescent Mills, Plumas Co., to impound tailings in Dark Ravine; from E. D. Hurd in the Miners' Row Mine, near Michigan Bluff, Placer Co., to impound tailings in a ravine; from Alfred A. Ludwig and William Everest, in the Nellie Bly Mine, near Igo, Shasta Co., to impound tailings in a ravine; and from R. E. Gumbert, in the Duquesne Placer Mine, at the head of Poplar Creek, Plumas Co., to impound tailings in a ravine—gives notice that a meeting will be held at Room 59, Flood Building, San Francisco, Cal., on April 6, 1896, at 1:30 P. M.


## TRUSTEE'S SALE
### IN SIERRA COUNTY.

On TUESDAY, APRIL 21st, 1896, at one o'clock P. M., at the front door of the Court House in Downieville, Sierra county, California, I will sell at public auction, to the highest bidder, for cash, all of that certain mining property, mills, machinery, boarding houses, tools, water rights, dams, etc., of the well known Young America mine, which consists of four contiguous patented claims and other locations; and also about 150,000 tons of tailings stored near the mine, and rich in free gold.

This sale is made by me as Trustee, and to make the sum of about $12,000.

Full information concerning the property and a full description thereof will be furnished on application by letter, or otherwise, to me at 230 California street, San Francisco, or to my Attorney in said matter, Frank R. Wehe, whose address is Downieville, Cal.

JOHN BERMINGHAM, Trustee.


## ANNUAL MEETING.

The regular annual meeting of the stockholders of the Jamison Mining Company will be held at the office of the company, Rooms 50 and 54, No. 120 Sutter street, San Francisco, California, on MONDAY, the 4th day of May, 1896, at the hour of 2 P. M., for the purpose of electing a Board of Directors to serve for the ensuing year and the transaction of such other business as may come before the meeting. SAM W. CHEYNEY, Secretary.

Office—Rooms 50 and 54, 120 Sutter street, San Francisco, California.


**An Assayer, Surveyor, Bookkeeper and Lawyer**

Wishes correspondence in relation to engagement. Address Box G, MINING AND SCIENTIFIC PRESS office.

# Assessment Notices.

CON. CALIFORNIA AND VIRGINIA MINING COMPANY.—Location of principal place of business San Francisco, California; location of works Storey county Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 4th day of March, 1896, an assessment (No. 6), of 30 cents per share, was levied upon the capital stock of the corporation payable immediately in United States gold coin to the Secretary, at the office of the company, Room No. 47 Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of April, 1896, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the 28th day of April, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. HAVENS, Secretary.

Office—Room No. 47 Nevada Block, No. 309 Montgomery street, San Francisco, California.

FAIRFAX VILLA COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Fairfax, Marin county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 6th day of March, 1896, an assessment (No. 5) of Fifty Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Room 36, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of April, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 4th day of May, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. STADTFELD, JR., Secretary.

Office, Room No. 36, No. 309 Montgomery street, San Francisco, California.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees held on the twenty-fifth day of March, 1896, an assessment (No. 78) of Fifteen cents (15c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-eighth (28th) day of April, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 20th day of May, 1896, to pay the delinquent assessment, together with the cost of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

CHALLENGE CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Gold Hill, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 27th day of March, 1896, an assessment (No. 21) of Five Cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 35, third floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 29th day of April, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on WEDNESDAY, the 20th day of May, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. McCOY, Secretary.

Office—Room 35, third floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 2d day of April, 1896, an assessment (No. 22) of ten cents (10c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of May, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on THURSDAY, the 28th day of May, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

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## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice. There are delinquent upon the following described stock on account of assessment (No. 5) levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| John E. Todd | 5 | 2,500 | $125 00 |
| John E. Todd | 6 | 2,500 | 125 00 |
| John E. Todd | 9 | 2,500 | 125 00 |
| John E Todd | 55 | 2,500 | 125 00 |
| Wm. H. Cain | 7 | 2,500 | 125 00 |
| Wm. H. Cain | 8 | 2,500 | 125 00 |
| Chas. A. Moore | 102 | 7,222 | 361 10 |
| Chas. A. Moore, Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6 0.0 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore Trustee | 130 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 140 | 6,667 | 333 35 |
| C. H. Neuhaus | 58 | 100 | 5 00 |
| C. H. Neuhaus | 145 | 120 | 6 00 |
| F. K. Harris | 42 | 1,000 | 50 00 |
| F. K. Harris | 43 | 1,000 | 50 00 |
| F. K. Harris | 44 | 1,000 | 50 00 |
| F. K. Harris | 45 | 1,000 | 50 00 |
| G. B. Libby | 85 | 2,000 | 100 00 |
| N. L. Bell, Trustee | 128 | 250 | 12 50 |
| A. U. Rugg | 16 | 1,000 | 50 00 |
| A. U. Rugg | 67 | 1,000 | 50 00 |
| Louise V. Rugg Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 155 | 1,000 | 50 00 |
| Louise V. Rugg Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg, Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg, Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 109 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 141 | 1,667 | 83 35 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 135 | 3,195 | 159 75 |
| E. C. Godfrey | 134 | 4,000 | 200 00 |
| Jos. A. Pratt | 3 | 2,500 | 125 00 |
| Jos. A. Pratt | 54 | 2,500 | 125 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Nos. 37 and 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

TO THE STOCKHOLDERS OF THE SOUTH PALOMA GOLD MINING COMPANY, LIMITED:

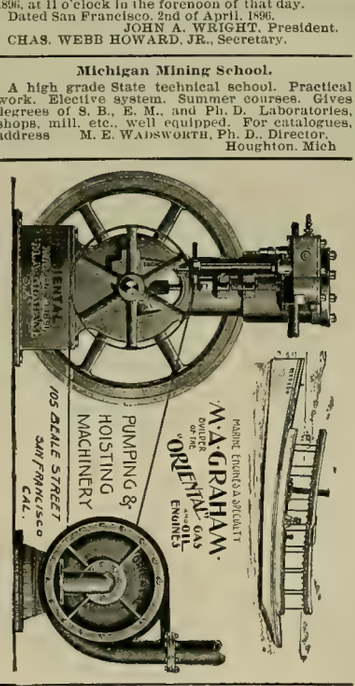
Notice is hereby given that by resolution of the Board of Directors of the corporation, adopted on the 21st day of March, 1896, a meeting of the stockholders of the corporation was called for the purpose of increasing the capital stock to the amount of two hundred thousand dollars, to be divided into one hundred thousand shares of the par value of two dollars per share, and of determining the disposition to be made of the increased capital stock; and it was resolved that such meeting shall take place at the principal place of business of the corporation, being the same building where the Board of Directors usually meet, to wit: No. 212 Sansome street, room 17, in the City and County of San Francisco, on WEDNESDAY, the 10th day of June, A. D., 1896, at 11 o'clock in the forenoon of that day.

Dated San Francisco, 2nd of April, 1896.

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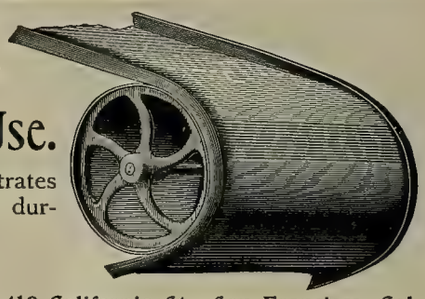
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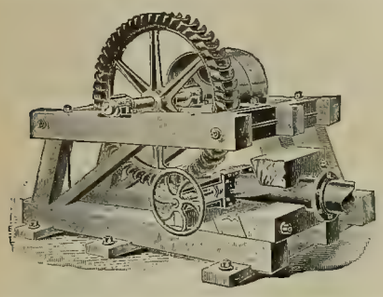
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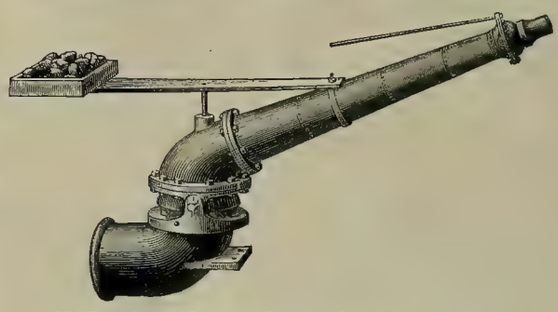
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## AND PACIFIC ELECTRICAL REVIEW.

VOLUME LXXII. Number 15. SAN FRANCISCO, SATURDAY, APRIL 11, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.


### The Cripple Creek, Colorado, District.

Herewith is illustrated Battle mountain, in the Cripple Creek, Colorado, district, Victor and two of the leading mines, the Independence and Portland. From the early days of the district it has been the site of active profitable mining operations. Victor is on the south slope of Battle mountain, near Wilson creek. Battle mountain is geologically described as an area of volcanic rocks surrounded on the east, west and south by granite and on the north by other volcanic materials. The mountain is mostly breccia, intersected by several dikes that cut the breccia and granite. On its south slope the granite dips beneath the breccia, the probability being that some of the mines started in breccia there may pass into granite as depth is attained, still carrying the ore. The veins occur in fissures and fissured zones, in some cases being well-defined bodies of quartz, in others being impregnations and partial replacements of the country rock with mineral matter along the fissures, the prominent veins being in the breccia and adjoining granite. The Independence mine is on the south slope of Battle mountain, just above the town of Victor. The ore of that mine consists of granite from which the quartz and mica have been almost wholly removed, leaving a vesicular mass of partially kaolinized feldspar, this being probably due to fluorine compounds evolved from the phonolitic magma. In this the cavities have been subsequently filled by secondary quartz, iron pyrites, fluorite, telluride of gold, etc. In such porous material surface water has freely percolated, the pyrites being largely oxidized down to the lower levels and the telluride partially converted to free gold. Where the vein crosses the dike the gold still exists in the telluride form even near the surface, as there the water did not have such free access as in the more open granite.

The Portland mine almost immediately adjoins the Independence farther up the slope of Battle mountain. Its main openings are in breccia intersected by parallel fissures, closely assembled in which the veins occur. A dike passes longitudinally along this fissured area, being itself fissured similarly. Two of the main veins are in the breccia and one in the dike between them. The vein to the east of the dike is called the footwall vein; that to the west the hanging-wall vein. The "sylvanite vein" is a seam in the breccia rich in telluride ore.

Calaverite, found so sparingly in this State, is rare in Cripple Creek also, and has been heretofore mistaken for sylvanite, its distinguishing feature there being that, though the lowest silver carrier of the gold-silver tellurides, carrying usually three per cent of silver, that found in Cripple Creek gives but nine-tenths of one per cent.



VICTOR, FROM BATTLE MOUNTAIN.



GRANITE. PORTLAND. STRONG. INDEPENDENCE.

VIEW OF BATTLE MOUNTAIN, CRIPPLE CREEK DISTRICT, TAKEN ON CONEJOS PROPERTY, MARCH 3, 1896.



INDEPENDENCE MINE, CRIPPLE CREEK, COLORADO.



PORTLAND PROPERTY, CRIPPLE CREEK, COLORADO.

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J. F. HALLORAN.....General Manager

San Francisco, April 11, 1896.


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A CONTEMPTIBLE FIGURE was presented last week by the anti-debris people in the presence of their representative, R. T. Devlin, in Washington, D. C., in the avowed character of an obstructionist. Neither he nor those he represents had any plan to propose to overcome existing evils; he simply was against doing anything, and appeared unsuccessfully before a united California Congressional delegation asking them to undo their work done in the interests of the very valley residents he claims to represent. Seldom has been exemplified how devoid of even self-respect a human being, otherwise intelligent and law-abiding, may become when his salary is affected and his "influence" ignored. But consciousness of his own identity is probably sufficient condemnation.

INEXPERIENCED and misinformed correspondents to daily papers sometimes send news from the Lake Superior copper country concerning the mines that is erroneous and misleading and the cause of loss in some instances to investors in mining stocks. A recent item sent from Houghton, Mich., states that the "Calumet & Hecla Mining Co. is pursuing the same policy as it did last winter, and by spring will have another immense reserve supply of unsmelted mineral. In case of any material advance in the price of copper, a large increase in the output of refined copper can be looked for from the Calumet, though the rate of the production at the mine will not be greatly increased." From reading that no other inference can be drawn than that the Calumet & Hecla is manipulating its product to meet the market, and that it has an "immense reserve" of copper to shove upon the market in case of a spurt in price. This is not the case. The Calumet & Hecla has a smelting plant at Buffalo, as well as at Lake Linden, where its stamp mills are located. As the transportation of the product of the stamp mills, "mineral copper," by rail is out of the question, compared with the much lower freight tariff by water, the Calumet & Hecla accumulates every year during the season when navigation is closed sufficient mineral copper to supply the Buffalo smelting works with a sufficient quantity to operate its furnaces. The refined product of its Lake Superior smelting works also accumulates until the opening of navigation, but in case of immediate large orders or an advance in price the refined ingots, bars or plates are then shipped by rail, but never the "mineral copper." The mine work is always regular and the rock is usually crushed as fast as mined.

AT the risk of appearing self-laudatory, this journal takes pleasure in having its articles so widely copied. Many of its original articles appear subsequently in some of the leading mining and scientific publications of the world, being of manifest value. The second and concluding section of the masterly article on "Invention—the indefinable requirement of the patent law," in this issue will be recognized by thinking minds on both continents as a clever analysis of an important subject, and will doubtless meet with wide reproduction. Mr. W. H. Smyth, the author, is a San Franciscan, and deservedly prominent in the practical exercise of the faculties concerning which he writes with unusual force. In his article, the first installment of which appeared in last week's issue, he closely and cogently argues out a point that seems to have hitherto escaped the observation of many who have given the subject considerable attention. The second article on "Matte Smelting" from an eminent, practical authority, is of wide interest and current value. Probably no subject is of more present interest to smelters and metallurgists in general than the one now under discussion in these columns by Mr. Austin. It is such articles that elicit further discussion, and aid in permanently establishing the truth or falsity of that stated. The comparison of coke-burning furnaces and sulphide burners with incidental reference to Mr. Lang's recent work, will attract universal attention. "The Gold Field of Cripple Creek," by T. A. Rickard, State Geologist of Colorado, is believed to be the first appearance in a journal of this class of a correct portrayal of that locality from a competent resident. Every week important articles from different specialists appear herein, being one of the strong features of this journal, and the favor with which they are received, and their reproduction sufficiently illustrate their value. Anything relating to mining, both as to methods and places that appears herein, is widely read by intelligent men. Judging by the usual calculations made by advertising agents and vendors of periodical literature, this issue will be read by more than one hundred thousand men, of a class that is quick to detect shams and resent any statement that appears to be an insult to human intelligence.

ON Monday, the 6th, the appropriation of $250,000 passed the House of Representatives by a practically unanimous vote. The Saturday previous, the Governor of this State said that the appropriation made by the State contingent upon the national appropriation had been paid into the general appropriation fund, which fund was exhausted, the appropriation used for other purposes, and that he didn't see how a warrant could be drawn against it. Of course, this from the chief executive officer of the commonwealth was aid and comfort to the opponents of the measure, and his remarks were wired to Washington on Sunday. But that eleventh hour attack was neutralized by the activity of Secretary Sonntag, of the California State Miners' Association, who got an official opinion from the Attorney-General of the State that the act of the Legislature admitted of but one construction, viz: "that whenever Congress makes an appropriation of $250,000 for the purpose specified in section 4 thereof, this appropriation of $250,000 therein made will be immediately available for those purposes." In addition, official statements were secured from State Controller Colgan, and Deputy State Controller Douglas that the money was in the State treasury and would be forthcoming. All this was wired to T. L. Ford, who made immediate use of the information and the next morning Congress passed the bill. No one's motives should be misconstrued. Maybe Gov. Budd believed what he said. After the bill passed, he expressed his satisfaction and suggested the improbable necessity of amending it in the Senate. Attempted amendments are usually fatal to a Congressional measure of this nature. It is unfortunate that the Governor should happen to make those suggestions at the very time they would, if met, be most likely to defeat the measure. It is believed that the Senate will this week pass the bill as received from the House. No doubt this will please the Governor who, at the '94 convention of miners in this city, said in an address: "You have my utmost sympathy, and any proper measure in the line of your deliberations that may come before me as Governor will not only have my approval BUT WHEN IT IS IN THE HOUSE AND SENATE IT WILL HAVE MY ENERGETIC AND HEARTY SUPPORT. This is not mere talk. A man should be in an insane asylum who will not recognize that engineering skill, properly backed by the Federal Government, will show that mining is properly carried on as in the past, without injury to the industries of the valley." The miners believed Gov. Budd's sincerity then and we hope that no future action on his part will shake such belief.

SAN DIEGO, CAL., is earnestly agitating a smelter project. A smelter in operation is a good thing for a community; it brings considerable business and locally expends the most of its earnings. There is nothing magical, however, about its presence. Building a 100-stamp mill does not insure the immediate existence of sufficient ore to keep it profitably going. Of course, where one sees a stamp mill, it is fair to assume that much ore must be contiguous; but there are cases where sanguine men built the mill first and then started to develop the ledge. So with smelters, though occasionally some smart middleman succeeds in spending some one else's money in building a smelter; yet, ordinarily, the rules of business prevail and the question: "Will it pay?" is thoroughly gone over before the plant is ordered. There is now a partially completed smelter in Los Angeles, which is much more of a mining and commercial center than San Diego, and distant only a little ways, as distances go in California. So far as known, the Los Angeles smelter is not yet a commercial success, though the reasons why it should be a success are much greater in Los Angeles than in San Diego. There is another smelter at Portland, Oregon, which is not a source of present profit to its owners. The Spokane, Wash., smelter was much talked of, but has never been fired and is now somewhat obsoloscent in pattern. At Stege, Contra Costa Co., is a similar example. These are referred to merely as practical object lessons of a fact sometimes forgotten or ignored by newspaper commendation of proposed smelters, that the same commercial laws govern this matter that decree success or failure in any department of the business world. A smelter must be centrally located, with reference to competing lines of rail and water transportation, where ores can be drawn from all directions, where cheap fuel, fluxes, etc., can be readily secured and the resultant product as readily placed. There is as little co-operation and as much competition among smelters as among any and all other forms of business. The projectors of a smelter who leave out of their calculations the questions of supply and demand and the cost of the smallest item cannot expect satisfactory returns. Then, too, a smelter to be profitable in the highest degree must be on a large scale, for there must be low rates and ore can be handled most economically in large quantities. That involves considerable necessary outlay. Nor is this all. A smelter to be largely successful can not be a hand-to-mouth concern. It needs strong financial backing; surplus funds to buy ores in the market, if need be, and not depend solely on "custom work." Finally, it is needful to insure due measure of success that competent metallurgists be in charge. The discussion now going on in these columns on "matte smelting" is of present point on this as on other matters of considerable metallurgical importance. After all, "the man behind the gun" is the most important factor. Given plenty money, commanding site, favorable transportation rates, low figures for necessary requirements, abundant supply of ore, a comprehensive, up-to-date plant, and without a competent man in charge, the furnace can not be a success. Those men are not plenty, and it is only a concern financially capable that can secure their services. There is nothing added herein to the stock of general knowledge on this subject, but noting the present urgent and oft-repeated calls for a smelter in so many localities in this west half of America, it is deemed not amiss to remind some of our readers of a few homely facts that, in the possible event of investment, it would not be profitable to forget.

## Concentrates.

THE Eureka, Nev., *Sentinel* has ensmalled.

LOS ANGELES has organized a mining exchange at 208 S. Broadway.

A $10 ASSESSMENT on Butte & Boston is looked for by some Montana stockholders.

THE March payroll on the Comstock aggregated $60,000, the smallest for some time

SIXTY addit onal stamps are being put along with the sixty in the Mexican Alaska mill.

THREE CYANIDE PLANTS are now in operation at Wickenburg, Arizona, and the old Vulture mine is being reopened.

Now is a good time to begin doing assessment work. It's got to be done sometime during '96, and the sooner the quicker.

LAST week in this column it was stated "Next Saturday's issue of this paper will contain twenty-four pages." It does, and eight more.

PEARCE, ARIZONA, is now a postoffice, and is reported coming to the front since its principal mining property was bonded for $275,000.

A ROCK SALT drying plant, "the first of its kind on earth," is in successful operation at the works of the Inland Salt Co., Salt Lake City, Utah.

IT is questionable whether the new Yahk mining district is in Idaho or Montana, and miners there are recording their claims in both States.

W. H. THOMAS, a prominent Arizona miner, was choked to death on the street in Phoenix last Tuesday by an orange seed lodging in his throat.

THE Chollar and Potosi mining companies decide to continue work in the Brunswick lode, despite the withdrawal of the Hale & Norcross from the combination.

THE *Miner* says it is no use going to Bodie looking for a job. All the men needed were engaged last fall, and there are more men there now than there is work for.

PUEBLO, COL., talks of building a railroad to Cripple Creek. The only wonder is that Pueblo hasn't long since built thirty-two miles of the proposed road to the mountains.

MONTANA'S mineral land commissioners have resumed work in the Bitter Root valley. From there they will proceed to complete the classification of lands in the Kalispell district.

CRIPPLE CREEK, COLORADO, is extending its list of dividend-paying mines and curtailing its list of "boom" companies which are the unavoidable accompaniment of all mining centers.

A UTAH company recently organized claims to be able to manufacture cyanide of sodium at a cost of six cents per pound, and cyanide of potassium at a cost of nine cents, which is not probable.

THE Dubois lead ore sampling bill puts a $15 duty on foreign lead and lead ore, one-half what it was under the McKinley bill. It's better than nothing, but could be increased with benefit to the domestic miner.

FURTHER news from the Rawhide mine, Tuolumne county, regarding the recent strike there on the 930-foot level confirms the reports of its richness. Its already large monthly yield will now be greatly augmented.

THE trouble at the Hale & Norcross, Virginia, Nev,, has been obviated by the appointment of another superintendent, Jas. Cronin, an old Nevada miner, and a new man on the Comstock. Operations were resumed last Wednesday.

LAST Tuesday the Lucilla gold mine, Plymouth, Amador county, was sold to satisfy a judgment, J. E. Lees and J. H. L. Milne, of Liverpool, England, represented by Alfred Sutro, of San Francisco, bidding the property in for $45,323.

A RUSH of prospectors is reported from Lovelock, Nev., to the Rabbit Hole mines. Placer gold is known to exist at Rabbit Hole and vicinity, but water is very scarce. The mines are along the old Honey Lake and Humboldt road.

OZONE is now announced as a gold solvent and the claim made that refractory ore can be successfully treated thereby. It may be just the thing needed at Meadow Lake. There is plenty of ozone securable there, and there is any amount of rebellious ore.

IN the last four months Nevada county has contributed nearly $900 to the California State Miners' Association. Nevada and Placer have been the financial backbone of the association outside of this city, which has given thousands to aid the cause of the miner.

AS A STANDOFF to Mercur, Utah's being "the Johannesburg of America, a Snake River, Idaho, man writes that that region is "the Transvaal of the Pacific Northwest." 'Tis now in order for a Johannesburg paper to refer to "the mother lode of the Witwatersrand."

AT a champion drill contest at Butte, Montana, last Saturday, T. Tallon drilled 37¼ inches through a granite block in fifteen minutes. More than $3000 changed hands on the result. Tallon pounded the steel sixty blows a minute for the whole time and never missed a lick.

SAYS the Virginia, Nev., *Enterprise:* "The Utica mine, in Calaveras Co., Cal., turns out five times more gold than the Robinson, which is the most noted of the African mines. The Utica employs 700 white men at $2.50 to $3 per day, while the Robinson has 2500 Kaffirs at 30 cents per day each."

THE regular monthly statement that the Rothschilds are seeking to secure control of the Anaconda, Montana, mines, this time names $40,000,000 as the proffered price for a two-thirds interest. The value of the mines justifies those figures, though their frequent repetition grows tiresome.

AUTHENTIC statement comes from Nevada Co., that the famous old Allison Ranch mine is to be reopened, and is in the hands of men financially able and possessed of enough stick-to-itativeness to make it a go. The mine has produced over $3,000,000, and at one time gave employment to 250 men.

THIS week the New York and Boston owners of the Merced Gold Mining Co.'s stock are inspecting their property at Coulterville, Mariposa Co., on which, so far, they have expended about $700,000. They also own the Butte & Boston, Montana property, and have further interests in Arizona, whither they will go after looking over the California work which gives promise of being the most valuable of all their large investments.

THE Yreka *Journal* says: "Work on the big French Creek ledge has been suspended, owing to a dispute about the price of water. The company will put in an electrical plant to operate the mine, and will doubtless put in a mill of about twenty stamps, which will also be operated by electricity."

THE Grass Valley *Union* says that a letter from one of George Starr's friends in South Africa states that as consulting engineer for Barnato Bros., he now has charge of seventeen mines and is receiving a salary of $50,000 a year. A. W. Stoddart, who is superintending a mine there, gets $10,000 a year.

AS IT now stands in the provincial parliament, the British Columbia mine tax is one per cent on the assessed value of all ore or mineral-bearing substances from any lands in the Province, as ascertained and determined from verified smelter, reduction works or other returns satisfactory to the assessor.

A MINUTELY DETAILED REPORT of the Cariboo, B. C., properties in charge of J. B. Hobson, signed by him, gives the value of the gold gravel at 50 cents per cubic yard. In hydraulic mining ground paying ten cents a yard is ordinarily a paying proposition, and where it averages twenty-five cents is unusually good.

INVESTIGATION in the brass brick swindles in and around Oakland, Cal., developed the fact that eight or ten men there who wanted something for nothing have been cleverly victimized by two or three swindlers who are now parting with some of their newly acquired wealth in an effort to get free from legal entanglement.

THE following California gold mines have paid dividends as follows: Idaho, $5,489,000; Standard, $3,771,159; Kennedy, $2,734,000; Plumas Eureka, $2,696,295; Bodie Consolidated, $1,677,572; Sierra Buttes, $1,559,933. There are others. Unincorporated mines are the biggest yielders, one, the Utica, of Calaveras, being credited with a steady output of $500,000 per month.

AT the Bulwer Con. election last Wednesday both sides claim a victory. The New York stockholders held a majority of the stock, and when the old directors declared the meeting adjourned and withdrew, the others held a meeting of their own and elected directors and officers. The old management decline to recognize them and continues to hold control. Litigation will result.

THE Hope mine at Basin, Montana, has closed down, there not being room for two superintendents in one mine. Helena men held forty-five per cent of the stock and put in a miner; Michigan men owning the other fifty-five per cent put an Eastern man in charge, with the usual result. It is probable that one of the opposing forces will buy the other's interest. The mine is a valuable property.

A FORT WORTH, TEXAS, RESIDENT, who unnecessarily states that he is not a subscriber to this paper, writes asking where he can "buy a mineral rod that will locate silver and gold and hidden treasure." He prudently says he wants a genuine one, and will not pay unless it is in every way satisfactory. 'Tis such good-natured people as he that keep alive the much-advertised brass-brick industry now so prevalent and profitable around Oakland, Cal.

THE members of the Idaho Mineral Land Commission have resumed work, and expect this season to survey the most of the pan-handle of Idaho, extending from twenty miles south of the Northern Pacific road to the boundary line on the north. It would please the writer to be able to make some similar statement regarding the California Mineral Land Commissioners. The bill creating that commission is still before the Senate Committee.

THE Gold Mining Exchange of San Francisco was formally opened last Monday. Addresses were made by Walter Turnbull, president of the exchange, Irving M. Scott of the Union Iron Works, Hugh Craig, president of the Chamber of Commerce, John Daggett, superintendent of the U. S. Mint, and others. The exchange has for its officers: President, Walter Turnbull; vice-president, John Daggett; treasurer, D. E. Miles; secretary, J. F. Crosett.

A. N. BUTTS who sold the Golden Gate mine at Mercur for $75,000, which is now credited with $2,000,000 of ore in sight, is retrieving his mistake by operating five properties on the California mother lode, where he has excellent prospects. The Utah transfer shows how close a miner sometimes comes to bonanza and then some one else gets it. The first blast in the Golden Gate an hour after the $75,000 deal was made disclosed the oxidized ores that now give that property its great value.

G. G. GATES, of Jackson, Cal., has a patent system of separation and concentration of tailings that is in operation. One plant at the Zeila mine tailings treats 150 tons per day; a pump is used to raise the tailings 12 feet. The Carson Creek plant, near Angels, is not yet completed. It is expected that the Utica plant at Angels will daily treat 600 tons of tailings from the Utica, Stickles and Madison mines. It will be lighted by electricity and it is expected to commence operations May 1st.

A KENNETT, Cal., subscriber writes that he has a telluride deposit, and asks is tellurium paid for in smelters. It is not ordinarily practicable to save the tellurium contained in gold or silver ores when smelted. It is believed there is no smelter in this country that does. It is mainly produced by Alexander Maly's wet process at Schemnitz, Hungary, from gold telluride ore. It occurs in minute quantities in various places in this State and Colorado, but it is unlikely that the Shasta Co. "deposit" is of sufficient extent to justify the expense attendant upon its treatment.

A FRESNO correspondent asks where "aluminum is reduced or produced." The principal reduction works in this country are at Pittsburg: Niagara Falls contemplates reduction works and a St. Louis Company is now arranging to put in a plant at Greenland, Colorado. The total U. S. production is now about six tons daily: the wholesale market price in New York last Saturday was fifty-five cents per pound. The cost of production is said to be twenty-five cents per pound, the cost of raw material fifteen cents per pound. This applies to the Pittsburg concern which imports fluorine. Colorado claims to be able to furnish clay sufficiently rich to yield aluminum by the electrical process for twenty cents per pound including all expenses.

IF thousands of miles away across oceans and deserts there was a mining region inhabited by thousands of intelligent men and women, surrounded by all the comforts of civilization, with fruits and flowers nine months in the year, a railway at their door, a climate incomparable and millions in gold being taken from the ground, it would be heralded to the ends of the earth as the one great blissful El Dorado; yet there is more than one such locality in California of which all the above is strictly, literally true, and, being in California, it is taken as a matter of course.

WRITING of South African affairs, the London *Mining World* of March 28th says: "The Transvaal labor trouble is still acute. There is supposed to be an agreement among the different mines to keep the wages of natives down to something under £3 10s per month, but we are informed of many cases where £4 or £4 10s is being given in the competition for boys. It is the old story of supply and demand, and where the interests and reputation of a big company are at stake it is easy to understand a manager offering, almost in distraction, inducements to natives to leave other mines and come to his."

THE mints are now coining standard silver dollars at the rate of 1,500,000 per month from the silver bullion purchased under the Act of July 14th, 1890. Of the number of silver dollars now being coined, 1,031,375 will be held for the redemption of Treasury notes, being the cost of the bullion contained in 1,500,000 silver dollars at the average cost of silver bullion purchased under the Act of July 14th, 1890. The remainder, 468,675 dollars, will be paid into the Treasury as profits on the coinage of silver bullion, and against which silver certificates can be issued and used in the payment of any expenses of the Government.

ABOUT 90 taels buying as much on the average of Chinese commodities to-day, when silver is 8¼ cents an ounce, as 100 taels bought in 1873, when silver was $1.29 an ounce, it is evident that Chinese products can be sold in gold-using countries for less than one-half the price in gold than was possible when silver was worth $1.29 an ounce. Or, accurately, 90 ounces of silver buying as much to-day in China as 100 ounces in 1873, and these 90 ounces, costing in gold 8¼ cents an ounce, instead of $1.29 an ounce, $61.50 in gold will buy as much to-day as $129 in gold in 1873, or 106 per cent more—6 per cent more than twice as much. Consequently, the Chinese can sell their produce in our markets for less than one-half the price they could before silver was demonetized. And what is true of the Chinese is true of other silver-using peoples.

AT Michigan Bar, Sacramento Co., Manager Smyth of the Interior Development Company proposes to put in an electric plant, so that the men operating the monitor, drills, picks and shovels will be able to work at night. The company has increased its water supply several hundred inches by erecting new flumes and siphon-pipes along its entire line of forty-six miles of ditch. This, it is thought, will insure an abundant supply of water to the large irrigation districts on the Cosumnes river. Two monitors, one eleven inches and another seven inches in diameter, were turned loose on a 75-foot gravel bank at Forest Home, near Michigan Bar, last week. Three miles of pipe have been laid sufficient to secure a water supply. The engineers estimate that there is enough gravel in sight for a run of fifty years. The facilities for impounding the debris are unexcelled. The gravel, an ancient channel, is deposited at the head of Arkansaw creek. Below the mine the water will be diverted by means of a stone impounding dam into an irrigation ditch. Not a grain of sand or a drop of water will ever find its way into the river.

TIREY L. FORD, the Washington representative of the California Miners' Association, wires from the national capital his belief that the mineral land bill will go through both houses of Congress in its present shape. Last Thursday the Sacramento *Record-Union* served formal editorial notice that the Southern Pacific Company had withdrawn all opposition to the bill—would do all it could to pass it. This is the worst thing that has happened so far, but the miners will correctly interpret the announcement as making a virtue of necessity. It is probable Congress also will so understand it. The *Record-Union* article states several things that are not so, and in giving up the fight does it so cleverly that those unacquainted with the facts would be inclined to believe it. Meanwhile no friend of the bill, in or out of Congress, should relax the slightest effort till it has become a law. When that comes about it will be in order to see that the commissioners who will administer and interpret it are not biased. The President, who has the appointing of these commissioners, is fully advised and will not lack information as to the facts.

THE Act of the California Legislature of '93, making contingent appropriation of $250,000 is as follows: "There is hereby appropriated out of the General Fund of the Treasury of this State the sum of $250,000, no warrant against said sum to be drawn or paid until the United States Government shall have appropriated at least an equal amount, to be used in the construction of works for the restraining or impounding of mining debris in California, said moneys to be paid only upon an order drawn by the Controller upon the written request of said Debris Commission, and to be drawn only for the payment of not more than one-half of the cost of construction of any such works for restraining and impounding mining debris as shall have been approved by him and duly adopted and recommended by engineers of the United States Government appointed for that purpose. All expenditures are subject to the approval of the State Board of Examiners." The United States Government is now making the $250,000 National appropriation that unlocks the State appropriation made three years ago. Gov. Budd has tried to make a point that that contingent appropriation has been paid out, and that the Legislature would have to make it over again. The Governor's ability to veto such a bill need not enter into the case. His point is not well taken. The official text of the appropriation herein given in full refutes the objection of the Chief Executive of the commonwealth. "No warrant against said sum to be drawn or paid until the United States Government shall have appropriated at least an equal amount," etc. Of course, it is well understood here that the State appropriation is charged to the State fund and available whenever the fund is replenished, but probably not so well understood at Washington. It is possible that our good Governor's remark was not intended for home consumption.

## The Cripple Creek Gold Field.

By T. A. RICKARD, State Geologist of Colorado.

The stirring pages that tell the checkered story of western development record many queer-sounding names whose inappropriateness or lack of euphony has long since been obliterated by the impress of fame. Five years ago "Cripple Creek" sounded such an unlikely name for a great gold field, and yet to-day "Cripple Creek, Colorado," has by the magic baptism of its golden discovery become as alliterative and impressive as the most exacting company promoter could desire.

The locality of the new district is itself full of romantic suggestion. Overshadowed by the granite battlements of Pike's Peak, its very position recalls the fact that it has fulfilled the expectations of the pioneers of 1858. "Pike's Peak or bust," the mock-heroic motto of the immigrants of an older generation, tells of the delusion which led so many a hardy prospector to associate the occurrence of gold with the beacon mountain first reconnoitered by Capt. Zebulon Pike in the dawning years of the century. No gold was at that time found in the canyons or on the hillslopes encircling the peak. Colorado's early discoveries were all made farther north within the watershed of streams fed by the snows of Gray's Peak and Mt. Evans.

Not long ago the cowboy, tending the cattle that until recently found the grass-clad hill slopes a kindly pasturage, looked north, west and south from ridges now teeming with the busy life of Cripple Creek and could see in the distance the snowy ranges which watch over the old camps of Gilpin and Clear Creek, the white banner of the Mosquito range overlooking Leadville, the serrated ridge of the Sangre de Cristo near Silver Cliff and the great complex of the mountains of the San Juan; and as his eye took in a panoramic view which covered so much of the most productive portion of the State, he never dreamed that the day would come when the dull monotony of the cow pasture would be swept away by the eager rush of the gold digger and the feverish haste of a great gold field.

More than once in the years gone by the hidden wealth of Cripple Creek was on the verge of detection. There was some abortive silver mining on the claim since known as the Elkton as early as 1874. Many will remember the Mt. Pisgah fiasco in April, 1884, when a dark, conical hill, now overlooking the town, was the scene of a mining excitement long notorious for its untimely ending. A horde of deluded prospectors were drawn thither by the assays obtained from certain claims whose croppings had been subjected to a Keeley cure and inoculated with chloride of gold at the hands of designing schemers. The little low-grade quartz discovered at that date only served to add bitterness to the disappointment. The stampede ended in a fiasco.

In the early days of 1891 a few men wandered over the hills from Colorado Springs and in February the first recorded location was made. Rumors of a new gold camp began to circulate in Denver, but the contemporaneous discovery of Creede diverted attention and the recollection of Mt. Pisgah evoked a contemptuous unbelief. And, in truth, the small veins first found at Cripple Creek did not compare with such a magnificent lode as the Amethyst, whose bold cropping glistened amid the dark umbrage of the pine-clad hillside. Creede, moreover, was on the northern borderland of the famous San Juan; the railway was already at its doors; the first discoveries became immediately productive; silver was in fashion; development therefore advanced apace, and the results were made apparent in smelter returns. Cripple Creek, on the contrary, was discredited by its position, its former record, its lack of transportation and the smallness of the first discoveries. Silver mining was then at its best; the fashion of the hour favored the camp at the headwaters of the Rio Grande and underestimated the discoveries heralded from the snow-clad peak which had long been a landmark to the wayfarer across the plains.

The logic of events is however incontrovertible. When 1893 came Cripple Creek was still pegging away without any notable results; Creede had leaped into a silver producer of the first rank. Cripple Creek that year yielded only $583,010 in gold, while Creede gave $3,100,000 in silver. In July, 1893, the Indian mints were closed and the silver market collapsed. Mining was completely disorganized, and the business activities of the State were temporarily paralyzed. Then, in the hour of distress, the bankrupted silver miner looked toward the new gold field and with a courage born of despairing hope he trudged across the hills and set to work with dogged perseverance to dig holes upon hillslopes whose grass-covered debris gave scant suggestion of underlying ore. The smooth surface underwent an overturning; nature seemed to have the measles; gophers of a larger growth appeared to have invaded the former cattle range; a thousand prospect holes were put down everywhere and anywhere, the absence of outcrops being neglected until the eager search became rewarded by the finding of a score of veins of rich, golden ore. Cripple Creek instantly leaped to the front. In 1893 the yield rose to $2,100,000. Colorado faced the future with renewed courage and redressed the decline of her silver industry by the enthusiastic development of new resources.

In 1894 came the labor strike, whose evil effects were largely traceable to the vagaries of an imbecile executive and the hysteric vaporings of the Colorado Springs press. The energies of the camp were for many months either stilled or else diverted into unproductive channels. The production that year only reached $2,900,000, but in 1895, unhampered by strikes and aided by improved transportation and reduction facilities, the yield approximated $8,000,000, putting Cripple Creek at the head of the gold-producing camps of the United States.

New mining districts are often quoted as exhibiting unique geological conditions. Cripple Creek is frequently stated to have upset old theories and to have nonplussed experienced miners. It is easier to write last year's almanac than to foretell the future. In the light of extensive exploration we can appreciate the facts which caused so many widespread misconceptions regarding the ore occurrence, and at the same time understand the reasons for the slow growth of early discovery.



GLIMPSE OF SCENERY AS THE CRIPPLE CREEK REGION IS APPROACHED.

Owing to their position, on hillsides almost bare of trees, facing south and at an altitude of 9500 feet above sea level, the rocks themselves, mostly of a fissile structure, had been shattered by frost to such an extent as to cover the solid formation with a notable thickness of debris to which the hardy grass had given a kindly covering. Hence the infrequent rock exposures. Moreover, the larger number of the veins consist essentially of country rock impregnated with minute quantities of valuable gold-bearing minerals without the deposition of any large percentage of gangue material, such as quartz. The silicification of rock along ways of water circulation, which replaces soft decomposable minerals by a hard insoluble one, and creates lines of resistance to weathering such as eventually stand out alone above the surface, had not been actively at work and the outcrops which it ordinarily tends to form were therefore conspicuously rare.

The first prospectors came from the neighboring districts of Leadville and Gilpin, and failing to recognize in the conditions of the new camp any resemblance to the conventional vein systems of the one or the limestone contacts of the other region, they hastened to term phenomenal what was only new to the limited knowledge of an essentially local experience. It was the so-called practical miner (as if a real miner or mining engineer could be otherwise than practical) who condemned Cripple Creek, and it was the fledgling from the laboratory who gave color to the statement that scientific men refused to consider the new gold field seriously. As a matter of fact, many experienced mining engineers of the writer's acquaintance, while they deprecated exaggerated descriptions based on insufficient development, such as circulated during the reaction of the autumn of 1893, yet were strong in recognizing the fact that the discoveries were valuable and far-reaching in importance.

Nor is the geology extraordinary when viewed in the light of an adequate experience. The determination of the country rock as consisting largely of masses of andesite breccia covering the basal granite is quoted by the Western miner as an unfamiliar geological environment, and the use of a previously little known rock term strikes the uninitiated as indicative of conditions heretofore unrecognized. It is a fact, however, now pretty well known, that the "porphyry" dikes accompanying the fissure veins of the old districts of Gilpin and Boulder counties are composed of a quartz andesite; it is interesting also to remember that in San Juan, Ouray, Dolores and La Plata counties, in southwestern Colorado, there is a mass of andesite breccia, of a geological age contemporaneous with that of Cripple Creek, whose thickness is to be measured in thousands of feet and its extent in hundreds of square miles. Moreover, the rock formation and vein structure of our American gold field finds a prototype in the old mining regions of Transylvania in Europe and in the Hauraki district in New Zealand. In the last named gold field there occur conditions exhibiting a most remarkable parallelism with those obtaining at Cripple Creek. All of which merely accentuates the known orderliness of nature's operations, which, when they appear unprecedented, seem such only because of our limited observation.

No recorded mining region exhibits evidence so confirmatory of the most recent theories on ore deposition as does Cripple Creek. It has been said by some that it upset preconceived theories. Far otherwise. No theory is of course impregnable; it is but a tangent to the circle of observed facts and represents the direction of conclusions covering a small arc of that circle; therefore no theory is final or immutable. Nevertheless it is one of the most striking features of the new camp that it corroborates the views of those who seek to derive ore deposits from ascending mineral-bearing solutions and emphasize the connection between ore occurrence and geological structure.

The basal granite of the Pike's Peak region has been intruded and covered by a complex of volcanic rocks. The masses of andesite tuff and breccia which constitute the prevailing country are penetrated by later dikes of andesite, nepheline basalt, sanidine phonolite and allied varieties. The lodes consist largely of dikes rendered gold-bearing by their impregnation along lines of fracturing whose origin may be traceable to contraction consequent on cooling. Other ore deposits not actually following such dikes but occurring as veins in the massive formation have nevertheless directions recognized as sympathetic to the dike fractures. The chief and immediate result of this type of vein structure is the multiplicity of fracturing and the repetition of vein walls. This "sheeting" of the rock encasement and of that gold-bearing portion constituting the ore itself is a feature of great importance in the actual work of mine exploration. It is noticeable that the ore streak when following one of these fracture planes may maintain its continuity for a certain distance and then either end abruptly, decrease in size or scatter itself, only to resume its regular course along a neighboring parallel "wall" while the original wall goes on smooth as a skating rink, devoid of ore and delusive as a promoter's dream. This structure may cause the continuation of a rich ore body to be found not in a straight line with its last determined position but to one side, in the claim adjoining the extension claim rather than in the latter. Moreover ore is found distributed not along one but several such fracture planes so that certain veins consist of a parallel series of ore bearing streaks distributed over either a portion or the whole of the thickness of a dike. Cross-cutting is therefore imperative. Ore may occur not only along both of the boundaries of a dike but also in a neighboring dike or indeed along independent but sympathetic fractures within the massive country. The andesite breccia itself is traversed by several well developed systems of joints which have served as waterways along which gold bearing minerals have been precipitated. This has resulted in the formation of several large, less regular and less rich, ore deposits of the stockwerk type, whose want of definition has proved puzzling to the mine superintendents.

Generalizations are proverbially dangerous. In the Cripple Creek area they are unusually so because of the notable diversity of vein structure. It is this which caused, in its early days, so many con-

flicting and misleading statements regarding the formation of the district. To the geologist this diversity is of great interest and a discord which investigation discovers to be a fine harmony of evidence on the genesis of ore deposits. To the miner it is perplexing; and to the promoter it is a snare and delusion.

There are fissure veins of the most classic type cutting clean through changing rock formations, such as the Independence; there are dikes of volcanic rock unaltered save by a fracturing followed by a minute percentage of mineral deposition, such as the Elkton, Moose and others, there are narrow, but very rich, seams of jasperoid quartz following contraction fissures such as the Buena Vista and Victor veins; and there are irregular and apparently structureless, but really definitely arranged, ore bodies such as the Summit and Deerhorn mines.



STREET SCENE IN CRIPPLE CREEK IN 1891.

Conditions diverse as these are apt to be confounded in the desire to apply the experience of one part of the district to another less developed portion of it. The common practice of quoting the success of a well-developed mine as indicative of the probable outcome of the exploitation of a neighboring prospect is likely to prove more than usually misleading because the geological environment of the two may be as dissimilar as though they were on separate continents.

The ores are of striking beauty.* Fluorspar is a prevalent and characteristic gangue. Native gold is frequent in the oxidized ores and gives place to combinations with tellurium as depth is attained. The purple fluorite, the silvery telluride and the reddish-yellow gold form a color combination of rare beauty to be appreciated even by the most untechnical visitor. The investigations of Dr. Richard Pearce and the chemists of the U. S. Geological Survey have gone to prove that the native gold has been derived from the decomposition of pre-existing tellurides, that the surface ores carry telluric oxide and that the relative percentages of gold, silver and tellurium indicate the presence of both calaverite and sylvanite. Another telluride, namely, petzite, is also occasionally recognizable.*




TOWN OF CRIPPLE CREEK IN 1894.

Such are to the mineralogist the most evident characteristics of the ores. To the geologist, however, the most remarkable feature of a great part of the output of the mines is its identity with country rock. In its early days the camp sent shipments to the Denver smelters that looked more like ballast than ore. The very slight addition of foreign mineral required to change valueless rock into valuable ore was one of the surprises of Cripple Creek. The Independence, for example, sent many carloads easily recognizable as Pike's Peak granite, differing from the normal rock only in a decomposition of the mica and the occurrence of gold amid the remaining oxide of iron. Even when the lode penetrated from the granite into the andesite, the habit of the new rock encasement was as readily recognized as previously the structure of the granite had been. It was neither then nor now necessary to look outside the vein to determine the character of the enclosing rock. How purely commercial and essentially unscientific is the distinction between ore and rock, between veinstuff and country rock, is illustrated by most of the ore bins and dumps of Cripple Creek, whose testimony has gone far to prove that lodes are for the most part composed not of injections of foreign material filling open spaces, but the slow replacement of rock in place along lines of maximum porosity or minute multiple fracturing.

To the metallurgist a new field of activity has been offered. The bodies of rich telluride ores previously found in Boulder, Hinsdale and La Plata counties have been so restricted in size as to render their reduction at the mine unnecessary in the face of excellent smelting facilities, made available by cheap railroad transportation. At Cripple Creek the quantities of these ores have been found to be large and so siliceous that the output threatened to exceed the digestive capacity of the lead furnaces. Moreover, the presence of only a minute percentage* of sulphur and the absence of copper and lead ores invited chlorination and cyanidation to enter the field of competition. Both have done so successfully. At present the two chlorination† plants have a combined capacity of about 85 tons per day, and the two cyanide‡ establishments 130 tons. The former have necessarily been compelled to include a careful roasting among their operations, while cyanidation has been able to give an excellent extraction without such preliminary treatment. Now, however, the ores of the lower levels have brought with them the need for a similar preparation for the cyanide process, and the two leaching methods will henceforth compete on a more equal footing. The near future will see an increase in baseness as the ores of the deeper horizon are exploited, and with these changes will come difficulties requiring further metallurgical skill to overcome them.

The district produces an average of about 425 tons per day. Of this total 200 tons goes to the smelters and the remainder to the leaching plants. The average gold contents approximate 2½ ounces per ton. During 1895 the Omaha & Grant smelter purchased 40,000 tons of Cripple Creek ore, which averaged $78 per ton, or 3½ ounces of gold. The eight millions produced in 1895 were extracted from about 150,000 tons. Facts such as these emphasize the comparative smallness of the tonnage and, per contra, its compensating richness. The Witwatersrand region crushes in one month twice as much ore as Cripple Creek produced in 1895, but the grade of the latter was about six times as high.

The output of the district is regrettably irregular, varying within a recent period from 300 to 700 tons per day. This is due to the limited development work required by ore bodies of unusual richness and proportionate smallness; it is traceable also to the ups and downs of the demands of a speculative stock market. But it is particularly caused by the operation of the leasing system. Many companies own claims, but are barren of working capital. It is then a common practice to cut up the territory into 100-foot divisions and lease them to parties of miners for periods ranging from three months to a year. The leasing system is much overrated. It is usually the last resort of a perplexed management or an exhausted mine. It results in gutting the ore reserves and throws the property back into the hands of the owners in a depleted and dilapidated condition. In certain sections of the Cripple Creek area leasing is very general, and is due largely to the fact of the ownership of claims by inexperienced persons. To its working the fluctuations in the output are mainly due. As time wears on and matters are put on a better basis and under more experienced direction, this factor will be slowly eliminated and the maintenance of a steady production be rendered possible.

No account of the present condition of Cripple Creek would be complete without a reference to the epidemic of stock speculation which appears to accompany the operations of a new gold field with the stale iteration of the sea serpent story in the silly season of the year. In January the Secretary of State received $52,800 in payment of the registration fees of new mining companies. This would be less regretable were but a proper proportion of the amount spent in furthering the industry that contributed it, or if it represented an adequate ratio of expenditure in actual mining work. The original subdivision of interest which was intended to distribute the expense of mining among several where it exceeded the capability of one has now progressed so far that thousands of shares can be bought for a few dollars. The word "share" has lost its meaning—what share in a mine is represented by paper telling that its possessor owns so much stock in a million-dollar company floated on the flimsy basis of a hungry looking pocket hole? The whole business is fundamentally bad and is to mining what the bookmaker and bunco man are to legitimate horse-racing.

That many will be bitten is manifest. Nor is it particularly regrettable in some ways, seeing that so many of the transactions are based simply on the elementary philosophy that, though the mine be valueless, some one more foolish than the buyer will be found on whom it or its stock can be unloaded. The mine itself is usually lost sight of; it is merely an excuse for childish gambling. Not much sympathy need be wasted on those that get caught. It is an old story. The experience of past mining excitements gives warning which if unheeded brings merited punishment.

Mining is to-day a sound business; those who treat it as being otherwise deserve to fail. Good mines properly managed are plentiful at Cripple Creek without this absurd "speculative investment" of the irresponsible promoter. Honest advice from properly qualified and thoroughly experienced technical men can be had for fees less than those of the other professions, and if people choose to plunge recklessly on the suggestions of interested schemers, they must expect a fitting finale to their vagaries.

Stock speculations and share epidemics will rise and wane, but the development of the mines goes on unresting, and it is the pleasant duty of the writer to record the belief that Cripple Creek is destined to a future of long-continued productiveness.




STREET SCENE IN CRIPPLE CREEK.

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THE world's record for the greatest number of ems set in one hour on a Mergenthaler linotype was broken recently by B. J. Mensing, a compositor of the *Post-Dispatch*, at St. Louis, Mo. In that time he set up 10,685 ems, 585 more than did Green in Chicago, who held the former record. The event was a seven-hour contest between Robert Erancis of the *Globe-Democrat* and B. J. Mensing for a purse of $200. About $1000 changed hands on the result. Mensing won the contest, setting 74,100 ems to 65,800 by his opponent, and had ten minutes lost time.

*These minerals have the following composition: Calaverite, 55.5% tellurium, traces of silver, 44.5% gold; sylvanite, 55.8% tellurium, 15.70% silver, 28.50% gold; petzite, 32.68% tellurium, 41.86% silver, 25.60% gold.

*The amount of sulphur in the ores averages under 2 per cent. Some of the Bobtail ore reached 5 per cent, this being the maximum. The percentage is increasing as depth is gained and additional roasting facilities are becoming required.

†The Lawrence works have just been burnt down. They will be rebuilt immediately. Those at Gillett will be enlarged.

‡The largest is at Florence, the oil city of Colorado. Its capacity is about 90 tons daily, shortly to be increased to 300 tons. The first cyanide mill erected in the district is the Brodie plant, with a 40-ton capacity. In addition to these leaching plants, there are four or five stamp mills treating the oxidized ores with very varying results.

## "Invention"—The Indefinable Requirement of the Patent Law.

NUMBER II.

By W. H. SMYTH, Mechanical Expert and Consulting Engineer, Berkeley, Cal.

In recent years the scope and ramification of mechanical and other industrial processes have become world wide, effecting every act of life. Consequently the points of contact and coincidence of new devices have become more numerous, and opportunities for striking novelties have become fewer and fewer. It is under these circumstances that this subtle metaphysical—one is tempted to say occult—idea of invention has been given prominence, and the patentability of devices determined by fallible personal opinions, instead of facts and evidence.

The legal text-book writers, with every intention of rendering assistance to work-a-day men on a subject of practical importance, in dealing with the accepted idea of invention are irresistibly forced in the mazes of metaphysical and philosophical abstrucities.

But admitting what the text-book writers and the courts say on this subject, that invention does exist, though indefinable; that it is an "impalpable something" wholly within the domain of metaphysics and philosophy, does it not seem utterly illogical that the determination of these subtleties should be left to mechanics, chemists and lawyers.

Would it not be more reasonable that the examiners in the Patent Office, instead of being versed in the arts of their departments, be metaphysicians trained to determine mental principles and operations. And above all, would it not be more logical to try patent cases involving these issues before this same kind of experts, than as at present before judges who are neither specialists in the art involved nor metaphysicians, but simply men trained to determine and discriminate in matters of fact. "The mental process of invention, in most cases, is very similar to that of discovery. * * * * The distinction between them is almost always overlooked, sometimes its existence is denied by the courts." (Merwin.)

There is, as has been hinted at, still another phase of this question, namely, that "invention," instead of being the result of a peculiar, unique, and altogether exceptional mental process, is simply the result of conscious or unconscious reasoning on data supplied by observation, and in all respects similar to other mental processes, in which observation, memory and reason take part.

This view was set forth at some length in a recent number of the *Engineering Magazine*, under the title "Is the Inventive Faculty a Myth," by the present writer. It is not necessary to the present argument, and is simply referred to as offering a possible reason for the difficulty of defining wherein invention differs from other rational processes, also as suggesting the justice and advisability of determining first the *existence* of "invention," as interpreted by the courts, beyond question. Before demanding its presence as a statutory requirement to a common contract, "* * * * the statute demands a peculiar process of mind as the characteristic of invention. * * * * The statute is so interpreted by the courts. * * * * It is impossible to arrive at the patentability of an improvement in any other way." (Merwin.)

As illustrating how this demand for the presence of "*invention*" works in practice, take this case:

The Patent Office refuses to grant a patent, not on account of lack of novelty, for no anticipating device can be found, it is admittedly of great practical importance, but it is refused simply on the ground of want of invention.

After exhausting argument the applicant finally says: "Surely we must be quibbling about words. What does the Office mean by 'invention?' What has the examiner in mind which he says this device lacks?"

To this there is no reply except the arbitrary exercise of power.

This is not a suppositious case, for of late years it is becoming of frequent occurrence.

Before drawing conclusions from all the foregoing, I desire to make some remarks, which, while they do not bear directly on the present argument, do bear on the subject of invention in general, and will probably serve to give point even to the present matter.

The courts and authorities are agreed that "invention involves the spontaneous conception of some idea not previously present to the mind of the inventor" (Robinson), but that wise judgment in selecting and combining ideas already there has no part therein, and that "reasoning is not invention."—(Merwin.)

It is justly inferable, therefore, that inventive ideas do not depend upon other ideas, or they would not be spontaneous, but simply inferences.

This being so, it logically follows that a mind devoid of ideas, if such were conceivable, would be as fertile a field for invention, as one rich and full of ideas, concepts and observations.

Or to put it in another form, that in a mind stored wholly with, say, *legal* concepts and ideas, a *mechanical* invention is as logically probable as in a mind filled with observations of every variety of mechanical elements and combinations.

The born blind should invent new colors, and the born deaf compose music.

At the risk of opening the door to a metaphysical argument, which I would avoid, being a mechanic and not a philosopher, and my present object being the wholly practical one of suggesting a way of taking patents out of the misty region of metaphysics into the domain of facts, where they belong, still, I can not refrain from suggesting that when the first sentient atom perceived inert matter, the concept of resistance originated, the first embryonic idea, with and from which all others have arisen in continuous and unbroken sequence.

In every attempt to disentangle "invention" from other forms of thought much stress is laid upon the idea of its instantaneousness of operation. This, I take it, is a relic of ignorance, for we now know that even thought is not instantaneous. Rapidity is chaarcteristic of all thought. Is it not possible that behind this question of time lurks hidden the solution of many of the difficulties of "invention" as interpreted by the courts?

The phonograph is frequently cited as one of the most perfect illustrations of inventive genius.

In this I fully concur, and, further, I hold it to be an equally beautiful example of pure inductive reasoning, and that the idea of the phonograph being "spontaneously conceived" is simply unthinkable. For *its* conception a distinguished line of ancestry was required, among which as near kinsfolk were very sturdy ideas of sound waves, elasticity of diaphrams, and whole troops of mechanical ideas. And for a birthplace a mind furnished with every achievement of modern science and lighted by logic as clear as noonday.

Spontaneously conceived, forsooth!

In contrast to this may be mentioned the illogical unreasoning and unmechanical attempts of Von Kempelen, and later of Faber, to make a talking machine by copying the human speech organs, ignorantly overlooking what simple observation should have taught, that the human mouth, with other functions, is a tasting device, a grinding apparatus and a fighting machine, and only last and least of all, and incidentally, is used for talking, for which purpose, by the way, it is so ill adapted that it takes years of adjustment to do in the way of talking what the phonograph does instantly it is made.

"Reason is unraveling and invention is weaving of thought. Reason is analytic, invention is synthetic."—(Merwin). The error of this lies in the fact that reason is both analytic and synthetic. Illustrations, both analytic and synthetic, of convincing character could readily be given, but they would be out of place in this article.

"In the class under consideration (viz: inventions in which reasoning appears to be solely employed) reasoning is, indeed, the faculty most conspicuously used, but imagination must be employed before the reasoning begins, and in order that it may begin. For in these cases invention (imagination) is exercised * * * *in selecting out of a great many possible elements the particular element to accomplish the result desired.*"—(Merwin).

A pertinent inquiry is here suggested: "Invention" (Imagination) being unreasoning, how is it possible for it to select.

The quotation in effect concedes my whole contention. The courts and text-book writers first eliminate reason, and then immediately proceed to endow imagination with a power of *intelligent selection*, which *is* reason.

The better idea of imagination, I avoid the word "Invention" as being misleading, is just what the word implies, mentally *seeing images*, that is, a sort of mental pictorial scrap-book, in which is stored past visual observations (leaving out of consideration those who derive their principal impressions through other senses). *The imagination is just as inert and as incapable of conception, spontaneous or otherwise, as the physical scrap-book* used as illustration.

The circumstances of life and man's contact with nature disclose wants, deficiencies and lack of adjustment between him and his environment, which reason sometimes supplies by selecting directly from physical nature or by recourse to the scrap-book of reminiscent observations, i. e., imagination, image memory, alias visual memory, alias visualization, alias (though wrongly) invention.

A patentable combination, no matter how involved or complicated, is simply an aggregation of co-ordinating *individual* wants or deficiencies which have been *individually* supplied.

It would be an entirely erroneous impression to derive from my remarks, that because I question the existence of "Invention" as interpreted by the courts, I also discredit "Genius" or believe that poets are made not born. I hold in the profoundest reverence those giants of intellect, both past and present, to whom the world owes its masterpieces, and I do not fear that an intelligent inquiry into the causes of their greatness, no matter how searching, will detract from their glory or tend to diminish their number in the future.

It may possibly be urged by some, that tribunals of law when they adjudge the existence of the "Inventive faculty" simply adjudge the existence in certain individuals of capabilities, which enable those so gifted to accomplish results superior to anything which might reasonably be expected from the best minds and skill at present engaged in the cognate arts or callings; and when the same tribunals adjudge that a certain thing is an invention, they simply adjudge that it is distinctly superior to and different from anything that might reasonably be expected from the skill of the best minds versed in the arts involved.

If what has gone before is not considered to meet this objection, then a complete answer is to be found in the decisions of the United States Supreme Court, in which it has been held time after time that simple superiority, or superiority accompanied by novelty, either in device or result, does not entitle it to be considered an invention, or entitled to the benefit of the patent statute.

On this point I refer to the following cases taken at random:—

Union Edge Setter Co. vs. Keith, 139 U. S. 530. It was decided that the claim lacked invention, though the result was a more perfect machine.

Bussell Trimming Co. vs. Stevens, 137 U. S. 423. Patent performed the work it was designed to accomplish in a better and more workmanlike manner, and yet was held to lack invention as being improvement only in degree.

Consolidated Roller Mill Co. vs. Walker, 138 U. S. 124. Conceded that the peculiar arrangement of patentee is attended with better results than previously, still this would not necessarily sustain patent.

Aaron vs. Manhattan Ry. Co., 132 U. S. 84. Though patentee was entitled to the merit of being the first to conceive the convenience and utility of a gate opening and closing mechanism which could be operated efficiently by an attendant in a new situation, still this merit might not sanction patent.

Though taken at random, these serve to show that superiority is not a criterion of invention, nor is novelty, nor yet superiority and novelty, though they may indicate it; but the statute as interpreted by the courts demands something else, which is not simply superiority nor novelty, nor even a combination of these qualities.

It may of course be said that the devices in question did not disclose the degree of these qualities contemplated by the statute, but this simply carries the question back again to the original difficulty not a whit simplified. The determination of that degree would still be left to the arbitrary decision of individual opinion. But this line of argument is futile anyway, for it is not in accordance with the facts of the case.

The statute as interpreted *does* demand a prescribed character of mental operation or evidence of it in the device as a condition on the part of the producer to entitle him to the provisions of the statute.

It is urged that the law being practical simply attaches to words it employs—the meaning as nearly as possible given to them by common consent—and does not inquire if the words correctly interpret facts or whether there is any *real* foundation for them in fact. It simply uses them as the best means available to convey a meaning. Even this does not help the matter if that meaning be erroneous or confusing and a source of continued and increasing trouble, tending to thwart the very end for which the statute was formed.

That this is the case with the words Invention, Inventor and Invented is thoroughly appreciated by both the producers of new devices and lawyers whose business brings them into close acquaintance with matters relating to patents and patent litigation. And it is with this practical difficulty that the writer as a mechanic is interested at this time, and not with any fine-drawn metaphysical distinctions or modes of mental action.

It does not follow, of course, that because the present interpretation of a word in the statute works confusion and difficulty that therefore the statute is based upon a wrong idea and ought to be abolished. This paper has gone far wide of its intention if such an idea is deducible therefrom.

The patent statute stands a monument of human wisdom which has few rivals either in honesty of purpose or grandeur of result, and the writer would be the last to suggest anything which in his judgment would tend to weaken or cripple its beneficent working. The very opposite of this is the intention, which is simply to suggest the elimination of those elements which tend to obscure the meaning and balk the evident purport of the statute.

The object of the patent law was undoubtedly to encourage and reward industry and intelligence when directed in channels beneficial to the commonweal. There certainly was no idea of rewarding certain supposed freaks of nature for the possession of a peculiarity they could not help. Therefore, putting aside any metaphysical controversy, inasmuch as the criteria of one of the requirements to the patent contract are so utterly indefinite and the determination so impossible, does it seem the part of the practical common sense and business-like procedure to eliminate the element of confusion? All other matters which have been found by practice to be good and desirable would remain unaffected.

In fact, the substitution of the idea conveyed by such words as *discovered, produced, thought out, reasoned out* for that which now attaches to the third requirement of the patent contract would work no change whatever in the spirit of the statute to reward intelligent industry, but would sweep away the cobwebs of mysticism which festoon the ideas supposed to underlie the word "Invention."



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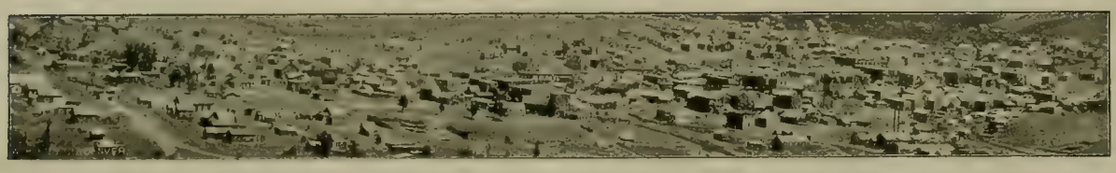


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TOWN OF CRIPPLE CREEK IN 1894.

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## ROOM 505 MINING EXCHANGE BUILDING,

DENVER ..... COLORADO.

## Matte Smelting.

NUMBER II.

Written for the MINING AND SCIENTIFIC PRESS by W. L. AUSTIN, Ph. D., Denver, Colorado.

The desirability of some cheap and practical method of matting sulphide ores, without preliminary calcination and in localities where carbonaceous fuels are scarce or almost unattainable, has long been recognized. Although many attempts have been made to produce such a process they have been uniformly unsuccessful, until the writer discovered the effect of a strong current of preheated air upon a blast-furnace charge consisting mainly of heavy sulphides.

The chief cause of most of the disappointments and failures resulting from such attempts, even after the way in which success might be achieved had been pointed out, has been very properly ascribed to the fact that those having charge of such operations have usually been accustomed to other lines of smelting and have been unable to break away from the customs and traditions to which they had become inured. If such an individual had acquired his smelting experience in an establishment where lead ores were treated, he would naturally build for pyritic smelting purposes a furnace greatly similar to those with which he was most familiar, and then endeavor to force the altered conditions of charge and fuel to meet the requirements of the apparatus he had constructed. With a singular fatality the use of lead-smelting furnaces has been general in experiment with pyritic smelting, and this practice has very much retarded the advance of this branch of industry.

Mr. Lang emphasizes the futility of adhering to preconceived notions of smelting in dealing with this new method of ore treatment. He expresses his views in the following language (see page 28 of his book): "It is only when we get away from lead smelting, discarding its mixtures, its slags, and to a large extent its apparatus, that we begin to realize the extent and variety of application and the suitability in diverse circumstances that characterize matte smelting.* It is for this reason, if for no other, that the application of the methods of lead smelting to the art have not been found to succeed, and why metallurgists of that school have not been, and are not likely to be, successful in their experimenting."

In the early, experimental stages of pyritic smelting circumstances compelled the use of blast furnaces built originally for other methods of smelting, and it is probably largely due to this precedent that later (with what might be supposed to be commendable conservatism in adhering to appliances which under skillful management had been temporarily made to accomplish certain purposes) furnaces have been built on similar lines, without sufficient consideration being given to the altered conditions under which they must be operated. A lead furnace, although admirably adapted to the purpose for which it was designed (i. e., the reduction of metallic lead from ore mixtures in which that metal is a prominent feature), is wholly out of place if used to smelt pyritic ores when it is desired to turn to account their fuel qualities. In speaking of lead furnaces the usual rectangular type which is in common use in Colorado is referred to. Such furnaces have been constructed measuring 140 inches by 36 inches inside of jackets at the plane of the tuyeres and about 20 feet in height, with one or more tiers of water jackets. The fact that the usual crucible has been replaced by a bottom plate supported upon screw jacks is not considered as an essential deviation from the general lines of the type referred to.

That furnaces built on the lines of those designed for smelting lead ores are not suitable for pyritic smelting becomes all the more patent when the two classes of fuel operated upon in the respective processes are considered.

The blast furnace fuels in common use (coke, charcoal, or anthracite) are such as present the combustible element (carbon) in a highly concentrated and comparatively pure state. These are prime requisites in fuels to be used for this purpose, and although other less concentrated forms of carbon have been advocated from time to time as substitutes, their adoption has not come into general practice.

In the mineral or artificial sulphides and arsenides the above requirements or a blast furnace fuel are found in a high degree of perfection, with this difference—the combustible components are not, as in the case of coke, practically a single element—carbon—but a combination of iron with sulphur or arsenic. The following table is given to bring out as prominently as possible the main features wherein these two classes of fuel radically differ:

COMPARISON OF CARBON AND IRON SULPHIDES AS FUELS.

| | CARBON. | IRON SULPHIDES. |
|---|---|---|
| Porosity | Great. | Practically none. |
| Surface exposed to blast | Very large. | External surface only. |
| Behavior in furnace | Retains its form until consumed. | Decrepitates, melts and drops to bottom of stack. |
| Products of combustion | Gases. | Mostly fluids or solids. Comparatively small amount of gases. |
| Principal direction of heat | Upward. | Downward. |
| Area of smelting activity | Large. | Restricted. |
| Chemical composition | Practically a single element. | A combination of elements which must be dissociated. |
| Time allowed for action | Indefinite, or until consumed. | Very short—only from moment of becoming fluid until globule has dropped past the tuyeres. |

*In using the term matte smelting it is assumed that Mr. Lang has reference here to pyritic smelting.

As these fuels are so very far apart in their physical, as well as chemical, properties, it would be only reasonable to suppose that some modification of the conditions under which they may be advantageously employed would be required in applying them to economic purposes.

It seems, therefore, hardly necessary to point out that an apparatus designed for burning coke as fuel (coke being a porous mass with large surface exposed to the action of the oxygen of the blast, and which maintains its solid condition and position in the charge while undergoing combustion, and passes directly from the solid into the gaseous state without any noticeable fusion) is not a suitable one for burning the various forms of pyrites, which are dense solids, practically impervious to penetration by the oxygen of the blast and possess the other characteristics given in the above table, yet these differences are ignored by those using lead furnaces for pyritic smelting.

When thrown into the blast furnace, pyrites part with some of their sulphur at a comparatively low heat, and the protosulphide of iron which remains, being readily fusible, melts in advance of the other slag-building components of the furnace charge; and, when so melted, trickles down through the subjacent mass. In dealing with sulphides as a fuel, there is, therefore, the further radical difference to be considered in that we have to do with a liquid combustible of a very dense nature, and the oxygen of the blast can only act on the limited outside surface of the heavy viscous drops as they fall through the charge. Furthermore, coke being a solid, retains its position in the furnace charge until it has been consumed by the action of the blast, whereas the liquid drops of iron protosulphide rush rapidly through the few feet of space which intervene between the point where liquefaction takes place and that of the entrance of the blast, and are only exposed to the action of the oxygen of the air for a very brief period. On account of the fluid nature of the fuel operated upon, time becomes an element of importance in the burning of sulphides, and the conditions, therefore, under which the combustion of these two classes of fuel should be allowed to proceed in order to derive their relative maximum efficiency are manifestly different.

The resulting products of combustion are as markedly distinct as the physical natures of the respective combustibles. In a coke-burning furnace the products of combustion are mainly gases and the tendency of the fire is to creep upward with the ascending current of gases, whereas in a sulphide burner they are largely fluids or solids, and the tendency of the fire is to follow the slag and matte downward. As a natural sequence, in a sulphide burner the stronger the blast the larger will be the amount of sulphide consumed and the hotter the lower part of the furnace will become, always supposing that the pyrites are supplied in sufficient quantities and in the proper manner to meet the requirements of the smelting operation.

An illustration of the downward tendency of heat in a sulphide burner was given in the early experimental work with this process, in the case of such a furnace operated at a point where only a very small amount of pyrites could be placed upon the charge on account of local scarcity of that material. It chanced one night that this furnace "froze up" from lack of fuel. The "freeze up" was complete. Bars were passed into the furnace on one side and out through the tuyeres on the other side, without discovering any fire; nor was any light at all disclosed on removing the breast. As the furnace was filled with charge nearly up to the feeding door, there was no hope of resuscitating it by the addition of ordinary fuel, for any coke thrown in, if indeed it could be even set on fire, would merely burn on the top without helping matters in the least. To ascertain whether there was any life in the furnace at all the tuyeres were replaced, the aperture in front closed and the blowing engine started up at full speed. Then it was that at the charging door of the furnace a faint bubbling could be heard, showing that somewhere in the charge a small reservoir of molten matter was still in existence and the blast passed through the charge freely. Now, as previous experience had taught that, by the help of the vibration caused by the blower, wherever air could find openings upward, usually fine sulphides could be made to sift downward through the same passages; therefore the attempt was made to reach in this way the molten matter which had been heard to bubble. It was expected that if the live fuel or molten matter alluded to could be reached, the pyrites so introduced would catch fire and that with their help the charge could be brought to fusion and the furnace washed out.

To accomplish this purpose three tons of clean pyritic "fines" were thrown into the furnace at one time in a mass, without the addition of any carbonaceous fuel whatsoever. The effect was startling, for within half an hour the blast had to be slackened up, as the furnace had returned to its normal condition and the heat in the lower part was so intense that there was danger of the base plate giving way.

This incident illustrates one point of difference existing between the two classes of fuel, carbon and sulphides, when applied in blast furnace practice, and explains in a measure why furnaces designed for burning coke are not suitable for using sulphides. Those who have experimented with pyritic smelting, using for the purpose a furnace designed for lead or copper smelting, will have encountered various difficulties which have caused great annoyance, perhaps forced a return to the use of coke, or even an abandonment of the purpose altogether.

That such troubles should occur is only to be expected when using an apparatus for a purpose other than that for which it was originally intended. The coke-burning furnaces, with their provision for hot ascending gases and preparative treatment of charge, do not meet the requirements of the case where readily fusible sulphides are the material to be acted upon. In pyritic smelting the volume of ascending gases is comparatively small, and it is not desirable to have the raw sulphides undergo any preparatory treatment before coming into the actual smelting zone. In a properly constructed pyrites-burning furnace the heat on top of the charge is not great enough to melt sulphur, and as a natural result that element sublimes off and may be readily condensed.

In any coke-burning furnace there is always an immense volume of gases (the products of combustion) which must be taken care of. These gases, acting upon the superincumbent charge, prepare it, where such preparation is necessary, for the smelting zone further down, and therefore the shaft of the furnace is lengthened out in order to afford the gases an opportunity for doing this work. If it is attempted to operate such a furnace with a charge carrying large quantities of raw sulphides and more or less coke, the heat carried upward by the carbonaceous gases, etc., causes an incipient fusion of the said sulphides before it is desirable that such should take place, and as a natural result there is a sticking up of the whole mass, adhesion to the furnace walls, "bridging," "scaffolding," etc. So it is evident that the high stacks of the lead-smelting furnaces are not only unnecessary but positively detrimental to the proper carrying out of pyritic smelting. There are no higher oxides to be reduced, and no suitable gases to reduce them even were they present, and as the main tendency of the heat is downward, the economy usually effected by absorbing in the charge the escaping sensible heat contained in the products of combustion is not so apparent. In fact, in pyritic smelting, which is essentially an oxidizing fusion of the furnace charge, and not a reducing fusion, the high stack has no function to fill and is very much in the way.

As would naturally be suspected where two fuels of such radically differing properties are concerned, their simultaneous employment in the furnace leads to manifold complications and should be avoided, if possible. Apart from the fact that coke has a much greater exposed surface and therefore, on this account alone, will naturally burn before the protosulphide of iron (with its limited, dense exterior) is attacked at all, the latter possesses the additional disadvantage of being a composite fuel. The elements—iron and sulphur—which are combined in the protosulphide must first be dissociated from each other before either is in a condition to unite with the oxygen of the blast. This dissociation can only be accomplished by the expenditure of a certain number of heat units, and if these are not forthcoming the protosulphide is allowed to pass by and the more exposed coke is attacked in preference. So, it is a matter of fact that where coke and pyrites are exposed side by side to the action of an air blast the former will be attacked first, both on account of its greater exposed, cellular surface and because it is practically a simple element. Such being the case, what results would naturally be expected from employing a high stack and using both fuels—coke and iron protosulphide—in the smelting column? If a high column is used, sufficient coke will have to be added to keep the mass open and loose, and this amount may equal or exceed that which would have been necessary to fuse the charge without considering the thermal qualities of the pyrites—in other words, about the same amount of coke is requisite in fusing down a high column of sulphides as would be needed in smelting the same weight of material after it had been calcined in the usual manner; and, therefore, nothing would be saved except the cost of calcination, and that would be largely offset by the small degree of concentration effected in smelting the raw ore with coke.

If, on the other hand, a low smelting column is used the coke burning first fuses the protosulphide of iron, which drops through the neutral gases without being oxidized. In such a case, where much coke is used, the iron pyrites loses scarcely more than one of its sulphur atoms and the resultant protosulphide fuses and passes out of the furnace as a matte, without undergoing the decomposition calculated upon. The result is a disarrangement of the furnace charge due to the withdrawal of the iron as protosulphide, which it was intended to burn to protoxide and in that form to combine with the silica present to form a fusible slag. In this way there accumulates in the furnace a silicious mass which darkens the tuyeres, and in the case of brick furnaces assists in burning out the walls.

If small quantities of coke are used, a see-sawing motion is set up in the charge. The coke, as has been explained, burns first, and, melting down the sulphides, produces an undesirably large amount of matte. Sometimes the quantity of matte will equal or exceed the amount of slag coming out of the furnace. Then, as the coke becomes scarcer in the charge, the protosulphide of iron burns, the relative quantities of slag and matte produced are reversed, the amount of matte is not sufficient to protect the metals it is desired to save, and the slag is found to assay high. So that, in any case, whether with a high or low smelting column, the addition of coke to the charge (provided the latter contains sufficient iron sulphide to furnish the necessary thermal units for the operation) produces complications, and it is very doubtful whether such practice can compete upon equal terms with ordinary reverberatory or blast furnace matting. In isolated instances conditions may arise where such a hybrid process could be recommended, but they will be found to be few, and in any case where the percentage of iron sulphides (or arsenides) in the charge can (by partial concentration or otherwise) be brought up to 65 or 70%, the addition of coke is wasteful and an unwarranted extravagance.

One other interesting point in connection with the dissimilarity of the results produced in the burning of coke and iron sulphides should be mentioned. In coke-burning furnaces the products of combustion are to a large extent combustible gases, and the heat generated is, owing to the burning of such gases, distributed over considerable space and carried upward into the furnace. But in sulphide burners, the products of combustion being ferrous-oxide and sulphurous-acid gas, the heat generated is localized, remaining with the matte and slag, and only a small amount of the sensible heat is carried upward in the comparatively small volume of inert sulphurous acid gas and nitrogen. For this reason the smelting zone of a sulphide burner is small as compared with that of a coke burner, and the top of the charge is dark and cool, when the stack is closed, and when open it is covered with pale sulphur flames produced by the burning of the extra atom of sulphur driven out of the bi-sulphide of iron in the upper part of the shaft.

In the foregoing remarks the writer has endeavored to explain why it is not conducive to good work to employ the two dissimilar fuels, carbon and iron protosulphide, simultaneously. The attempt has also been made to show that, as the action of the latter is so very different from that of the carbon, it follows as a natural sequence that a furnace designed for smelting with coke can hardly be equally well adapted for use where sulphides furnish the principal source of heat, and least of all is the lead-smelting furnace a suitable apparatus for the purpose. Quoting again from Mr. Lang's work (page 29): "Speaking from the experience gathered in several years of experiment and research, I must say that it appears to me there is no possibility of successful matte smelting when following the lines laid down by the lead smelters. In fact, it is only when we leave the beaten track and strike out upon a road of our own that we put ourselves in the way of successful achievement."

The influence of temperature of blast upon the two classes of fuel, carbon and iron protosulphide, may be discussed in a subsequent article.

W. L. AUSTIN.

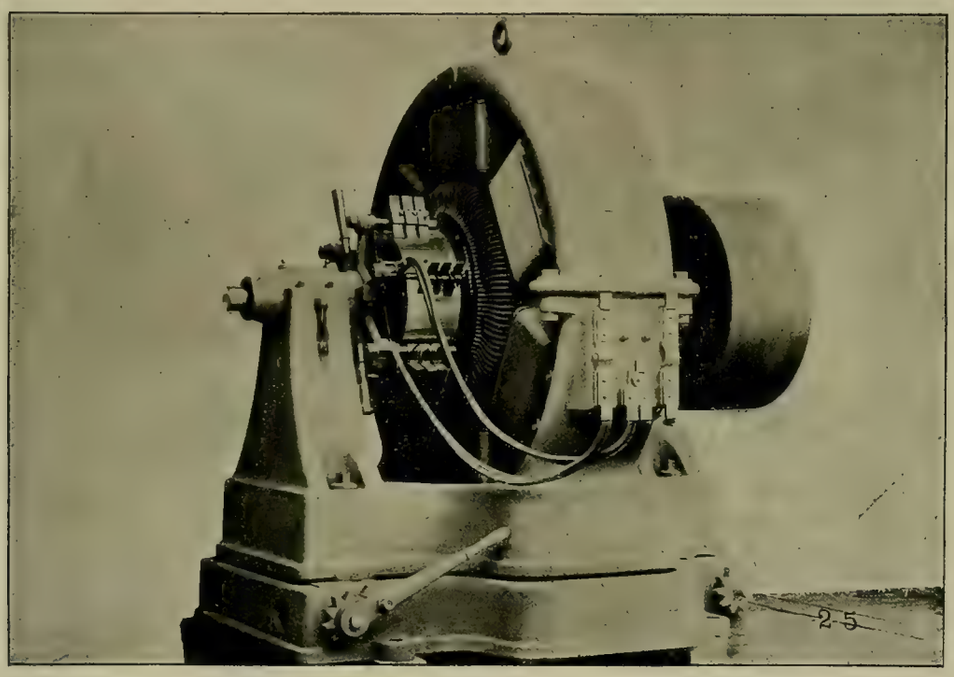
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# Scientific Progress.

## Origin of the Roentgen Rays.

California scientists have given considerable attention to the new system of radiography, and if they are not first with the correct solution or explanation of the phenomenon, have at least made simultaneous discovery of what is evidently of transcendent importance concerning the rays. Fernando Sanford of Stanford University, who three years ago directed scientific attention thereto, Dr. P. M. Jones of this city, each pursuing investigations along the same general lines, have each reached the same conclusion, viz., that the rays emanate from the anode, and not, as heretofore supposed, from the cathode or from the glass. Prof. H. A. Rowland points out the same fact, and Elihu Thomson, another eminent authority, is equally positive in making a similar statement.

The latter thus sums up his conclusions:

1. Cathode rays are produced at lower exhaustions than give rise to anode rays that reach the glass.

2. Anode rays are best produced at the very highest exhaustions short of insulation.

3. Anode rays pass out through the glass of the Crookes tube; cathode rays (radiant matter) apparently do not.

4. Both anode and cathode rays cause fluorescence of the glass and possibly of many other substances.

It is not known whether anode rays cause fluorescence of any substances that are not so affected by cathode rays, and vice versa.

5. Anode rays are erratic in distribution from the anode surface. Cathode rays are of nearly uniform distribution, and leave the cathode surface at right angles.

6. Anode rays are not capable of being deflected by a magnet; at least, not after they have passed the glass. Cathode rays appear to be so deflected within the tube, and after they have traversed an aluminum window.

7. Diminishing the size of the anode concentrates and focalizes the rays emanating therefrom. Shaping the cathode into a concave cup gives rise to a focus of cathode rays by virtue of their direction being normal to the cathode surface.

The question suggests itself: Can anode rays reach and pass through a thin aluminum sheet which is at the same moment the cathode for the discharge? And, on the other hand, can cathode rays traverse the anode if of thin aluminum sheet? It is probable that opacity of the opposite terminal would be noted in these cases, and possibly deflection of the rays in each case near the terminal of opposite polarity to that emitting the rays.

Dr. Jones deduces the following:

1. That the X rays do not emanate from the glass, as advanced by Roentgen.

2. The X rays do not emanate from the cathode terminals.

3. A certain number of X rays emanate from the anode irrespective of the position of the cathode.

4. The number and intensity of the X rays emanating from the anode per se seem to increase directly with the vacuum and the current tension.

5. (*a*) X rays emanate from a metal plate within the tube, which is not connected to either pole but against which the cathode rays are projected.

(*b*) The greater the intensity and concentration of the cathode rays upon the unconnected metal plate the greater the number and intensity of the X rays which emanate therefrom.

6. An unconnected metal plate within the tube may project X rays when it is not connected to either terminal, and when a second metal plate intervenes, cutting off the cathode rays.

7. X rays are produced in their maximum quantity and intensity at and emanate from the anode when the cathode rays are focused on the anode terminal.

8. That the X rays focused upon a cathode terminal are reflected therefrom.

The last is in his judgment so far only hypothetical; the others he considers as being demonstrated.

Prof. Cory of the University of California at Berkeley, who has given the subject continuous practical investigation, thus sums up:

"Cathode rays positively electrify any solid upon which they impinge, probably by carrying electrified particles to the solid. The source of the Roentgen rays, then, is the solid upon which the cathode ray first strikes and gives up, or partially gives up, its negative charge. A second solid behind the first may be a source of Roentgen rays if the first solid does not take up the entire negative charge from the cathode ray."

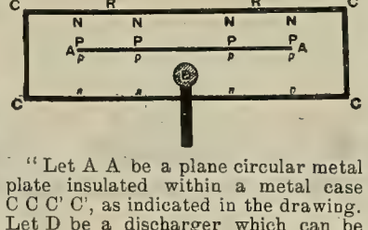
Discussing the investigations and conclusions of his co-workers, Prof. Cory concludes:

"The Roentgen ray may, therefore, proceed from the anode, the florescent glass, a disconnected terminal or a grounded terminal, provided the shape of the tube and the relative positions of the electrodes be such that the cathode rays impinge on the anode, glass, disconnected or grounded terminal, respectively. That the anode, because it is the anode, may be the source of the Roentgen rays is probable, but the fact that in almost every case when the anode has been found to be the source of the rays the shape of the tube has been such that the cathode rays impinged directly upon it. The use of a disconnected terminal, even connected to the earth as the source of the rays, places the matter in a very different light."

The final word in these discussions is still unspoken. The subject is receiving thorough experiment, and the best scientific minds of the world are now busy on the discovery of the source of Nature's most recently revealed secret.

In connection with the matter the following, written by Lord Kelvin, F. R. S., on "the generation of longitudinal waves in ether," is supplemented. That distinguished leader in science says:

"In a short note published in last week's *Nature* I suggested an arrangement of four insulated and electrified spherical conductors with their centers in one line, giving rise to ethereal waves in the surrounding atmosphere, of which the disturbance in the line of centers is essentially longitudinal. But at any finite distance from this line there must be laminar or distortional waves of the kind expressed in Maxwell's equations. The object of my present communication is to show an arrangement by which a large space of air is traversed by pressural disturbance, or by waves essentially longitudinal, or by condensational-rarefactional vibrations, with but a very small proportion, practically evanescent, of laminar waves.




"Let A A be a plane circular metal plate insulated within a metal case C C C' C', as indicated in the drawing. Let D be a discharger which can be pushed in so as to make contact with A.

"Let A be charged to begin with, positively for instance, as indicated by the letters P P *p p*, N N *n n*, showing negative electricity induced by it. Let now the discharger be pushed in until a spark passes. The result, as regards the space between A A and the roof R R over it, will be either an instantaneous transmission of commencement of annulment of electrostatic force or a set of electric waves of almost purely longitudinal displacement, according as ether is incompressible or compressible.

"Hence, if the theory of longitudinal waves, suggested by Roentgen as the explanation of his discovery (for the consideration of which he has given strong reasons), be true, it would seem probable that a sensitive photographic plate in the space between A A and R R should be acted on, as sensitive plates are, by Roentgen rays. Either a Wimshurst electrical machine or an induction coil, adapted to keep incessantly charging A A with great rapidity so as to cause an exceedingly rapid succession of sparks between D and A, might give a practical result. In trying for it the light of the sparks at D must be carefully screened to prevent general illumination of the interior of the case and ordinary photographic action on the sensitive plate.

"The arrangement may be varied by making the roof of sheet aluminum, perhaps about a millimeter thick, and placing the sensitive photographic plate, or phosphorescent substance, on the outside of this roof, or in any convenient position above it. When a photographic plate is used there must, of course, be an outer cover of metal or of wood, to shut out all ordinary light from above. This arrangement will allow the spark gap at D to be made wider and wider, until in preference the sparks pass between A A and the aluminum roof above it. The transparency of the aluminum for Roentgen light will allow the photographic plate to be marked, if enough of this kind of light is produced in the space between the roof and A A, whether with or without sparks.

"The new photography has hitherto, so far as generally known, been performed only by light obtained from electric action in vacuum; but that vacuum is not essential for the generation of the Roentgen light seems demonstrated by an experiment by Lord Blythswood. As a result he exhibited a glass photographic dry plate with splendidly clear marking which had been produced on it when placed inside its dark slide, and held in front of the space between the main electrodes of his powerful Wimshurst electrical machine, but not in the direct line of the discharge. He also exhibited photographic results obtained fromt he same arrangement, with the only difference that the dark slide, wrapped in black velvet, was held in the direct line of the discharge. In this case the photographic result was due, perhaps wholly, and certainly in part, to electric sparks or brushes inside the enclosing box, which was, as usual, made of mahogany with metal hinges and interior metal mountings. I have suggested to him to repeat his experiments with a thoroughly well closed aluminum box, instead of the ordinary photographic dark slide which he used, and without any black cloth wrapped round outside. The complete metallic enclosure will be a perfect guarantee against any sparks or brushes inside.

"If the arrangement which I now suggest, with no sparks or brushes between A A and the roof, gives a satisfactory result, or if it shows a visible glow on phosphorescent material placed anywhere in the space between A A and the roof above it, or above the aluminum roof, it would prove the truth of Roentgen's hypothesis. But failure to obtain any such results would not disprove this hypothesis. The electric action, even with the place of the spark so close to the field of the action sought for as it is at D, in the suggested arrangement, may not be sudden enough or violent enough to produce enough of longitudinal waves, or of condensational-rarefactional vibrations, to act sensibly on a photographic plate, or to produce a visible glow on a phosphorescent substance."

ALTHOUGH Roentgen's work was so thoroughly done that little has been added to it by other experimenters, his view that the X rays differ from the cathode rays is not accepted by all physicists. Prof. Dolbear believes that the same results could be obtained from any source of light. He has given some attention to the matter, having, as long ago as 1892, photographed an iron star through an ordinary table top by means of electric sparks. He stated two years ago that all rays have similar characteristic properties, that what any ray can do depends upon the kind of matter it falls on, that what we know as light has no existence apart from the eyes, and that it has long been known that ether waves too long to be seen by the eyes could be made to produce photographs. Le Bon has reported to the French Academy of Science photographs obtained through plates of iron and lead by a three-hours' exposure to the light of a paraffine lamp.

LAST WEEK from San Francisco there went to Alaska a surveying party from the U. S. Geodetic Corps, to determine, geographically, the exact location of certain passes in the Aleutian islands and of other northern points in reference to Ounalaska and Kodiak island. They expect to be engaged in the work until July 1st, '96.

## Steal Inventions of Others.

As Thomas A. Edison watched the pumping of air from a glass tube in his laborrtory a day or two ago a man said to him:

"You patent every little thing you discover, don't you, Mr. Edison?"

"I do," said Mr. Edison. "And do you know why I do it?"

"I suppose you do it so you will reap the benefit of your discovery," was the reply.

"I thought you'd say that," said Mr. Edison, "and I don't suppose you will believe me when I tell you it isn't so. But it isn't so, nevertheless. I discover a great many things that I would be glad to give to the public for nothing, but I don't dare. I patent these things to save myself from defending lawsuits. There are a lot of sharks in this world who are continually on the lookout for new things, and when one of them hears of something new he bustles to the patent office to see if it is patented. If it isn't, he claims it as an original discovery and files his claim. Then he will turn right around and, like as not, begin suit against the very man who invented the thing for making or using it. The inventor will say: 'But I discovered this thing first; I am the inventor.' He is referred to the Patent Office, where he finds the official claim of original invention. The fact that the papers are filed long after he made his discovery does not help him, for all the other man does is to hire a fellow to swear that he made the discovery a month or two prior to the date the inventor claims. It sounds ridiculous, probably, but it is a fact, that there are often races between the inventors and these sharks to reach the Patent Office, the sharks having had early information about the inventor's discovery. There are many such races, and thousands of dollars depend on each one. What I say is literally true. I patent things, and no doubt many other inventors patent things just to save defending lawsuits."

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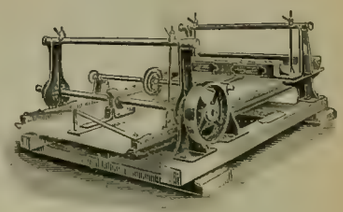
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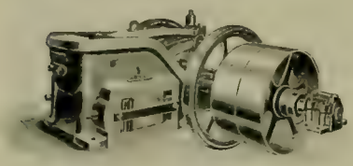
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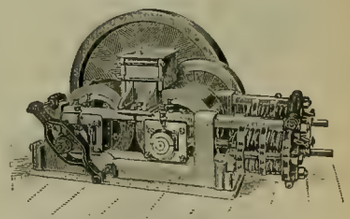
No single machine so far introduced has proved so effective or so economical in first cost and cost of maintenance as the **PERFECTION CONCENTRATOR** (see cut), and none has the capacity for amount of work so effectively performed. It is light; is easy of access for accurate adjustment; has hard rolled copper plates which will not buckle from bumping. Capacity depends on character of ore but generally may be stated as twenty tons per day of twenty-four hours.



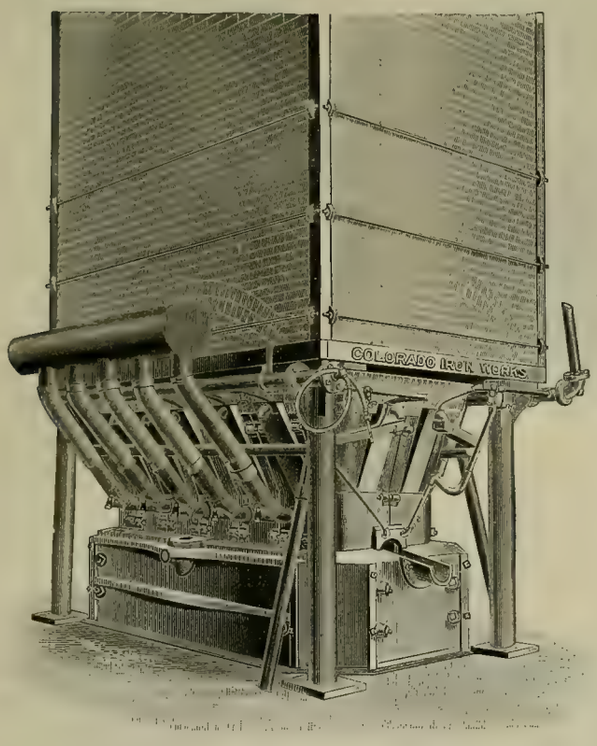


The best **ORE BREAKERS** made are the **BLACK HAWK** (or Dodge) and the **BLAKE.** We manufacture the Black Hawk (see cut) in four sizes, viz.: 6″x9″, 7″x11″, 11″x15″ and 16″x24″ jaw opening; the Blake in three sizes, viz.: 4″x10″, 7″x10″ and 9″x15″ jaw opening; and the **BOSWORTH,** for sampling and assay offices, in one size, viz.: 4″x6″ jaw opening.

We claim first place for our **CRUSHING ROLLS** and call especial attention to the following points: Solid Cast Frame, insuring rigidity; Rolled Steel Shells or Tires (no soft spots or holes); Universal Journal Boxes; End adjustment on Roll Shaft, to adjust rolls laterally, provides for even wearing of faces and consequently an even product is assured until shells are worn out. Look at cut opposite. Pamphlet on "Explaining Ore Crushing" mailed to interested parties on application.



CAZIN IMPROVED CRUSHING ROLLS.




WATER JACKET SMELTING FURNACE.

Our Specialty is SMELTING FURNACES and Equipments for the reduction of

## Gold, Silver, Lead and Copper Ores,

Having built many of the large plants in successful operation from Montana to Old Mexico. We show on the left a cut of our Standard Silver-Lead Furnace, and below some Slag Trucks for the quick handling and disposition of slag from smelters.

The following smelters are using these Slag Trucks:

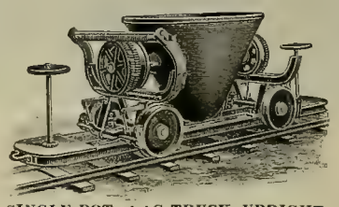
OMAHA & GRANT, GLOBE, Denver, Colo.

PHILADELPHIA, PUEBLO, Pueblo, Colo.

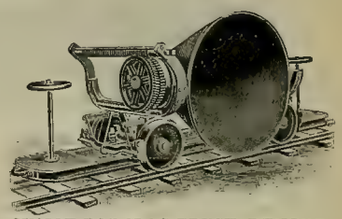
ARKANSAS VALLEY, Leadville, Colo.

UNITED VERDE COPPER SMELTER, Jerome, Ariz.

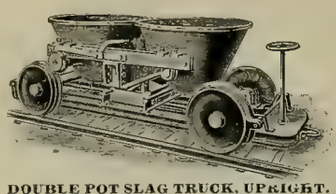
GREAT NATIONAL Monterey, Mex.



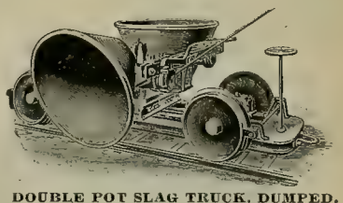
SINGLE POT SLAG TRUCK, UPRIGHT. Capacity, 35.16 Cubic Feet.



SINGLE POT SLAG TRUCK, DUMPED. Weight Empty, 6,350 Lbs.



DOUBLE POT SLAG TRUCK, UPRIGHT. Capacity Both, 15.6 Cubic Feet.



DOUBLE POT SLAG TRUCK, DUMPED. Weight Empty, 5,900 Lbs.

WE CAN FURNISH ON SHORT NOTICE

**BOILERS and ENGINES, STEAM PUMPS,**

HEAVY CASTINGS AND FORGINGS.

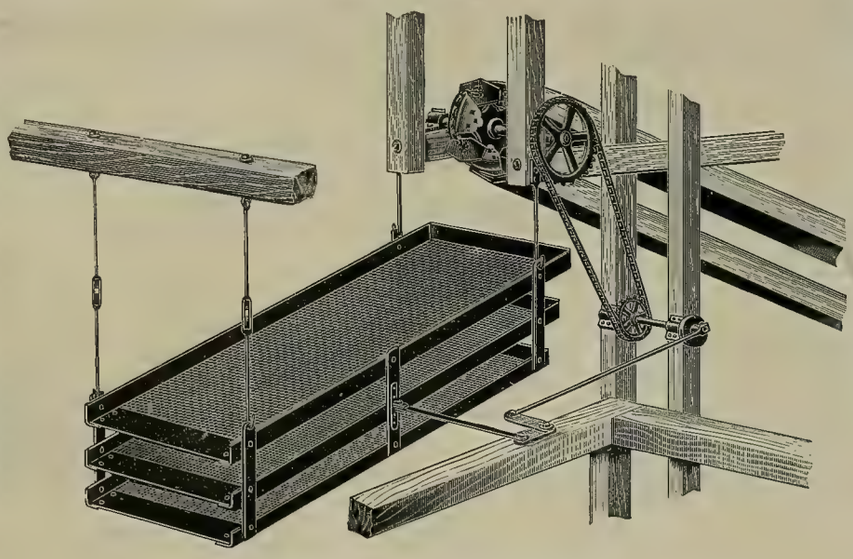
EQUIPMENT FOR CONCENTRATION AND AMALGAMATION MILLING, and Cyanide, Chlorination and Bromine Processes.

CATALOGUES AND INFORMATION ON APPLICATION.

# Mechanical Progress.

### Harrison Conveyor Coal Screen.

Herewith is illustrated a Harrison coal screen, manufactured by Borden & Selleck Co., 48 Lake street, Chicago. The plan of operation is to raise the screenings high enough to be delivered on an inclined screen, which can be changed to any angle so as to have the coal run rapidly or slowly. It has a side shake motion, but can be changed so as to give it an end shake. It is made entirely of iron and steel, and where a capacity of about twenty-five tons of screenings per hour is to be separated the cost of the screen is about $100. The cost of the elevator is not included, as it varies with the height. The wires of the screens can be removed or replaced with new wires of coarser or finer meshes in a few minutes. The screen is also adapted for separating gravel, etc.



HARRISON CONVEYOR COAL SCREEN.

### Jeffrey Roller Chain Conveyor.

The illustration on this page shows a Jeffrey roller chain conveyor erected for the Allice Falls Co., Keesville, N. Y., by the Jeffrey Manufacturing Co., Columbus, Ohio. This conveys the pulp wood out of the water, and carries it to the storage ground, about 450 feet distant. The special feature of this conveyor is the roller chain, which enables it to operate smoothly, with little or no friction and wear, thus requiring little power. The chain has spurs or hooks at regular intervals, which carry the logs.



JEFFREY ROLLER CHAIN CONVEYOR.

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"THE plan of winding steam pipes over eight inches in diameter with $\frac{3}{16}$-inch wire copper, thus nearly doubling the bursting pressure, is pronounced by competent judges to be an important change in engineering practice," says the *Railway Review*. "Further, that the thickness of sheet copper forming the pipe may be reduced to the minimum, and, at the same time, insuring the full advantage of wire winding, an improved system of manufacturing steam pipes has been devised, described as consisting in simply using copper of the thinnest possible gauge to form the interior or core of the pipe, while the body proper is composed of steel wire wound closely around the core, the interstices being filled in with copper by electro disposition. Increased strength comes from wire winding."

---

"STEALING THUNDER" has been objected to. On March 18th the New Jersey Legislature passed a law making the stealing of electric current from wires in that State punishable with fine and imprisonment.

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**Rapid Land Clearing.**

Large areas of forest land all over the western country are now lying idle and comparatively valueless, waiting to be cleared. Owners of such land can hardly fail to be interested in any practical mechanical device for doing this work of clearing effectually and cheaply. Such a machine has actually been in use on the Pacific Coast for eight or ten years, and has given excellent satisfaction in every instance. This machine is known as the "California Stump Puller"; it is the invention of the late Geo. Harvey, by whom it was introduced. The Cal. Stump Puller Co. is manufacturing it, at Zoe street. Write to the general manager, A. Barnes, for a catalogue that contains much valuable instruction about clearing land. See illustrated advertisement in another column of this issue. *

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**Improved Side Shake Vanner Concentrator, Recently Built By Mr. Woodbury.**

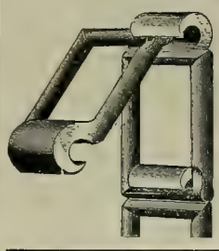
After years of experience in building ore concentrators, Mr. Woodbury has gained sufficient knowledge to select and adopt all the best methods, hence the success that he has met with in improving and perfecting a side shake machine. He is now building these machines four, five and six feet wide in connection with his multiple belt and end shake machines. The Woodbury patent distributors are used on the side shake machines, giving a better distribution to the pulp on the belt. All these machines have first-class rubber belts and corrugated edges which prevent cracking. A six-foot vanner with improved distributor is capable of handling the pulp of five stamps. See cut in advertisement. *

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UNITARIAN LITERATURE sent free on application. Address Postoffice Mission Committee, First Unitarian Church, corner Geary and Franklin streets, San Francisco. Mention this paper. *


**Jno. D. Eby,**

17 & 19 Main St., San Francisco, Cal., U. S. A.



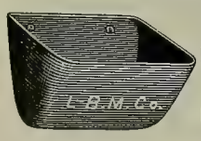
The only complete line of **Link Belting, Sprocket Wheels, Elevator Buckets & Boots, Take Ups, Etc.** On the Coast, For immediate Delivery.

Also Logging Locomotives, Engines, Boilers, Sawmill and Woodworking Machinery, Supplies.

**LINK BELT MACHINERY CO.**

Engineers, Founders, Machinists.

CHICAGO, U.S.A.




Malleable Iron Buckets of approved pattern and weight.

Elevators & Conveyors.

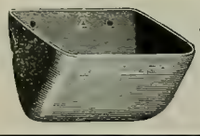
ELECTRICAL MINING MACHINERY.

Water Elevators, Shafting, Pulleys, Gearing, Friction Clutches, Rope Sheaves, Etc.

**Send for Special Mining Machinery Catalogue.**

**FIELD & GOETZMANN, ENGINEERS,**

712 Cooper Bldg., Denver Colo.



Detachable chain belt, sprocket wheels, malleable and steel elevator buckets, elevating and conveying appliances.

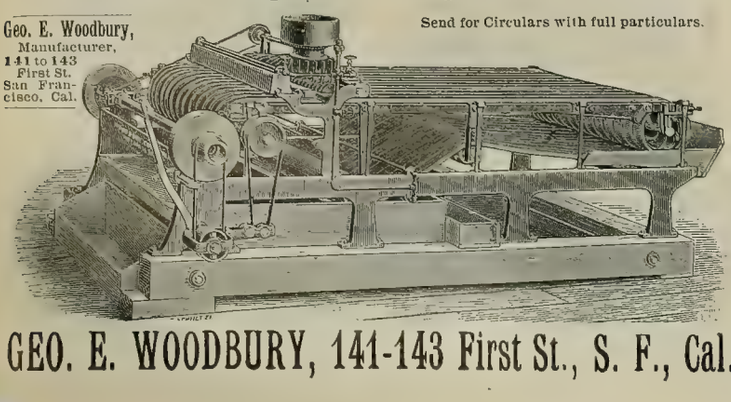

## Engineer Wants Position.

Has had marine, stationary and locomotive experience. Best of references from present employer and others. Address W. M. BROWN, JR., Mechanical and Erecting Engineer, 974 Center St., West Oakland, Cal.

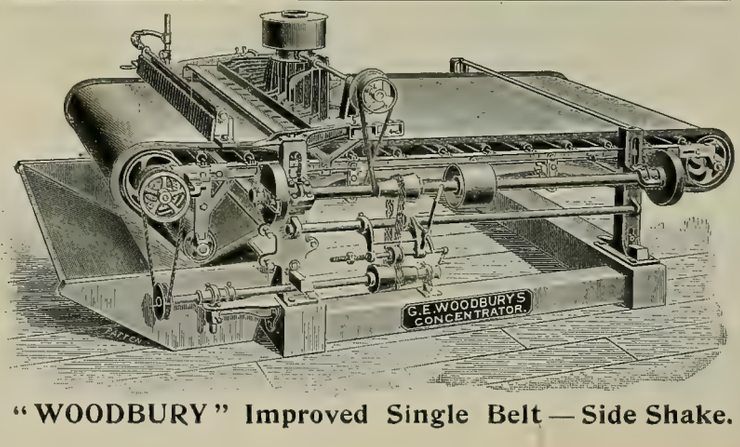

**"WOODBURY" Improved Multiple Belt—End Shake.**

Send for Circulars with full particulars.

Geo. E. Woodbury, Manufacturer, 141 to 143 First St. San Francisco, Cal.



**GEO. E. WOODBURY, 141-143 First St., S. F., Cal.**




**"WOODBURY" Improved Single Belt — Side Shake.**

# THE MacArthur-Forrest Cyanide Process.

## IT RENDERS LOW-GRADE ORES VALUABLE. 200 TONS OF CRIPPLE CREEK ORES TREATED DAILY.

## CAPACITY BEING DOUBLED.

One of the chief factors in the success of Cripple Creek has been the local facilities for profitably disposing of the low-grade ores that cannot stand railway freight and smelter charges. This has been made possible by the erection of two large cyanide plants — The Brodie Gold Reduction Co., 50 tons daily capacity, and The Metallic Extraction Co., 150 tons daily capacity. These plants are situated respectively at Mound City, El Paso Co., and Cyanide, Fremont Co. The Metallic Extraction Co. is at present doubling its capacity to more fully meet the supply of ore, and The Brodie Gold Reduction Co. also proposes installing new machinery. Although neither of these plants have been in operation for a year, they have already recovered over half a million dollars from low-grade ores that, but for the cheap treatment and high extraction by cyanide, must have remained valueless on the dumps. The accompanying engravings show the exterior of the Brodie Mill and also a part of the interior of the leaching department in that plant. This Process is at present in successful operation in over thirty mills operating on low-grade ore and tailings over all the Western mining States and Territories. The Gold and Silver Extraction Co. of America, Limited, with head offices in Denver, who control the patents for the United States, has for some time been suing the Mercur Gold Mining and Milling Co. of Salt Lake City, Utah, for infringement. This suit, which was regarded as a test case, was recently decided in favor of the patentees by a Decree entered in the Circuit Court of the State of Utah. A copy of this Decree is printed below. The Mercur Co., in accordance with this Decree, has now paid The Gold and Silver Extraction Co. *$20,000* for back royalties, and has taken out a License from them covering future use of the Cyanide Process at the Mercur Mill, on payment of regular monthly royalties hereafter. The Gold and Silver Extraction Co. are headquarters of all technical information and assistance for all who propose to adopt the Cyanide Process. At present, The Leadville Gold and Silver Extraction Co. is erecting a fifty-ton daily capacity Cyanide Plant at Leadville to handle the low-grade ores of the Leadville Gold Belt. The Company is composed of Ex-Governor J. B. Grant and Mr. W. H. James of the Omaha and Grant Smelters, Mr. August Meyer of the Kansas City Smelting Co., and Messrs. John Campion and Wm. Byrd Page of the famous Little Johnnie Mine, Leadville. Other plants are in course of erection elsewhere.



EXTERIOR OF THE BRODIE MILL.



PART OF LEACHING DEPARTMENT IN THE BRODIE MILL.

## THE PROCESS.

The Cyanide Process, as usually conducted, may be conveniently divided into three stages: First, the preparation of the ore. The ore has usually to be reduced to a fineness corresponding to 20 to 40-mesh per lineal inch, without producing an undue amount of dust, the desideratum being a pulp that, for the given mesh, will contain the minimum amount of dust. Such a pulp will be granular, and permit the free percolation of solutions through its mass. With properly designed machinery, working on ores of moderate hardness, it is possible to crush to 40-mesh without producing more than 10 per cent that will pass through a 200-mesh screen. The next step in the operation is to place the properly granulated pulp in open leaching tanks of capacities varying from 10 to 300 tons capacity or over. As it takes practically the same time to treat a charge of 10 tons as it does one of 300 tons, the economy and convenience of large charges is obvious. Weak solutions (0.4 to 0.6 per cent) of cyanide of potassium are allowed to percolate through the charge, say from three to five days, and, when the extraction of the precious metals is completed, water is added to replace the cyanide solution and the charge is then sluiced out, or, where water is scarce, it is shoveled out of the tanks. Finally, the cyanide solution which has percolated through the tank charged with crushed ore emerges carrying its burden of gold, and is next conducted to the precipitation boxes and caused to percolate slowly through zinc shavings. There the gold is deposited as a dark brown, or dark yellow, powder, which is cleaned up periodically, freed from zinc and smelted, the resulting bullion usually being disposed of at the local mint. The cyanide solution, freed from gold by passing through the zinc boxes, is returned to the leaching tanks to dissolve more gold, and is thus kept in continuous circulation, though, of course, fresh cyanide is added from time to time to keep the strength of the solution normal. The Gold and Silver Extraction Co. of America, Limited, was awarded the leading Process Medal at the World's Columbian Exposition.

**Official Decree in the Mercur Cyanide Case.**

**The following is the full text of the Decree of the United States Circuit Court for the District of Utah in the case of The Gold and Silver Extraction Company of America, Limited, vs. The Mercur Gold Mining and Milling Company, John Dern and Henry W. Brown, as entered by Hon. John A. Marshall, Judge of the District:**

**United States of America,** } ss.
**DISTRICT OF UTAH,**

*In the Circuit Court of the United States in and for the District of Utah aforesaid.*

**Present: HON. JOHN A. MARSHALL, Judge of said Judicial District.**

THE GOLD AND SILVER EXTRACTION COMPANY OF AMERICA, LIMITED, *Plaintiff.*

*VS.*

THE MERCUR GOLD MINING AND MILLING COMPANY, JOHN DERN AND HENRY W. BROWN, *Defendants.*

**DECREE.**

The summons and complaint in this action having been duly personally served on all the defendants above named, upon the said The Mercur Gold Mining and Milling Company and John Dern on the 12th day of January, 1895, and upon the above named Henry W. Brown on the 14th day of January, 1895, and the defendants having all duly appeared in said action and filed a demurrer to said complaint on the 11th day of February, 1895, and the plaintiff having by leave of the court filed an amended complaint on the 5th day of April, 1895, and a second amended complaint by leave of the court on the 9th day of July, 1895, and a third amended complaint by leave of the court on the 16th of March, 1896.

**Now**, on reading and filing the annexed consent of the attorneys for all the respective parties, and on motion of Messrs. Marshall & Royle, Bennett, Harkness & Bradley and Williams, Van Cott & Sutherland, Hugh Butler and Walter D. Edmonds, attorneys, or of counsel for the plaintiff, it is hereby

**Ordered, Adjudged and Decreed** that letters patent of the *United States, Number 403,202*, issued to John Stewart MacArthur, Robert W. Forrest and William Forrest, on the 14th day of May, 1889, for improvements in process of obtaining gold and silver from ores, and the claim of said letters patent are good and valid in law, and that the plaintiff herein is entitled to the exclusive rights in and to and under the said letters patent, and in and to the inventions secured thereby, and that the entire title to said letters patent is duly vested in the plaintiff.

**It is Further Ordered, Adjudged and Decreed** that letters patent of the *United States, Number 418,138*, issued to John Stewart MacArthur on the 24th day of December, 1889, for improvements in metallurgical filter, and each and every claim thereof are good and valid in law, and that the plaintiff herein is entitled to the exclusive rights in, to and under the said letters patent, and in and to the inventions secured thereby, and that the entire title to said letters patent is duly vested in the plaintiff.

**It is Further Ordered, Adjudged and Decreed** that the defendants have jointly and severally infringed upon the said several letters patent upon each and every claim of each thereof, and upon the exclusive rights of the plaintiff thereunder, by using in the treatment of ores in their mines and mills the improvements in the process of obtaining gold and silver from ores, which are described and claimed in said letters patent Number 403,202, and also conjointly said patented improvements in metallurgical filters, which are described and claimed in the claims of said letters patent Number 418,138, by using substantial processes of separating precious metal from ore con-substantially in subjecting the powdered ore to the action of a cyanide solution, containing cyanogen substantially in the proportion not exceeding eight parts of cyanogen to one thousand parts of water, as described and claimed in said letters patent Number 403,202, and also conjointly with the use of said process; further using metallurgical filters containing the improvements and inventions described in said letters patent Number 418,138, and as claimed in the claims thereof.

**And**, an accounting being waived,

**It is Hereby Further Ordered, Adjudged and Decreed** that the complainant do recover of the defefendant, The Mercur Gold Mining and Milling Company, the sum of Twenty Thousand Dollars in full of all the gains, profits, savings and advantages which the said defendant, The Mercur Gold Mining and Milling Company, has derived, received or made, by reason of the infringement of the plaintiff's exclusive rights under the said letters patent aforesaid, or either of them, and also any and all damages which the said plaintiff has sustained by reason of such infringement of its exclusive rights by the said The Mercur Gold Mining and Milling Company.

**And it is Further Ordered, Adjudged and Decreed** that the defendants, The Mercur Gold Mining and Milling Company, John Dern and Henry W. Brown, and each of them, their and each of their servants, agents, attorneys and workmen be, and they hereby are, severally enjoined and restrained from directly and indirectly using or causing to be used any process or improvements like or similar to those which the the said defendants or either of them have heretofore used which may in any wise infringe either of the patents hereinafter named, in the treatment of ores in their said mines and mills, in the process of obtaining gold and silver from ores, or containing or embodying the inventions, improvements and process or either of them, or any part of them described and claimed in said letters patent Number 403,202 or any substantial or material parts thereof as claimed in the claim of said letters patent, and from imitating or using the said inventions, improvements or process, or either of them, or any part or parts thereof in any way whatever during the term of said letters patent Number 403,202.

**It is Further Ordered, Adjudged and Decreed** that the defendants, The Mercur Gold Mining and Milling Company, John Dern and Henry W. Brown, and each of them, their and each of their servants, agents, attorneys and workmen be, and they hereby are, severally enjoined and restrained from directly or indirectly using or causing to be used any metallurgical filter like or similar to those which the said defendants, or either of them have heretofore used, which may in any wise infringe either of the patents herein named, or containing or embodying the inventions, improvements or mechanism or any part thereof, described in the claims of said letters patent Number 418,138, or substantial and material parts thereof as claimed in the claims of said letters patent, and from imitating or using the said inventions, improvements or mechanisms, or any part or parts thereof, in any way whatsoever during the term of said last named mentioned letters patent.

By the Court,

JOHN A. MARSHALL, District Judge.

**We Consent** to the form of the foregoing decree and to the entry thereof.

THOMAS MARSHALL, JONATHAN C. ROYLE, P. L. WILLIAMS, WALDEMAR VAN COTT, C. W. BENNETT, WM. M. BRADLEY, *Solicitors for Plaintiff.*

(Signed) HUGH BUTLER, *of Counsel.*

W. H. DICKSON, FRANK PIERCE, *of Counsel for Defendants.*

FRANK PIERCE, *Solicitor for Defendant.*

# Electrical Progress.

MANY electric power stations are greatly exercised over the fact that not a few of the business houses and manufacturing places in their immediate vicinity obtain their electricity for light and power purposes without paying for it. The free discussion of the way in which the pipes running under many city streets have been honeycombed and destroyed by the electrolytic action of the stray currents from trolley lines has taught the public that where electric roads are operated there is plenty of current, as it were, lying loose, and the next idea that naturally presents itself is to turn it to account. Any electrician can, for a few dollars, make the required connection, and the electric companies have no case against the man who does it. It is not like tapping a gas main, for the electricity is taken from the ground, and not from the company's wires. All along the line of electric roads in large cities are numberless pipes, which, being good conductors, are sought by the stray electricity. Water pipes are particularly susceptible, as water itself is a good conductor. To utilize the current it is only necessary to attach wires to a motor, and a very efficient power is obtained without expense. It is also said that a great deal of private lighting is never paid for, and owes its existence to this deflected electricity.—Scientific American.

THE cathodic rays literature is overwhelming, and comprises more that is sensational than scientific. Among minor matters is considered worthy of note the discovery and publication by Dr. W. J. Morton of a new method of producing cathodic rays in vacuum tubes by means of a static machine and Leyden jars. The cathodographs taken by this process are of unusual strength and cleanness. This is a new proposition in Roentgen photography. The historical fact that Dr. Morton made a demonstration of the production of etheric light by means of the static machine and the same bulb he is now using for producing Roentgen rays, in 1893, before the American Institute of Electrical Engineers, now thus acquires additional interest and importance. Another valuable new departure is reported from Toronto, where Professors McClellan and Wright have discovered a method of taking instantaneous photography by cathodic rays. Hitherto it has been found impossible to focus the rays, which radiated in all directions with varying intensity. By covering the Crookes tube with a glass jar, the rays are directed downward, there flection obtained practically focusing the rays and giving an instantaneous photograph.

ELECTRIC welding progresses. Welding of metals by the electric current was but recently looked upon as a pretty laboratory experiment, but its commercial value is now being recognized. The real advantage of the system is not so much its economy as that it is a method of securing an absolutely reliable result. On straight welds it is estimated that it will cost between 10 and 15 per cent more than the ordinary smith's work, but, on the other hand, out of 500 set trials there has not been a single failure or even a defective weld. The metal, when put under excessive strain, will also break at a point other than the welding junction. One firm which uses the system for piercing shafts from three-eighths of an inch to two and one-half inches in diameter, and for heating necks and bearings for hardening purposes, says that it can get through at least two-thirds more work for each machine than a smith and striker, at a less cost, and with scarcely any waste of iron.

THE possibility of telegraphing through space, which was apparently demonstrated last year by W. H. Preece, has been turned to account in a most effective way for maintaining communication between the mainland and the Fastnet lighthouse, on the southwest coast of Ireland. Formerly the difficulties of carrying a telegraph cable up an exposed rock, where it was subject to constant chafing, were almost insuperable. The non-continuous system is now used, and works admirably. The cable terminates in the water, sixty yards off, and the electric currents sent from the shore find their way through this distance to two bare wires that dip into the sea from the rock. The same system could find practical trial at Tillamook Rock lighthouse, about twenty miles from the mouth of the Columbia river, off the Oregon coast, where for ten years sporadic efforts have been made to secure continuous telegraphic communication with the mainland, the violent seas that eternally sweep the basalt base of the island lighthouse precluding all possibility of cable connection.

A NEW use of the trolley roads is being thought out by railroad men and has already been put into practice in certain parts of the Central Traffic Association territory. A trolley line, for instance, which runs out into country districts from large cities and villages is having its cars so built as to haul one or more freight cars to certain points away from the steam railroad lines. These cars carried in this way farther into the interior are permitted to lie at certain points to receive grain from farmers' deliveries by wagon, or run on sidings alongside warehouses which are open to receive the produce of the farmer. In this way it is calculated that the farmers will be stimulated to use the lines more to carry freight into market and save expense of hauling it themselves. It is almost a new development in the use of the trolley, and railroad men predict that it may revolutionize the present system of railroading in some respects. It is even suggested that it may become necessary for large railroading companies to equip their own branch lines with a trolley system so as to cater to a new class of business in this direction.

TELEGRAPHY is now passing, like so many other industries, from the stage of hand operation to that by machine. Hand telegraphy has continued to be practiced with wonderful tenacity. Even now, probably 90 per cent of the telegraph business of the world is done by hand. In America and England it is by hand and sound. In all other countries it is effected by hand and sight, although Belgium is just beginning to use the sounder. France, Germany, Italy, Austria, Spain, Russia and in fact the rest of the world use the Morse key and a receiving instrument which records the dots and dashes in ink on a paper tape. In the new system a marvelous stride is taken in telegraphic transmission. A message is put on a continuous tape and placed in a transmitter. At the touch of a key the tape rushes under the "brushes" of the transmitter, and the message is printed on a tape at the other end of the line. Mr. Delany, the inventor, claims for the system a working speed of 800 words a minute, and has sent over 3000 words, or nearly two ordinary newspaper columns in one minute.

THE American Electric Heating Corporation, after six months of negotiation, has absorbed all the important electric heating companies and the control of the new consolidation has passed into the hands of a syndicate. The concerns absorbed by the American Co. are the Western Electric Heating Co. of St. Paul, the General Central Electric Heating Co. of New York, the New England Heating Co., the Burton Electric Heating Co. of Richmond, the Carpenter Electric Heating Co. of St. Paul, the Dewey Electric Heating Co. of Syracuse, the Richelieu Electric Heating Co., as well as several others which have not been active in the business for some time, but which owned valuable patents. The manufacturing will be concentrated at Cambridgeport, Mass. J. I. Ayer, president of the National Electric Light Association, is the general manager. The capital stock is $10,000,000, and an issue will be made of $500,000 bonds. The bonds will be cumulative after January 1st, 1898, to have a sinking fund of $10,000 per annum.

NICOLA TESLA is credited with a statement last week that he was satisfied he had a machine, which, when perfected, would enable him to make practical experiments in distributing electric waves about the earth so that messages might be conducted to all parts of the globe simultaneously. He believed that electric waves might be propagated through the atmosphere and even the ether beyond, a disturbance of the waves at any point being instantly felt at every point along them. He declared that he believed that the transmission of news about the earth by electric waves in the place of wires was no longer a dream.

JAMESTOWN, SOUTH DAKOTA, to January 1st, has paid $8 per month for its electric lights burning to midnight. The citizens thought that rate excessive, and all the lights have been turned off. Jamestown has a supply of water from a 3½-inch artesian well, which is used for fire protection and the furnishing of power to about twenty water motors in the city. As this power is all taken up, the municipal authorities are considering the sinking of a six-inch well to furnish power to run an electric-light plant. They have decided that this is the cheapest and most profitable remedy available.

TELEPHONIC COMPETITION in this city has led to one company offering to put in telephones in kitchens of private residences for fifty cents per month. Another company will put in a telephone having connection with the general exchange for $2.50 a month and five cents a switch. In Los Angeles a company offers similar service for $2.50 and $3.50 per month.

AT Ogden, Utah, the Pioneer Electric Power Co. has let a contract for making six miles of wooden piping, which will bring the water of Ogden river from the dam to the power house at the mouth of the canyon, to Chris Darff of Ogden for $50,000.

THE Mercur, Utah, Electric Light and Power Co. will turn on its currents May 1st, with a capacity for supplying 1000 lights. The dynamos will be located in Ophir canyon, from which the light and power will be transmitted a distance of six miles.

THE Park City, Utah, Electric Co. has incorporated; capital stock, $300,000. Jas. Moffatt of Salt Lake is treasurer and secretary. The idea is to generate electrical power in Cottonwood canyon and transmit it for light and power purposes to Park City.

THE Bend Power Co., Mariposa Co., Cal., which proposes to install an electrical power plant, is asking mine owners and others likely to use power or light from them to state their requirements so that adequate machinery may be put it.

### A Daring Conception.

Preparations are under way for the creation in Cincinnati of a stupendous engineering novelty. It is intended to carry passengers from Sedamsville, directly over the Ohio river, to Lagoon Park, and the startling feature of the scheme is that the transport cars are to be lifted 120 feet in the air and then swung across the river by the overhead pulleys. Extraordinary as the scheme may seem, it is one which is in common and successful use—though not now as a means of passenger traffic—and the plans and specifications for the proposed structure are in the hands of the contractors. The scheme was devised as the result of investigations made last summer, with a view to arranging some practical method of direct communication between the western part of Cincinnati and the Kentucky pleasure resort. Briefly, the plan is as follows: Two steel towers, each 152 feet high and 50 feet square at the base, are to be erected, one on the river bank in Sedamsville, and the other 1760 feet distant, on the edge of the Lagoon grounds, in Bromley. The towers are to be connected with four patent steel carrying cables of 50 tons tensile strength. Beneath each tower there is to be a waiting room, and at the side of each tower will be the landing, to which the car descends. The hoisting and propelling machinery, weighing 60 tons, will be located in the tower, 60 feet above the ground. The span of the cables will extend 1760 feet, being 150 feet from the ground at the ends, and having a sag at the center of from 60 to 90 feet, according to the load suspended to them. The car will weigh 10 tons empty, and will carry 50 people. When the car is loaded it will be hoisted vertically from the landing until, by a series of automatic clutches, it is suspended to the pulleys on the four carrying cables. It will then be propelled by a system of tug cables and pulleys across to the opposite tower, traveling at the rate of 1200 feet a minute. At the opposite end it will be lowered to a landing, and the passengers will disembark, either in the Lagoon grounds or Sedamsville, as the case may be. Some idea of the immensity of the undertaking may be gained when it is known that the towers will be higher than any building in Cincinnati, and that the whole plan involves an outlay of over $1,000,000. It will require two miles of two-inch cable and eight miles of running cable. The plans have been sent to the Secretary of War for his inspection, as his permission is required for the erection of any structure crossing a navigable river.


THE KINKEAD MILL.

The Latest and Best.

CAPACITY.....10 to 15 tons.
POWER REQUIRED.....only 2-horse.
TOTAL WEIGHT.....only 2½ tons.
TOTAL COST F. O. B.....only $1000

This includes Automatic Self Feeder, Mill, Silver Plates, Mill Frame Timbers, Foundation Timbers, etc.

NO NOISE—NO VIBRATION—NO JAR.

More than double screen surface with one-quarter power and less than one-half wear and tear of ordinary Stamp Battery. **Can be set up in 24 hours.**

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Gold, Silver and Lead Ores and Concentrates

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Examinations and Reports of Mining Properties made.

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# GILLETT, El Paso Co., Colo.

## THE GREAT SMELTER AND REDUCTION CENTER OF THE

# CRIPPLE CREEK MINING REGION.

### Three Immense Plants Being Erected and Others Arranged For.

**GILLETT** will be to the Cripple Creek country what Anaconda, Montana, is to Butte City—the Great Industrial Center of Activity where the millions of tons of ores from the Cripple Creek and adjoining sections will be treated by the new processes which are now operated there and under construction for that purpose. IT IS AN IDEAL TOWNSITE LOCATION, Level and Sightly, and has the great advantages of Abundant Fuel and Water. IT CONTROLS THE WHOLE WATER SUPPLY of the surrounding mining sections and is the Head Source of Water Supply for the adjacent mining camps. A large number of the richest mines of the Cripple Creek district border the townsite, many of which are now nearly sufficiently advanced in development to commence the shipment of ore. The veins are large, well defined, and give sure promise of immense future returns in the precious yellow metal. The outlay of hundreds of thousands of dollars in the already existing and contracted for reduction plants, and the certainty of the location of others there in the near future, assures GILLETT of a permanent and rapid growth; and it is confidently predicted that very shortly GILLETT will be the GREAT CENTER OF BUSINESS AND INDUSTRY and the Most Populous City of the Cripple Creek District. Stores, hotels, banks, business houses, etc., are being erected as rapidly as lumber and brick can be procured, and the activity of the knowing ones to be in the front rank of advance in this commercial center almost borders on a boom. The heavy financial backing and permanency of the big establishments which are under construction at GILLETT, however, precludes any idea of mushroom growth. Everything is going forward on carefully laid business plans, with the idea of sufficient capacity for taking care of the present and future immense output of the Cripple Creek section. On these lines GILLETT'S INDUSTRIES are being erected, and as to the growth of the town, that will take care of itself. It needs no boomers to insure that rapidity which characterizes the growth of a locality so situate that the business of a rich mining section must of necessity be carried on within its limits.

With the idea of accommodating business men with ground on which to build and carry on trade and traffic, and for the building of homes for the thousands of mechanics, miners and laborers to be employed in the great smelters and reduction works operated at GILLETT, the Company has platted a part of its land and is now selling off lots at VERY LOW PRICES on the following terms: ONE-HALF CASH ON DAY OF PURCHASE, when the purchaser will receive the Company's regular form of contract for a deed, to be executed upon payment of the balance due, provided such payment is made within SIXTY DAYS FROM DATE OF PURCHASE. If the entire purchase price is paid in CASH, a deed will be executed AT ONCE. TITLE ABSOLUTELY PERFECT. Address,

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Established 1860.

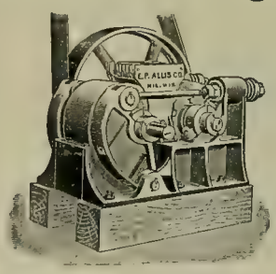
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PATENTED SEPTEMBER 19, 1893. CHEAPEST, SIMPLEST, MOST DURABLE AND CLOSEST SAVING CONCENTRATOR IN USE. FRANK BARRERE, Secretary and Manager.

Can be seen in operation at the Company's works, 132 Main Street, San Francisco.

Office, 116 Davis Street.

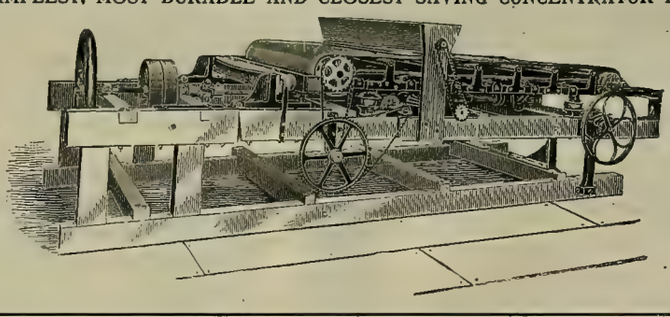
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A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.

SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION

CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
Including prepared canvas belt 4 ft. 6 ins. wide.



FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.

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Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,

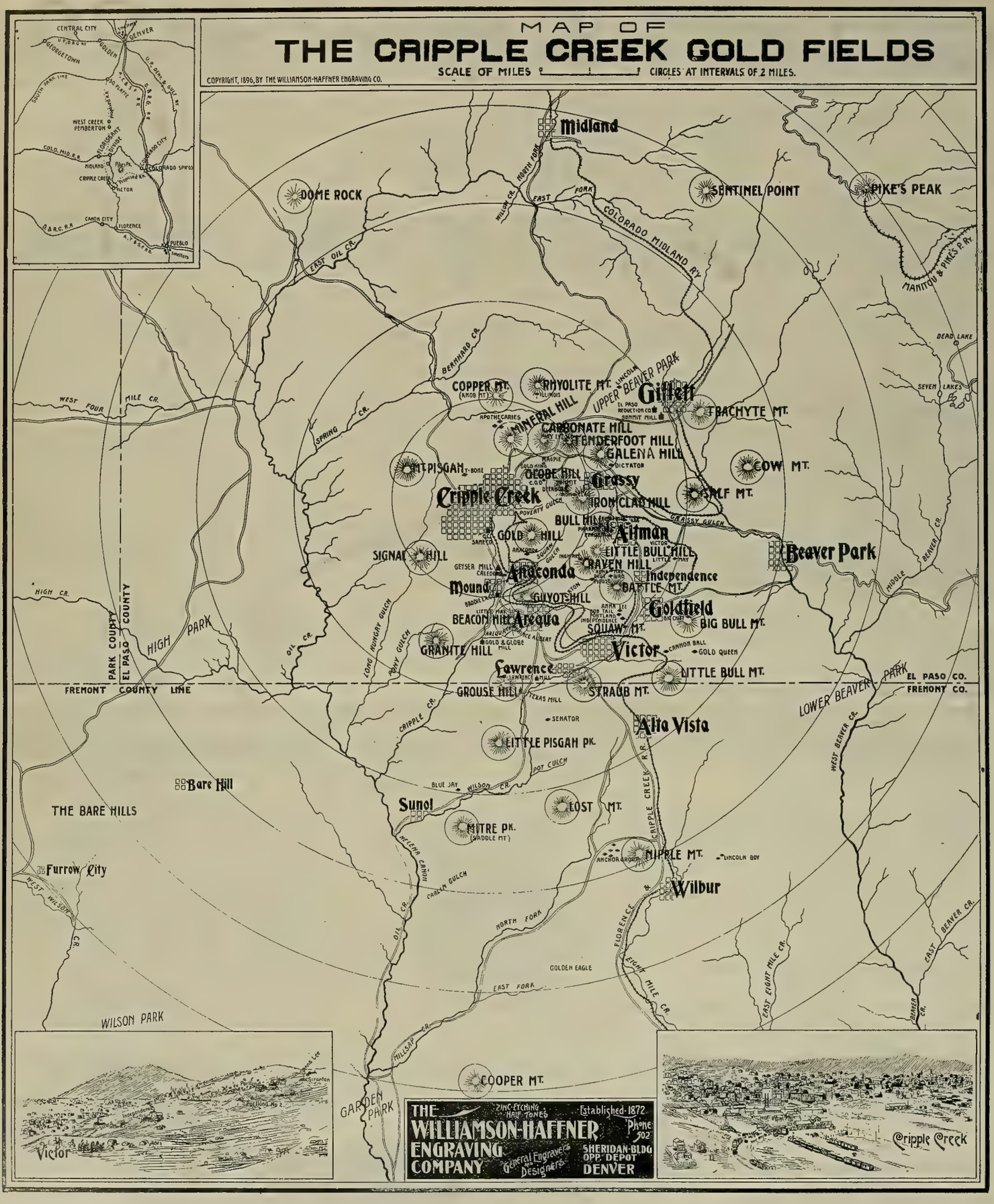
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**Old Abandoned Mines and Tailings** can be profitably worked by this new and wonderful process.

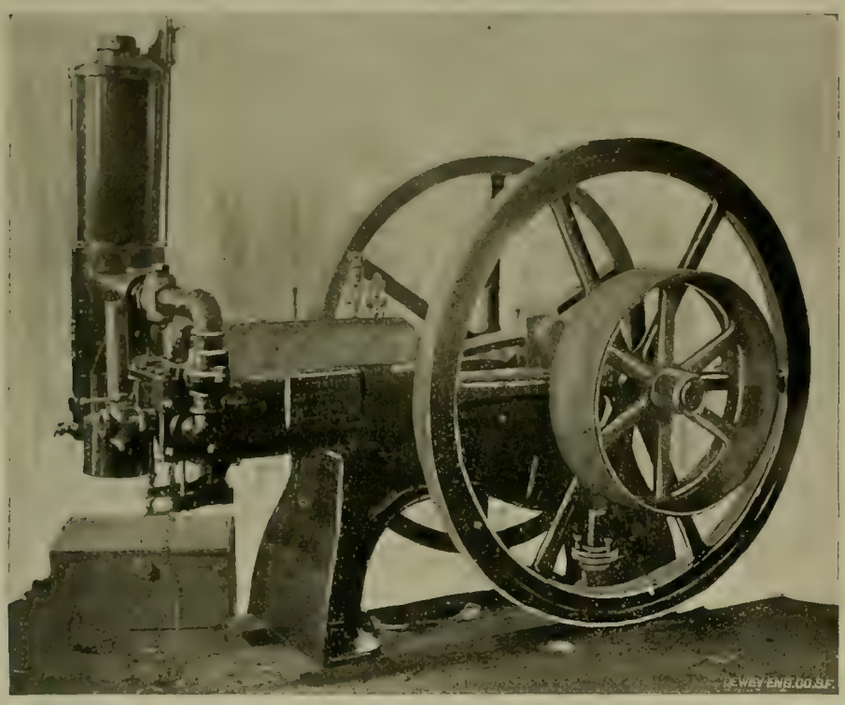
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The most economical motive power ever invented, costing but 10 cents per H. P. per ten hours run, using crude oil. Cheap, safe, reliable and clean. Strong and simple to operate. Requires no engineer, and when you stop, all expenses cease, and no fire is left to endanger your building. Send for Illustrated Catalogue with full particulars, and mention the MINING AND SCIENTIFIC PRESS.

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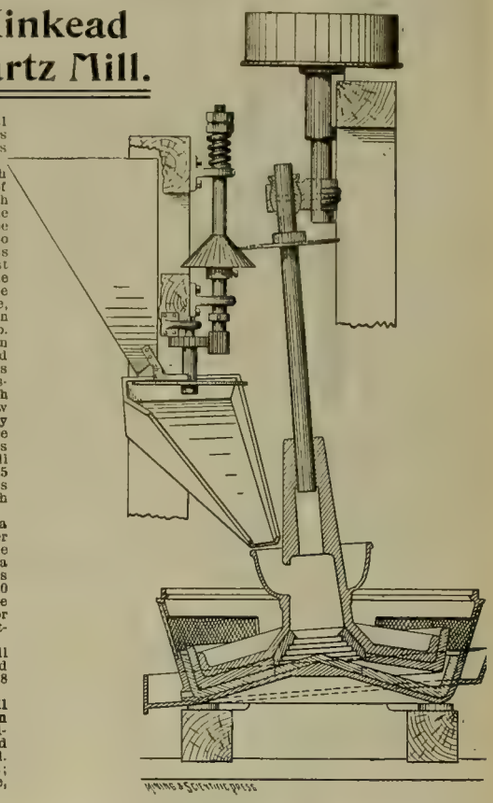
## The Kinkead Quartz Mill.

This sectional drawing shows the main features of **The Kinkead Quartz Mill** which will do the work of five stamps with less than half the power, and can be built and put into operation for less than half the cost of stamps. The only wear is the shoe and die, which is less than that of one stamp. The cheapness in first cost and operation of this mill makes it possible to work with profit ores so low in value that they have heretofore been treated as waste. Each mill will crush 15 tons in 24 hours through a 40-mesh screen.

It requires a two-horse power Daniel Best Crude Oil Engine, at a cost of 10 cents per H. P. per 10 hours' run. There is no vibration or jar, and very little noise.

Engine and Mill can be set up and running in 48 hours.

**Price of Mill $1,000, f. o. b. San Francisco.** Feeders, Apron and Plates included. Weight, 2½ tons; heaviest piece, 1200 pounds.



# PROSPECTING HOIST.

Total Weight. . . . . 650 lbs.

Lifting Capacity . . . . . 250 to 500 lbs.

Heaviest Piece . . . . . 280 lbs.

## Just the Plant for Prospectors.

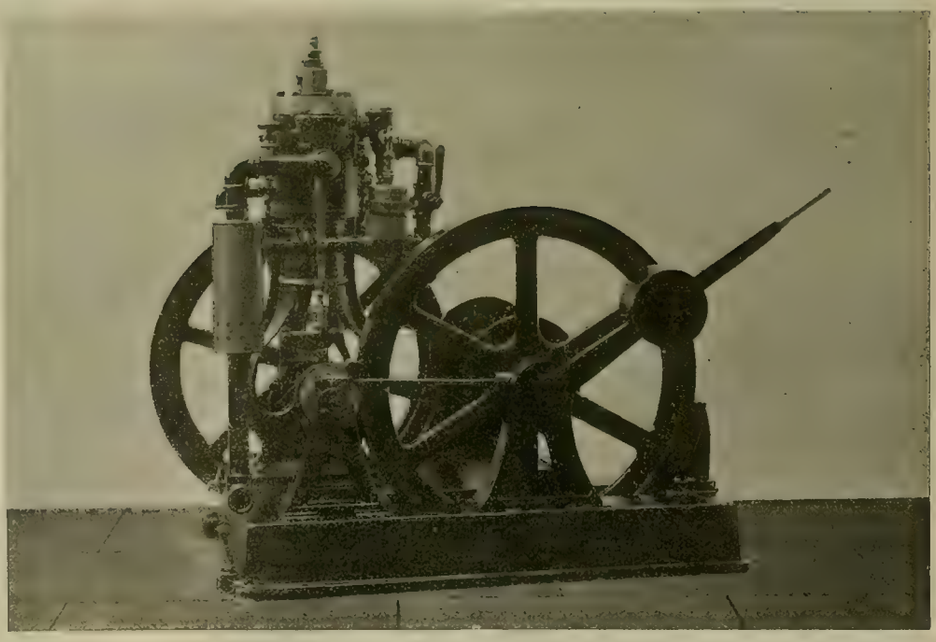
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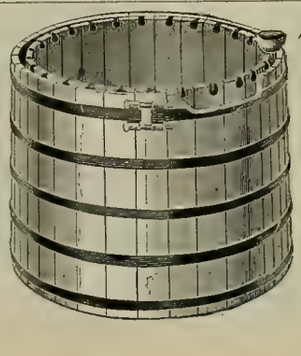

TO THE STOCKHOLDERS OF THE SOUTH PALOMA GOLD MINING COMPANY, LIMITED:

Notice is hereby given that by resolution of the Board of Directors of the corporation, adopted on the 21st day of March, 1896, a meeting of the stockholders of the corporation was called for the purpose of increasing the capital stock to the amount of two hundred thousand dollars, to be divided into one hundred thousand shares of the par value of two dollars per share, and of determining the disposition to be made of the increased capital stock; and it was resolved that such meeting shall take place at the principal place of business of the corporation, being the same building where the Board of Directors usually meet, to wit: No. 212 Sansome street, room 17, in the City and County of San Francisco, on WEDNESDAY, the 10th day of June, A. D., 1896, at 11 o'clock in the forenoon of that day.

Dated San Francisco, 2nd of April, 1896.

JOHN A. WRIGHT, President.

CHAS. WEBB HOWARD, JR., Secretary.

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The regular annual meeting of the stockholders of the Jamison Mining Company will be held at the office of the company, Rooms 50 and 54, No. 120 Sutter street, San Francisco, California, on MONDAY, the 4th day of May, 1896, at the hour of 2 P. M., for the purpose of electing a Board of Directors to serve for the ensuing year and the transaction of such other business as may come before the meeting.

SAM W. CHEYNEY, Secretary.

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Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

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Inspect and report upon Mineral Properties, Treat Refractory Gold Ores and Concentrates by Chlorination. Furnish Plans for and Superintend Erection of Chlorination Plants, General Analyses of Ores.
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Henry S. Munroe, Professor, School of Mines, Columbia University, New York City.
Joseph S. Harris, President Phila. & Reading R. R. Co., Trustee Penn. University, Phila., Pa.
Edward M. Preston, President Citizens' Bank of Nevada City, California.

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For information concerning this process for the reduction of ores containing precious metals, and terms of license, apply to
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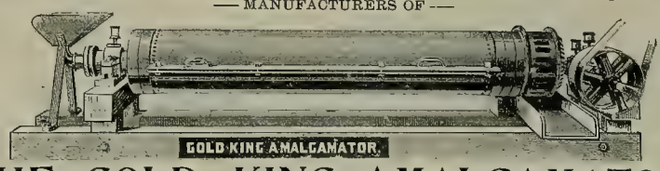
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Ores and Sweeps Crushed and Sampled and Working Tests Made by Any Process.
Assaying in all its branches. Analyses of Ores, Minerals, Water, Etc.
NOTICE.—We have just added to our plant a 3-Stamp Mill and Concentrator, and are prepared to work ore in lots of from 1 to 10 tons.
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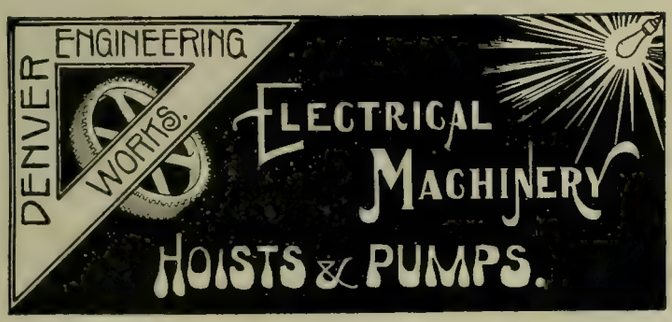
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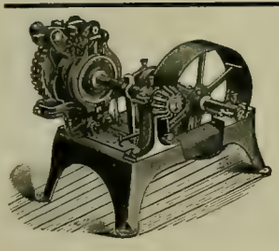
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# Mining Summary.

THE River and Harbor bill passed the House of Representatives on the 6th. An important provision in the bill is the following appropriation:

"For the construction of restraining barriers for the protection of the Sacramento and Feather rivers in California, $250,000; such restraining barriers to be constructed under the direction of the Secretary of War in accordance with the recommendations of the California Debris Commission, for the purposes set forth in sections 23, 24 and 25 of the act entitled 'An act to create the California Debris Commission and regulate hydraulic mining in the State of California, approved March 7, 1893,' provided said sum shall be available only on condition that the Legislature of the State of California shall have appropriated at least an equal sum for purposes herein set forth, to be expended in accordance with recommendations of engineers of the United States Government."

It is believed the bill will pass the Senate substantially as above and with the $250,000 already appropriated by the State will make $500,000 almost immediately available for the purposes specified.

## CALIFORNIA.

### Amador.

The debris commissioners have granted permission for hydraulic operations at the Lowry gravel claim at Aqueduct.

The Median shaft is down 500 feet; crosscutting goes on from the 900-foot level of the Tallisman shaft east to the Median. The South Spring Hill shaft is being pumped out; 1200 feet of new cable has been put in, and 700 feet at the Median.

Superintendent Martin is cleaning out the shaft of the old Kling mine, on the northern boundary line of the Keystone. He intends to extend the depth several hundred feet.

At the Treadwell mine the tunnel is in 475 feet.

### Butte.

The Spring Valley Gold Mining Company, Cherokee, has filed notice that it will move for a new trial.

AT ENTERPRISE—P. Kloss has sold the Red Point mine to San Francisco men who will put up a mill.

Mr. Peters at Rocky River mine is taking out nuggets, some of which are worth $75.

At the Carlisle mine, on the south fork of Feather river, work is vigorously pushed by fifteen men. A tunnel is being run, a shaft sunk and an upraise driven.

Judge Prewett has filed the findings and judgment in the case of Alvord et al vs. Spring Valley Hydraulic Gold Co. A decree of foreclosure is ordered for $282,000 in favor of the bondholders, fixing the attorney's fee for the plaintiff at $10,000 and the compensation for the trustees, Alvord et al, at the same rate as provided by law for executors, which will amount to nearly $6000. The decree includes all the property of the company, including lands, ditches, water rights, etc., with the exception of the Waldeyer and Rideout, Smith & Co.'s lands. The decree also provides that the receiver's expenses be first paid, the attorney's fees second, trustees' compensation third and then the bondholders.

### Calaveras.

Active operations have been resumed at the Green Mountain mime, Chili Gulch, under the superintendency of John McSorley. The chlorination works at the Esperanza mine were started up last week, handling six tons daily.

Prince Poniatowski has bonded from C. R. Lloyd the Specimen group of mines, one mile from Fourth Crossing, on a two-year bond for $22,000. Work is to be commenced in thirty days.

Mr. C. R. Lloyd has also bonded fifty-five acres of his 110-acre gravel mining ground on Central Hill, to I. Copeland of Vallecito.

A new shaft is being sunk on the Martin mine near Sheep Ranch.

The Ford Gold Mining Co. has issued a call for the first payment of 7½ cents per share to be made on the stock. Payment is to be made on or before April 20th.

Maloney & Hardy of Hawkeye have been paid $3000, the balance due on their Hawkeye mining property, bonded to the company represented by Philip Deidisheimer.

*Prospect:* The Starlight mine, bonded two months ago to G. McG. Ross, formerly superintendent of the Union mine at Copperopolis, is being vigorously developed. Day and night shifts are at work.

### El Dorado.

(Special Correspondence).—The Boulder mine, situated in the Jay Hawk district, fifteen miles southwest of here, is displaying great activity in development work. The incline has reached 550 feet on a 5-foot ledge. The property is owned by the Williams Bros. of San Francisco.

Parties from Santa Cruz have begun work on the old Baltic mine, twenty-five miles east of Placerville.

M. L. Requa of San Francisco is prospecting on the old Eureka property, near Grizzly Flat.

The Blue Bank mine has been bonded by the Murphy Bros. to J. J. Antwerp of Cripple Creek. The old tunnels have been reopened and tracked. The shaft will be cleaned and deepened. A 2-stamp prospecting mill is running day and night. The ore is free milling and nets from $10 upward. This is situated on Weber creek, fifteen miles southeast of Placerville. Kanakas operated this property with three arrastras. It is a promising mine.

A new shaft is being sunk on the Adams Gulch, which years ago yielded high grade ore, but was abandoned at water level. C. J. Heald, the owner, will push the work rapidly. This is thirteen miles west, near Nashville.

The Lone Star, five miles south of town, is being developed by D. H. Jackson and San Francisco people. The tunnel has reached 150 feet on the ledge. The ore is of dark ribbon rock formation, free milling.

Suman & Anderson are developing a claim near Irish creek, in the Garden Valley district, with fair prospects for a mine.

Richard Woolcock, the veteran prospector, is developing a hopeful looking ledge beyond Kelsey, near Garden Valley.

Considerable prospecting for quartz is going on in the neighborhood of Rescue, in the Weber creek region, fifteen miles southwest. The green slopes of the mountain sides are everywhere being plateaued with ore dumps and tunnel openings.

Placerville, April 7th.

At Garden Valley the California Jack mill is in operation. There are ten stamps of 1000 pounds each.

### Kern.

At Randsburg water must be hauled ten miles and costs $2 a barrel. About 200 miners are in the district, which is 75 miles from Tehachapi, at an elevation of nearly 5,000 feet. A townsite is to be staked off.

Mooers, Singleton & Burcham crushed five tons of ore, which yielded $900. They have nine mines. The Olympus, with a 30-foot ledge, averages over $90 per ton.

There is a quartz mill at Cowell's and another will soon be erected.

### Lassen.

The Bieber *Gazette* declares that "Willis Howard struck the richest vein of ore in the Blue Bell mine on Hayden Hill last week that was ever discovered on the Hill. It is only one inch wide, but it goes $100 to the pound—almost pure gold."

### Madera.

At Grub Gulch the Gambetta mine employs twenty-five men. The 400-foot level, east extension, is now the largest and richest part of the mine.

The Savannah mine, owned by Mr. Sharp of San Francisco, consists of four full claims and has ten stamps running and two hoists.

The Starlight mines, three claims, on the westerly extension of the Savannah mines, are owned by C. M. Ward and M. M. Gale of San Francisco. The inclined shaft is sunk on the ledge 340 feet. The ore samples $6 per ton in free gold. The ledge is from 5 to 8 feet wide of solid ore. There is 1600 tons of ore now on the dump. The owners have not yet put up a mill, but expect to soon.

### Mariposa.

*Gazette:* In the Whitlocks district prospectors and miners are out in all directions. There is a probability of the Triumph mine being sold within the next few days.

At the Mabel & Ethel mine, owned by Dr. E. S. O'Brien of Merced and others, development work is going on steadily, but somewhat slowly on account of the character of the country.

Coulterville *Miner:* The Merced Gold Mining Company's mill started up Thursday morning with a full crew and will continue to run steadily. The company has enough ore in sight at the Melvina to keep the mill running for years, and the building of another mill of at least 100 stamps to handle the ore from the other mines in the group is assured in the immediate future. A large force of miners has been put to work and indications point to renewed activity on all the properties of the company.

### Nevada.

The 10-stamp mill at the Stanford and the 15-stamp mill at the Delaware gravel mine have resumed operations.

*Transcript:* The long drain tunnel at the Chapman ranch mine is now in 1,000 feet. This tunnel connects with the tunnel that runs from Deer creek through the Champion, Wyoming and Nevada City mines, making an underground passage over a mile long, through which the water from these mines is drained. The tunnel gives 800 feet of backs in the Chapman ranch mine. The shoot of ore that is being run for is a large 4-foot vein 700 or 800 feet long, and which paid well as far as worked.

*Transcript:* I. M. Taylor, W. H. Maher and others have now complete ownership of the Plumbago quartz mine at Moore's Flat, having made the last payment of $12,500 to Chas. Heggarty a few days since. The price paid was $25,000 and the purchasers are well satisfied with their bargain.

The mill at the Delaware drift gravel mine is running, fifteen stamps being used to crush the cement and gravel that is being taken from the channel which was struck recently.

### Placer.

The following are present dividend-paying mines in the eastern part of the county: Morning Star and Big Dipper drift mines, Iowa Hill; Pioneer quartz mine, near Damascus; May Flower drift mine, Forest Hill; American Bar quartz mine, near Michigan Bluff; Hidden Treasure drift mine, Sunny South; Herman quartz mine, Westville; Page & Buckman quartz mine, Westville; Golden River mine, Red Point.

A 20-stamp mill at the Pioneer quartz mine, Damascus, produced during February, $17,512.

AT OPHIR.—The Green mine is about to start up again under Superintendent Ruse.

### Plumas.

*National-Bulletin:* The Quincy M. and W. Co., at Spanish Ranch, has one large stream doing execution at Gopher hill and another at Bean hill.

In the Hibernia quartz mine, near Greenville, a 12-foot vein of ore is struck. The owners have drifted 80 feet along the side of this ledge and the ore gives a fine prospect.

### San Diego.

At Julian a satisfactory crushing of 93 tons of ore from the Ranchita mine last week went $40 a ton.

The Elevada mine is sold by Holland Bros. to Denver men.

### Shasta.

About 150 tons of ore are daily hauled from the Mountain mine to the smelter at Keswick.

*Free Press:* Rhodes, Fowler & Benton of Harrison gulch shipped 200 ounces of gold bullion to San Francisco Thursday night. The brick was the result of a three-weeks' run with W. R. Conant's Kendall mill.

The Quartz Hill property has been bonded to a New York syndicate by Mr. Campbell, of San Francisco, who succeeds Mr. Humphreys as superintendent of affairs. There is a ten-stamp mill on this mine. At the Commodore mine, owned by Humphreys, Billups & Quigley, a tunnel has been run 125 feet to tap the ledge, which has been opened up a distance of 200 feet. In this distance two raises have been made on the pay chute to a height of 70 feet each, from which $30 ore is taken. A shaft was also sunk on the four-foot ledge in the tunnel, at a distance of 25 feet on the ledge, and this shaft furnishes $60 rock. Tunnel number two is now being run at a depth of 350 feet to tap the ledge lower down. The length of this tunnel is to be 210 feet.

### Siskiyou.

MINING NOTES.—*Journal:* Eastlick Bros., at Oro Fino, expect to make a good cleanup this season. The water supply is abundant at present, but it is probable it will not hold out as long this year, as the snowfall in the high mountains was smaller than usual.

The ditch of the Seattle placer mine, near Nolton, in western Siskiyou, is completed. Early in June they expect to turn 1000 inches of water onto the Shinar mine, and the people of that section of country familiar with the property claim they will take out $100 a day.

The Columbia mine at Scott Bar was redeemed this week by Mr. Dennemeyer of San Francisco. There is a 5-stamp mill on this property, operated by water power.

### Trinity.

*Journal:* The Minersville H. G. M. Co. is running night and day. Three giants are working steadily and twenty men are employed.

### Yuba.

The Marysville *Democrat* says the barge, with machinery, that was bought at Oroville last summer and floated down the Feather to that city and then taken up the Yuba about ten miles, has not proven a success. The intention was to dredge and use other means operated by stream, and machinery carried on the barge, that the gold on the bedrock of the stream could be obtained. The deposit of rock and gravel was too great to reach the bottom with such machinery and to raise the pay dirt.

## NEVADA.

### ESMERALDA COUNTY.

J. M. McSwain has made a strike near Cambridge, on the east Walker river, and has sunk a shaft 20 feet and has a 6 to 8-inch ledge of ore that will average $290 in gold. This ore is being hauled to the Gignoux mill and the mill will be started next week.

### EUREKA COUNTY.

The Ruby Hill Tunnel and Mining Company at its annual meeting elected B. F. McEwen secretary and treasurer and A. Laird superintendent.

### LYON COUNTY.

The Dayton *Times* says: The old Rock Point mill resumed for a steady run on ore from the Logan and Hully mine in Como. Ten stamps will be kept busy. The ore is free milling gold rock which averages $20 per ton, possibly more. It will be worked by the continuous process, doing away with the tanks and slum shoveling, the pulp passing directly from the stamps into a string of pans—seven in number—and then into four settlers. Before the pulp reaches the pans, however, the pulp passes over a set of riffles which are for the purpose of catching the gold that may be in a condition to catch before it reaches the pans. The process is similar to the Boss process, with some changes made by Messrs. Hully and Logan, who are experienced millmen.

## OREGON.

### LANE COUNTY.

*Journal:* The Champion quartz mine, in the Bohemia district, will resume operations shortly. The mine was shut down last January on account of snow.

### JOSEPHINE COUNTY.

L. L. Jewell of the firm of Jewell & Dodge has bought the Jewett mine, near Grant's Pass, and talks of putting a large mill on the property.

## WASHINGTON.

About 300 assays have been made by Spokane assayers of ores from the Colville reservation since its opening to mineral locations. A few of these have shown good values, and the ores are of the same character as those found in the Boundary and Trail Creek districts, but the vast majority of the assays have shown little or no values and offer very little encouragement to locators of claims. The ores for the most part are copper and pyritic, though there have been assayed a few samples of free milling rock said to offer an encouraging outlook, says the Spokane *Miner*.

W. Donohue, of Pesbastin, says the cyanide process has recently been given a satisfactory test there. A run was made last week on the tailings of the Blewitt mill, which had been considered worthless, and they yielded $9 per ton under the process. Concentrates have also been treated with the most gratifying results, a yield of $220 to the ton having been secured, as against $160, at the Tacoma smelter. The ore, which is first reduced to a pulp, is treated to a solution in large vats. In passing over plates, which are connected with an electric battery, the mineral contents are deposited, and after the solution the plates are scraped and the amalgam is ready to be retorted. The plant has a capacity of twenty-five tons a day.

## BRITISH COLUMBIA.

The matte shipments from the Nelson smelter for the week ending March 21st aggregated 213,565 pounds, valued at $26,045, according to entries made at the Custom house. The *Tribune* says, "during the week the ore smelted yielded a ton of silver."

At Trail Creek the Le Roi has three shifts of men sinking the shaft. When the work of sinking was suspended a short time ago it was down 432 feet. It is now proposed to go down another 100 feet. Owing to the hardness and toughness of the rock, only about nine inches of depth can be attained daily.

## ALASKA.

The Apollo Consolidated gold mine is in a remote position, lying about 1000 miles a little south of west from Sitka, on the island of Unga. It is a property of considerable importance, inasmuch as its yield is at the rate of about $300,000 a year. It is also of much geological interest, says Prof. Becker in the *Cosmopolitan*. It is sunk on a zone of fracture in lava (andesite) of Tertiary age, resembling in this and other respects the deposits of Bodie in California. The age of the lava is determined by the occurrence of fossils in immediate connection with the same rock at a distance of a few miles from the mine. The dislocating forces have not opened a clean fissure in the developed position of this property, partly on account of the rock's own irregular structure, and partly because the present workings are near the original surface. It is manifest that any fissure as it reaches the surface will tend to divide into branches and to splinter the rock, because the walls at the outcrop are free to yield in various directions. The fractured zone shows many irregular interstitial spaces, which have been filled with quartz, this mineral crystallizing by preference on fragments of lava with a very pretty radiated structure. The ore possesses two striking peculiarities. A very large part of its value (eight or nine dollars per ton) is due to the presence of finely divided free gold which is not mingled with sulphurets, and is so abundant as to often stain the quartz yellow. Sulphurets occur in about the ordinary quantity, but they are usually massed in the neighborhood of the gold instead of being mingled with it. The ore also contains at some points considerable quantities of filamentous native copper, a very rare constituent of gold ores. Of course, its presence proves that gold and copper are deposited under very similar conditions. Though there are no other working mines in this area, prospecting is in progress, and there is reason to believe that the product of the region may reach much larger dimensions.

Near Dalaroff bay, on the island of Unga, in the Shumagin archipelago, a thousand miles southwest of Sitka, the Apollo Consolidated mine is now yielding at the rate of $300,000 a year.

*News:* N. S. Trowbridge arrived at Sum Dum on the Al-Ki and will at once begin work for the season on the now famous Bald Eagle mine. He brought up twenty-six men and a summer's outfit, consisting of seventy-eight tons of general merchandise.

*Record:* The 10-stamp mill of the Alaska-Willoughby Mining Company is in operation. There is now sufficient water-power to keep the stamps dropping. The tunnel is in 50 feet on the Tellurium vein.

The Glacier mine on Sheep creek is turned over to the Nowell Gold Mining Company. The new company, which has also secured the interests in the Silver Queen mine and workings, the Silver Queen being the east extension of the Glacier, is now making an addition of ten stamps to the Silver Queen mill.

## UTAH.

In the Bullion-Beck mine at Eureka, a fine body of ore has recently been cut on the 700-foot level, 250 feet north from the shaft, that shows values of sixty ounces silver and 30 per cent lead to the ton. A diamond drill was recently started in the Bullion-Beck mine, the power being compressed air.

Of Camp Floyd—Mercur mining district—J. E. Spurr, in the U. S. Geologic Survey report, says the veins are true contacts of lime and porphyry; the mineralization occurred from below, that of the silver vein through an aqueous solution, and that of the gold ledge, at a later period, through gases and vapors; the region of greatest mineralization is the lower point of contact between the second or middle sheet of porphyry and the lime, and immediately below such point of contact; the form or state in which the gold was deposited has not been determined, but it was probably a telluride, as traces of tellurium have been found in the unoxidized ores; in the oxidized ores the gold is probably now in a free or metallic state, but of invisible fineness; the mineralized zone is about 1000 feet wide and of undetermined length. The opinion is advanced that as greater depth is attained the character of the ore will change, tellurium will be found, higher values obtained, and smelting will then be the method of treatment.

*Tribune:* Col. Heffron, manager for the Niagara Mining Company, says that in view of the enactment of a law prohibiting the mines and smelters from working an employe longer than eight hours a day, the projected mill on his property at Bingham would not be built.

## IDAHO.

(Special Correspondence.)—P. J. Cirkel, general manager Yellow Jacket Company, told me on his return from New York last Thurs-

day that the Idaho Yellow Jacket mine and mill properties have been sold to New York capitalists for $1,000,000. The new company will make no changes in the management for the present. They are running 200 tons of ore through their sixty stamps per day.

Mr. H. H. Armstead, superintendent of the Idaho Chemical Gold Mining Company, tells me that they will have their 50-ton chemical plant in operation by May 15th. This company have a 10 stamp mill on their property but were unable to make the ore pay by the amalgamating process.

James Short has just returned from Wilson Creek, a new camp struck last fall, 18 miles west of here, and reports things looking well. Of thirty different veins examined, twenty-six showed gold in the cropping. There will undoubtedly be a great rush in there as soon as the snow is gone, as the ore is reported rich. Rasor, Short, Ryan and West intend to ship ten tons as soon as they can pack it out, which they claim they have sorted to $1000 per ton.

Mr. Sam Wyatt was in last week from Black Bird, a camp struck last summer twenty miles east of here. On the surface everything was free milling gold ore, valued at from $12 to $20 per ton. There have been about twenty men working all winter, and in every instance when they have gone 50 feet deep, the ore has become smelting ore and carries from 10 to 30 per cent copper but retains its value in gold. Most of the ledges are large and increase in width with depth.

The Uncle Sam, at a depth of 100 feet, had 5 feet of solid ore that assayed 29.6 per cent copper and $24 in gold. There are four distinct, parallel veins in this camp, that have been traced from 2 to 3½ miles, and as far as surface indications go seem to be of some value the entire distance. W.

Yellow Jacket, Idaho, April 3, '96.

G. A. Williams, manager of the Atlanta Consolidated, at Boise, says he will expend $200,000 this year in improving the property. It is his intention to put forty more stamps, making sixty. There are forty men employed at the mine and mill.

Nebraska men interested in placer properties along the Snake river have incorporated as the Hydraulic Placer Syndicate, $50,000 capital stock and built a boat at Lewiston 89 feet long, 21-foot beam and with the machinery on board drawing 20 inches, with two lengths of Howe trussing. The hull is divided into six compartments. A steam pressure pump will supply 1,500 gallons of water 100 feet high per minute for giant purposes and will use eight-inch steel riveted pipes. There is a centrifugal pump that will furnish 3,000 gallons per minute for sluice head and will use 15-inch steel riveted pipe. This will be submerged through the bottom of the boat into the river and will be operated by a 40-horse engine, which will also be used to propel the boat. The gold will be saved by concentration of riffles with sluice boxes lined with steel plates to be used. About 2,000 yards of dirt per day will be handled and the boat will be lighted by large locomotive headlights enabling three shifts to work. Eighteen men will be employed.

### MONTANA.

*Inter-Mountain:* The strike in the Homestake mine east of Butte is important. Copper ore of profitable grade has been discovered where mining sharps of local, national and international fame have said it could not exist.

The report that Hamilton Smith is due on the 22nd inst. has awakened much speculation in mining circles, but whether there is any truth in the story that a deal is on for the remaining three-fourths of the stock in the Anaconda is not known. The *Inter-Mountain* believes that Mr. Smith would like to make the purchase, but it is doubtful whether he can swing money enough to take it in, or that it is for sale.

The big strike in the Moonlight by Dave Bricker seems to be misunderstood as far as it relates to the Butte & Boston Blue Jay. It is James A. Murray's end of the Blue Jay that the Bricker body of ore runs into. Murray has the big end of the Blue Jay.

Good reports come from the Boston & Montana smelter at Great Falls, and from the company's mines in Butte. The entire enterprise is in fine shape, and the cost of producing copper is so low that the stock remains high. The company is opening new ground all the time, and keeps well ahead of the smelter.

The Colorado, Clark's & Heinze's plants are all running as usual, and making a good record with steady profits to the shareholders.

As to the silver mills, they were all closed down by the last Democratic congress, but the Alice is now running forty stamps on company and custom ore together, and making a little money under the economical and skillful management of Captain Buzzo.

During the week the financial committee having in charge the matter of saving the Butte & Boston from total wreck has been in consultation with the receivers and it is likely that a plan has been outlined by which it is expected that operations may be resumed. It is said the first mortgage bonds will be paid, and that the second mortgage will be settled on the basis of fifty cents on the dollar.

The Duck Creek mines, twelve miles from Townsend, have been sold to St. Paul, Minn., men for $50,000.

G. F. Bartlett has put in two Bryan mills on the Old Ambler M. Co.'s property, York gulch, Meagher Co. The ore averages $10 per ton. Thirty-five men are employed extracting it from a slate formation under the management of Prof. Kerr.

### SOUTH DAKOTA.

Black Hills *Times:* The cleanup of the Homestake mills for last half of March, amounting to 10,000 ounces of gold run into five bricks, was shipped to the Park National bank of New York yesterday via American Express. This is one of the largest cleanups yet made by the company from a run of 15 days. The approximate value of the five bricks is $200,000.

### MICHIGAN.

John Birkinbine says: "As illustrating the depths reached by some of the mining operations of Lake Superior and the relations which the mouth and bottom of various shafts bear to the level of the ocean and that of Lake Superior, it may be stated that in the copper region the work has been carried to a depth of nearly one mile from the surface, those interested in these exploitations anticipate no unsurmountable difficulties in reaching depths of 10,000 feet. The surface at these mines approximate 650 feet above Lake Superior, or 1250 feet above sea level, but the vertical shafts of the Tamarack and Calumet and Hecla, the slopes of the Quincy and other mines extend far below the water level of Lake Superior and of the ocean, and the Silver Islet workings were carried from a few feet above the lake level to below ocean level. The iron mines are located from 550 to 1200 feet above the level, and although a number have been exploited to or below lake level, but a few have been carried to depths below ocean level. The high temperatures experienced in the Comstock lode and other deep workings in the western States is not apparent in the Lake Superior mines, which have penetrated the earth for great distances. The increase in temperature is not great, and at 1500 feet the mine water becomes saline, but as greater depths are reached more objectionable characteristics are noticed, the water becoming so acrid as to destroy books and clothing and affect the skin. In some of the iron mines ore is dug from 500 to 700 feet below the surface and delivered on cars for shipment for less than 70 cents per ton. This includes wages of miners, cost of light, explosives, timbering, etc., surface and machinery attendance, repairs, and all charges except royalty, general administration and interest on investment. During the business depression which has characterized the past two years, millions of tons of iron ore have been mined in Lake Superior region, shipped by railroad from 15 to 90 miles to ore docks, transferred to vessels and carried from 600 to 1000 miles, unloaded and delivered on cars at lower lake ports for from $2 to $3 per ton. Although little if any profit (after paying royalties or interest) resulted from these low prices, the possibility of accomplishing the above result is a credit to the skill in mining, transporting and handling large quantities of ore."

### COLORADO.

(Special Correspondence)—The Mayflower Gold Mining Company, incorporated in October, 1894, capital stock $1,000,000, has its principal transfer office at Colorado Springs. H. P. Lillibridge is president, E. F. Smith vice-president and treasurer, W. S. Reynolds secretary, S. B. Stewart superintendent. These, with Joseph Newell, constitute the board of directors. The company owns the patented claims Mayflower, Highland Chief, Ute, Beaver Springs, Placer No. 1 and 2, comprising 52 acres, and the Alva lode of six acres in process of patenting. All these claims are located one mile southwest of the town of Gillett, in the Cripple Creek district. Development of these claims is at present being pushed by the company. It is the intention of the board to lease part of their holdings on the Highland Chief. The shaft is down 100 feet and will be put to a depth of 200. On the Ute two shafts are going down on what appears to be two different veins. On the Mayflower a tunnel and shaft are being operated in low-grade ore. All this work has been done and is being done with proceeds of sale of treasury stock, which is not yet listed on any of the stock exchanges. There still remains for disposal about 70,000 shares of the treasury stock.

The Apex, on Phonolite mountain, abutting the townsite of Gillett, is preparing for regular shipments of ore.

Thirty carloads of ore from Cripple Creek were received for treatment at the El Paso reduction works at Gillett last week.

The Little Pittsburg properties, west of Gillett, are being retimbered preparatory for vigorous work this spring.

A strike has been made in the Maggie Weymer, near Gillett, about a quarter of a mile south of the Lincoln. The ore assays $40 to the ton in gold.

The Lincoln is now down 130 feet. Three shifts will continue sinking until a depth of 200 feet is gained. There is two feet of ore in the bottom of the shaft. Picked samples assay $340 to the ton.

The King of Diamonds commenced shipments from the north drift last week.

John Hestin and associates of Gillett have taken a bond and lease for $30,000 on the Black Wonder.

The old Summitt mill near Gillett is being overhauled and will soon start up again with 30 stamps and Hartzell concentrators. Denver and Boston parties are at the head of the enterprise.

The Pontiac tunnel on Oil creek, near Gillett, now in a distance of 120 feet, has gained a depth of 140 feet. The breast of the tunnel is low-grade ore, and the management is arranging for the erection of a mill for its treatment. The tunnel is a mile north of Gillett.

A new property which shows up well in the vicinity of the Lincoln, near Gillett, is the Eva Ray. A vein 3 feet wide has been encounted in the 40-foot shaft which averages $35 to $40. A contract has been let to sink an additional 100 feet.

Phonolite, the rare eruptive rock about which so much has been said since the discovery of gold at Cripple Creek, is made up of a compact matrix of sanidine (or oligoclase) and nepheline, with hornblende, leucite, nosite, and some magnetite. It its fresh state it is dark greenish gray or yellowish, showing single cleavage surfaces of sanidine. The mass is, as a rule, somewhat slaty or schistose, or of thin tabular jointed structure, and gives, under certain conditions, a clear sound when struck with a hammer (whence the name); on weathering, a sharply defined yellowish-white or white crust is formed. Sanidine and oligoclase are glassy varieties of feldspar. The former is one of the varieties of orthoclase and the latter an intermediate between albite and anorthite feldspars. The matrix or ground-mass of phonolite is micro-crystalline, and presents either a rough and porous, or a compact character. The nepheline crystals, which occur in six or twelve-sided prisms, are, as a rule, very minute, although they occasionally attain moderate dimensions. In some phonolites they are very numerous, while in others the mineral is so poorly represented that the rocks approximate to trachytes. Hauyne is often very plentiful, and there are few phonolittes in which it is totally absent, except in those rocks in which leucite takes the place of nepheline. The minerals which are less common, and less important as constituents of phonolite, are augite, olivine, sphene, zircon, apatite, and titaniferous iron.

Phonolite is partly soluble in hydrochloric acid, the soluble portion being represented by nepheline and zeolitic decomposition products of that material, while the feldspathic portion of that matrix constitutes the insoluble part. The phonolites fuse easily before tee blowpipe to a whitish or greenish glass, and yield more or less water when heated. Phonolite occurs occasionally in the form of lava flows, but more commonly in conical masses or hills. It sometimes exhibits well-marked columnar structure, and has a very general tendency to split into slabs or slates, the more finely cleavable varieties being used for roofing purposes in certain localities. The ringing sound is observed in thin slabs of unweathered rock.

The foregoing is a general description of phonolite. Following is the special description by Dr. Cross of the rock found in the Cripple Creek district:

The region about Cripple Creek is specially characterized by many masses of the rare igneous rock, phonolite, elsewhere known in the United States only in the Black hills of Dakota. Phonolite is a rock allied to trachyte but characterized by the presence of nepheline, in addition to alkali-feldspar, a result of its richness in soda and a low percentage of silica. The phonolites of this district are, when fresh, dense greenish-gray rocks, often with a sub-viteous luster. They are usually somewhat decomposed, however, and are then dull, yellowish-brown, straw-colored, pink or white. Some of the rocks of the region have no distinct crystals visible to the naked eye; others have small glassy tablets of sanidine and dark-green prisms or grains of ægirine, a soda-bearing pyroxene; and a few, notably a rock occurring near Altman, on Bull mountain, carrying large tabular crystals of sanidine, giving the rock a typical porphyritic structure. The bleaching of a thin outer zone by weathering, and a pronounced tabular jointing, are thoroughly characteristic features of this rock type. It occurs in numerous narrow dikes, both within and without the main volcanic area, and is the only one of the volcanic types having such a distribution. It also occurs in several isolated bodies capping granite hills or mountains for some miles on all sides of the center, as in Trachyte, Big Bull, Cow and Nipple mountains. These masses are thought to be remnants of large inclined dikes in granite. This origin is further suggested by the phonolite bodies of Grouse and Straub mountains, which are clearly lateral intrusions into the High Park lakebeads, near the granite surface. No surface flows of phonolite are now identifiable.

Phonolite was a product of several epochs of eruption, for a part of the breccia contains phonolite fragments, and this breccia is cut by phonolite dykes. In addition to the alkali feldspars, it consists of nepheline, sodalite, nosean, and pyroxene which is in great part ægirine. Accessory minerals are sometimes present, the most notable ones being lovenite and a peculiar blue amphibole. Analcite occurs in drusy cavities in certain places.

R. J. Jackson, who recently visited the Johnston mine at Pearce district, has returned to San Francisco, and is writing his report. At fifty-five feet on an incline, where the ledge was first tapped, the ore is reported to average $20 per ton.

The Mollie Gibson Mining Company has $100,000 cash on hand, and is out of debt. The last dividend paid was in January, 1895.

Georgetown *Courier:* On Saturday last the connection was made between the level from the Lamartine shaft and the drainage tunnel. The length of the tunnel to the shaft is 4,508 feet. The work was commenced on Oct. 4, 1894, and the cost was nearly $60,000. It is estimated that the tunnel will make a saving of $100 a day in fuel alone. The size of the tunnel is 8x8 feet, and it will have a 20-inch track, with four-ton cars, which will eventually be run by electricity. In driving the tunnel five cross veins were cut. In December last a large body of ore was encountered which was continuous for 300 feet. An upraise will be commenced to ascertain its height, the distance to the surface being more than 600 feet.

Cripple Creek *Times:* Thirty men are employed at the Ingham mine, on Raven Hill. The mine was never making so good a showing or producing so much rich ore as now. A shaft is being sunk on the Rose Maud to catch the Doctor vein.

Fifty men are working on the Dante claim, on Bull Hill. At the Johnson shaft, the vein has been sunk on 150 feet and the contract has been let for another 150 feet. Another vein was opened in one of the drifts from this shaft, and ore has been encountered in all the headings.

*Mail:* W. S. Stratton has closed down several of his mines this week and cut the force on the Independence. This caused a great deal of talk in camp and outside, but the act was a matter of business. A new mill is being built just below the dump at the Independence mine for handling low-grade ores and what is now the waste rock of the mine. The mill is being built by a Mr. Peck and will employ a new process, which is claimed to be a very superior one for the treatment of low-grade ore. When the mill has proved a success it is expected that it will be purchased by Mr. Stratton. Under the present system of working the mines, taking out the high-grade ore, it is necessary to break and handle large quantities of the low-grade, and to avoid the inconvenience and unnecessary expense of providing new ore bins, it has been decided to await the time when the mill will be ready to treat the ore as stated, and all classes of the product from the mines can be handled at the same time. Work is then to be resumed with increased force in all the mines.

During March, says the Denver *Record*, there was paid into the office of the State $24,500 as fees for incorporation of mining companies.

The Silverton *Industry* says: The wonderful gold discoveries and output of San Juan county have so far overshadowed the silver interests that it may be doubted that we were entitled to the name of "Silver San Juan."

At Leadville the present daily tonnage approximates is about 1600 tons. About 60 per cent of this is iron ore. The rest is carbonate, sulphide and silicious.

### NEW MEXICO.

Hemetite mining district, northwest Colfax county, is reported taking a prominent place among gold producers. It is virtually the old Elizabeth town district, revived by new lode discoveries. More than $1,000,000 was washed from these fields by crude placer methods. The Maxwell land grant covers this section of the country.

Silver City *Enterprise:* At Hanover the New Mexico and Arizona Smelting Company has fourteen men at work on the Guadaloupe, Yosemite and Chimo copper mines at Santa Rita. The mines are owned by the Santa Rita Copper Company and are being worked under lease by the Smelting Company. All three of the mines are producing fair quantities of good copper ore.

The New Mexico and Arizona Smelting Company of Ivanhoe has resumed. The shortage of water at Pinos Altos curtailed the supply of sulphuret ores produced by concentration and the smelter was compelled to suspend operations temporarily.

Silver City *Sentinel:* The new company which is operating at Carlisle are preparing to do some deep development work soon. They will put down a number of 500-foot shafts on their different claims. They have bonded the Alabama mine and active work will be pushed on it.

SONORA.—The Yaqui and El Tiro mines in the Altar district have been sold to an American company, through Johnson, for $30,000.

A letter from the Minas Prietas to the Yuma *Sentinel* warns miners to stay away from that camp. The writer says that while wages are fair most of the men are not able to work more than one-half of the time. He says that the camp is overrun with Americans who visit there hoping to get something to do and that nine out of ten are disappointed. These men, he says, are without means, and concludes with, "being broke in Mexico and Arizona," are two widely different things.

### ARIZONA.

The United Verde Copper Company at Jerome is laying a pipe line to the top of the mountain, south of the town of Jerome, to carry off the fumes, smoke and dust from their smelters.

The Westinghouse interests are reported to have secured control of the Washington camp group of copper mines, and will take possession of the defunct International Copper Smelting plant in El Paso, Texas.

The *Gazette* says the Congress mine will shortly be fitted out with double its present capacity, increasing from forty to eighty stamps, enabling the running of 300 tons instead of 150 per day as at present. There are now 350 men working and houses building on every hand.

The Prescott *Journal-Miner* reports that the Commercial Mining Company has men at work developing the Iron Queen mine, an extension of the Boggs, in Big Bug. They have the shaft down 80 feet.

General Manager Frost of the Leland Stanford mine on Groom creek has abandoned work in the old shaft on account of not finding anything to justify further development in that direction.

The T. M. & M. Company has started its cyanide mill at Tombstone, employing fifteen men.

### SOUTH AFRICA.

SIMMER AND JACK.—Johannesburg *Mining Journal*: The directors submit the following summary of operations for January: Quartz milled (100 heads), 10,400 tons of 2,000 pounds, yielding 4,196.3 ounces smelted gold, taken at 72s per ounce—£15,106 13s 7d; chlorination, 621.42 ounces from concentrates—£,2485 13s 7d; tailings treated, 5,280 tons, yielding 1,502.47 ounces smelted gold—£4,507 8s 2d; total value, £22,099 15s 4d. Cost, £11,686 4s 5d: Mining and hauling, 14s 7.30d per ton; transports, 5.49d; milling, 4s 2.62d—19s 3.41d per ton; general charges, 3s 2.27d—22s 5.68d; expended on mine development, 5s 11.67d per ton—£3,105 12s 8d; total per ton, 28s 5.35d; cost of treating concentrates, £458 10s 8d; cost of producing concentrates, £353 6s 11d; cost of treating tailings, £1,148 11s 9d—£5,066 2s; total cost, £16,752 6s 5d. Profit for month, £5,347 8s 11d. Capital account: Expended on plant and buildings, new shafts, etc., £21,444 18s 9d. Mine development: 949 feet sunk and driven, developing approximately 18,990 tons of ore.

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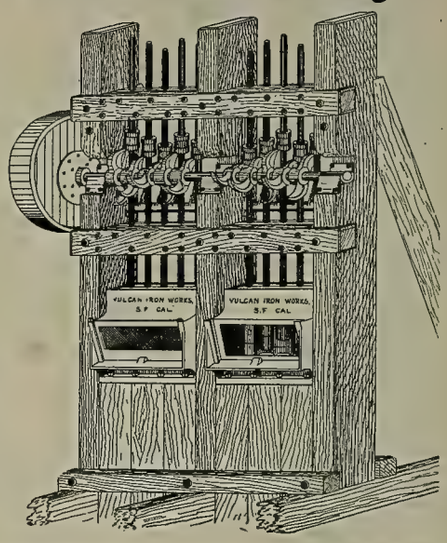
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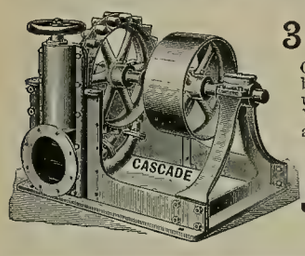
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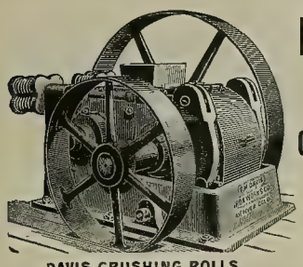
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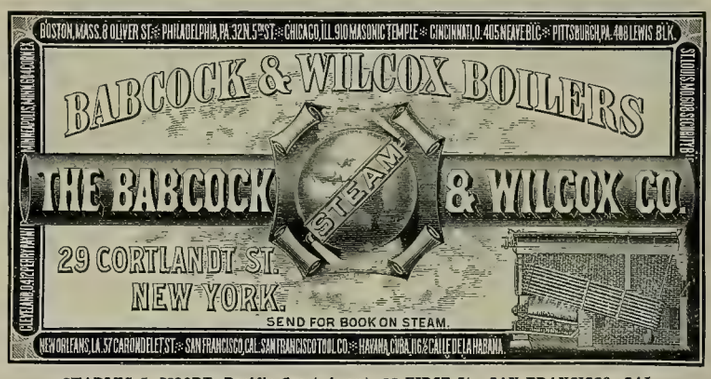
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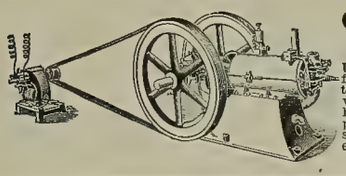
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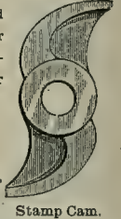
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The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Self-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill

FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.

SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.

THIRD: The Large Amount of Space Saved.

We refer by permission to Mr. N. A. McMillan, Haines, Oregon, manager of the Blue Mountain Mining Co., at Rock Creek, Or., where ten of our stamp mills are in operation; also to Mr. John S. Miller, Helena, Montana, manager of the Diamond Hill Mining Co., operating one of our forty-stamp mills at their mines at Townsend, Montana.

Send for Catalogue and Price List.

CORRESPONDENCE SOLICITED.

# MINE BELL SIGNALS.

Adopted, Used and In Force in Accordance with State Law.

FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.

## Coast Industrial Notes.

—Since the extensive planting of eucalyptus trees in southern California there have been fewer drouths there.

—W. H. Holabird, who recently bought the San Diego cable railway for $55,000, will change it to an electric road.

—Winemakers in Sonoma county are contracting for next season's grapes at $15 per ton, an advance of $3 over last year's prices.

—The Southern Pacific Co. is reported to be withdrawing its accustomed subsidies to sundry San Francisco and Los Angeles newspapers.

—To Fresno last Monday the first current was sent over the wires from the powerhouse on the San Joaquin river, thirty-five miles distant. The experiment was successful.

—The Chino ranch, San Bernardino Co., is sold this week to English parties for $1,600,000; ten per cent cash, $550,000 in four months, balance on time. The new owners will colonize it.

—A general strike was begun by the labor unions of this city last week, and several hundred men quit work, awaiting further instruction from their leaders. This week they resumed work under former conditions.

—Columbia river, Or., salmon canners have formed a protective association and say they will pay the fishermen four cents a pound for salmon bought of them. The fishermen who also have an association demand five cents a pound.

—The Harlin Car-Coupler Company has incorporated at Stockton; capital stock, $250,000, $216,750 subscribed; J. J. Scrivner, San Francisco, J. Simon, O. B. Parkinson, G. C. Harlin, J. Reine, Stockton, A. Dinsmore, Seattle, Wash.

—The President of the Southern California Fruit Exchange estimates the season's crop of California oranges at 9000 carloads, or 2,700,000 boxes—an increase of about 400,000 boxes over last year.

—S. L. Hanborough proposes to sell this city a lake in Monterey Co., supply sufficient water for all purposes, construct mains and have the works in operation in 18 months, for $12,000,000. The Board of Supervisors have the proposal under consideration.

—President A. C. Sheldon of the Rio Verde Canal Company, Phœnix, Arizona, has gone to Minneapolis, Minn., with $2,400,000 bonds which have been disposed of. The money realized from the sale of the bonds will be applied to the completion of the canal, dams and reservoirs now being constructed by the company.

—The San Francisco Street Superintendent and City Surveyor are at present engaged in an unsuccessful attempt to repeal the law of gravitation by having sewers constructed from 12 to 24 inches higher than the lesser ones they are supposed to drain. As the plans are unaccompanied by pumping specifications it is believed the effort will be abortive.

—A beginning has been made in actual railroad competition with the Southern Pacific Co. in this State. Last Saturday the first wheat ever moved from the San Joaquin Valley by any other than a Southern Pacific engine was carried over the S. F. & S. J. V. R. R. from Escalon to Stockton. The road is now completed from Stockton to beyond the Tuolumne river, and forty miles of it is in operation.

—The Nevada Co., Cal., narrow-gauge road running from Grass Valley and Nevada City to Colfax reports gross earnings for 1895, $108,460.89; gross earnings for 1894, $98,794.89; increase of earnings over preceding year, $4666; total amount of expenses including taxes and interest on bonds for 1895, $104,854.03; total amount of expenses, 1894, $102,520.95; increase of expenses over preceding year, $2333.08.

—The new steamer President, built by the Fulton Engineering and Shipbuilding Works for the Alaska Packers' Association, was successfully launched at the company's works at Harbor View last Wednesday under the supervision of Jas. Spiers and L. Heynemann. The vessel is specially constructed for hard work in northern seas, and will make her trial trip next week.

—This week the Lighthouse Board awarded contracts for supplies for the Twelfth Lighthouse district for the fiscal year ending June 30, 1897, as follows: Coal—John C. Wilson, San Francisco, $5.49 per ton in bulk, $5.74 per ton in sacks. Provisions—Charles C. Pennell, San Francisco, $59.39 per man per annum, on vessels; $36.04 per man per annum at stations. Buoy service, Humboldt bay—Henry Smith, Eureka, $210.

—During '95 seven steamers loaded lumber on Puget Sound for Delagoa bay, South Africa, carrying 15,000,000 feet, which cost in Tacoma $8 per M. It costs $17 per M. to Delagoa bay, making the cost there $25 per M. It is 360 miles from Delagoa bay to Johannesburg, where most of the lumber goes. The railroad company charges $50 per M. for carrying it those 360 miles. By the time the lumber is retailed at Johannesburg and other cities it costs the consumer nearly $100 per M.

—April 2d was the date originally set for the opening of the Mexican international exposition in the City of Mexico. Owing, however, to delay in the erection of some of the buildings, the formal opening has been postponed until September next. The enterprise is under the administration of a company of Mexicans and Americans, with a capital of half a million dollars, and the exposition buildings, when completed, will cover an area of 600 acres in the suburbs of the city.

—Some of the features of the engineering work upon the Nicaragua canal were discussed before the House Committee on Commerce at Washington, D. C., last week, from the standpoint of engineers experienced in large enterprises, who described the dredging machines and operations on the Chicago drainage canal, and asserted that by the same machinery and method the work on the Nicaragua canal would be done for less than the company's estimates. The construction of the canal would inaugurate a new era for us.

—The usual annual "strike" of the salmon fishermen at the mouth of the Columbia river, and the regular April discussion regarding modes of catching fish whether by traps or gill nets is on. The season opened yesterday and in thirty days all hands will be at work reaping a golden harvest in a little strip of water from which annually without any preparatory sowing or cultivation a crop worth $3,000,000 is harvested.

—W. F. Pierce and other Oakland, Cal., men have capitalized the Blue Lakes project and propose to establish an electric plant at Tripp's Mill, Mokelumne Hill, Calaveras Co. A canal 3000 feet in length and having in that distance a fall of 1043 feet, will convey the water from the high level above to the bottom of the canyon, where electric apparatus will develop 6000-horse power. In setting up this plant and establishing power wires to Stockton and other places, it is stated $500,000 will be spent.

—Keys & Son of Mayville, Gilliam county, Or., have sold all their cattle, 500 in number, to W. M. Butler, who is buying for the Montana Mining & Livestock Company, which owns and operates the Anaconda Smelting Works. The prices paid were: Three-year-old steers and over, $22; 2-year-old steers and cows, $15; yearlings, $11. This will make an average price of $16 per head for the band. The cattle are to be delivered at Arlington May 10th. Mr. Butler expects to ship altogether about 1200 head from Arliugton next month.

—Samuel W. Allerton and other Chicago men have a concession from the Mexican Government to build 400 miles of railroad along the west coast of Mexico, connecting Toetillan, a terminal of the Mexican Government railroad, with the Guatemala frontier, eighteen miles east of Tapuchula. The concession is accompanied by a subsidy of $2,500,000 worth of Mexican lands. Thirty-five miles of completed roadbed, built by the Baring Bros., which reverted to the Mexican Government when that firm failed, will be presented to the new company, which now has a representative in London seeking to interest English capital in the enterprise.

—The Puente Oil Refinery at Chino, Cal., has commenced work. It is equipped to produce kerosene, gasoline, benzine, etc. Later, the paraffine base in the crude oil may be utilized. The refinery is supplied with oil from the Puente wells, fourteen miles away, through four and three-inch pipes, the oil flowing by gravity. From tanks the oil is drawn to the stills from whence the vaporized oil is carried in an eight-inch pipe to the coolers, where it is divided into a series of two-inch pipes which run lengthwise through a long flume filled with running water, condensed into liquid form, and emerges into the separator as a distillate, when it is seperated according to its specific gravity into kerosene, benzine, gasoline, etc., and flows into large receiving cylinders, thence is pumped to tanks on an elevated platform and drawn from them into drums and cans. The fuel used, both in the steam boilers and under the stills, is the crude petroleum. The oil itself does all the work, and no part is wasted.

## Personal.

THOS. J. BARBOUR of the Risdon Iron Works, has returned from Butte, Montana.

JNO. W. MACKAY is expected to leave New York on the 20th inst. for this city.

J. C. FRICK has resigned the superintendency of the Old Spanish mine, Shasta, Cal.

JAS. CRONAN is the new superintendent of the Hale & Norcross, vice H. W. Tangerman.

THOS. G. MERRILL of Montana is about to develop the Vanderbilt group at Mercur, Utah.

DR. W. J. CHAMBERS has been appointed general manager of the Acacia mine at Cripple Creek, Col.

CAPT. GILLETTE, of the U. S. Debris Commission, was inspecting debris dams in Shasta county last week.

JOHN TIERNEY will be superintendent and P. Kervin general manager of the Allison Ranch mine, Nevada Co.

JAS. A. EDMAN of Meadow Valley, Plumas Co., eminent authority on gold in black sand in California, is visiting the city.

C. E. UREN of Grass Valley, C. E. Creller of Oakland, and P. A. Wagner of the Judson Iron Works, are examining mines in Shasta.

JULIAN SONNTAG goes to Bakersfield, Kern Co., this week, to do some missionary work for the Manufacturers' and Producers' Association.

W. S. MCCORMICK and W. H. Thomas, two Utah mining men, are negotiating for the possession of a mother lode property near Angels, Cal.

S. H. WILLIAMS, late assistant assayer of the Butte and Boston company, has gone to Coolgardie, Australia, to take a position with a London mining company.

JOHN MOSS, several years assistant local freight agent of the Southern Pacific Company, has been appointed traffic manager of the San Francisco and San Joaquin Valley railroad.

W. R. BUSENBARK of Salt Lake, Utah, arrived here last Wednesday to meet the other members of the party which recently obtained concessions from the Japanese Government that justify them in proceeding with the construction of 800 miles of railway in that empire.

THOS. COUCH, general manager of the Merced Co.'s property in Mariposa Co., goes on a six-months' vacation to England, and talks of a jaunt to Johannesburg, South Africa, before returning to California.

JOHN HAYS HAMMOND and the other members of the reform committee were on the 8th inst. at Pretoria, South Africa, committed for trial at the next session of the High Court on a charge of high treason for their participation in the Johannesburg troubles.

A. S. BIGELOW, president of the Boston & Montana; Thos. Nelson, secretary and treasurer; G. M. Hyams, a prominent stockholder in the company, and M. Meredith, president of the Boston Real Estate Exchange, who have been inspecting the Boston & Montana smelters and the Butte & Boston M. Co. affairs at Butte, Montana, are in this city on a tour of inspection of the Merced Gold Mining Company's operations in Mariposa county, of which they are the owners. They express confidence in the permanence and value of the property, and will go on with the work.


"CRACK PROOF"
PURE RUBBER BOOTS
Are the CHEAPEST because
They are the Most Durable.
BEWARE OF IMITATIONS.
See that the heels are stamped
"Union India Rubber Co. Crack Proof."
BEST QUALITY
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This doesn't happen every day. You can't expect it more than a few times in a lifetime. No one is going to agree and guarantee positively to save you 30 per cent or else no pay unless they know what they are about. You can't expect people to say, "You need not pay for this until you have proved our guarantee," unless they intend to do all that they claim. As a matter of fact, we do more than we claim. We guarantee to save 30 per cent, but actually we save a good deal more.

Have you ever heard of a Double Pipe Air Compressor? It has one disadvantage. It needs twice as much piping as is needed with the ordinary makes of Air Compressors. On the other hand, it has more real, genuine advantages than you can shake a stick at. It will do the same work as the ordinary Air Compressors, such as are in general use throughout the mines on this coast, on 30 per cent less power. We will guarantee this and prove it to your satisfaction, else you need not pay for the Compressor. It weighs less than half as much as the ordinary Air Compressor. It costs less for freights and is more easily carried up into the hills. It shows the same high efficiency at all altitudes, high or low. It takes no more fuel to do the work if located on the highest peak of the Sierras than it would take if located at the sea level. It enables you to buy a smaller boiler than you can use with any other Air Compressor to do your work. It does not overheat the air at the Compressor and freeze it at the rock drill. In short, it is the ideal Air Compressor. It has been tried in practice, and we can show you the highest recommendations and endorsements. We sell it on a strict, positive, iron-clad guarantee If your power costs you anything, you want the Double Pipe Air Compressor, because you can buy it on a guarantee that it will run on 30 per cent. less power than any other make of Compressor. If you have to take a Compressor to your mine over bad roads, you want the Double Pipe Air Compressor, because it weighs less than half as much as any other Compressor. It is cheapest to buy, cheapest to run, cheapest to transport, cheapest to carry anywheres. For pumping it beats the world. You can run it with steam or water.

Write to the Pneumatic Power Co. for further information. If you are in the city and want a compressor, call and see them. They will show you the Double Pipe Air Compressor in operation. Remember you run no risk. We claim wonders, but we have to perform wonders in Air Compression, or else you don't have to pay for the machine. We are ready. Are you?

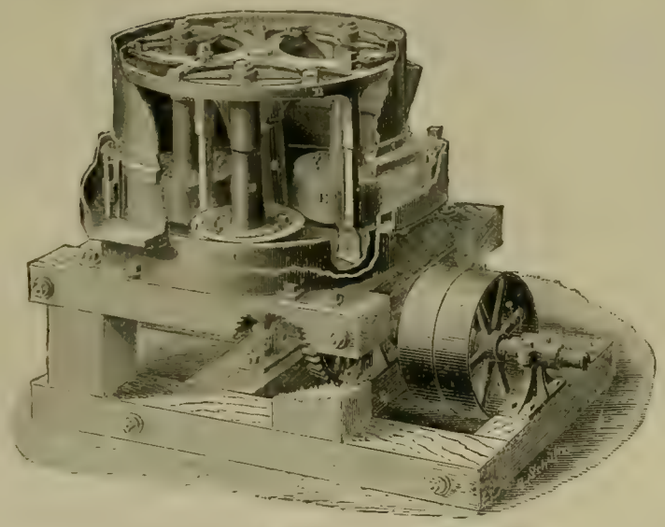
Pneumatic Power Co., 306 Pine St., Room 10, San Francisco, Cal.

THE OLD RELIABLE
COMMON SENSE STEEL WHIM
STILL STAYS TO THE FRONT.
Over 2800 now in use, which is more than all others combined. We make them for all purposes, all sizes and prices. **Steel Ore Buckets**, all sizes from a windlass to a ton. We press "'em out" 'cause hammer dents make holes, "savy?" **Common Sense Easy Dump Ore Cars.** Center of car body over center of truck, equal weight on each axle, makes equal wear on all the wheels. Incline turn table makes the car dump itself when you press the latch. Send for Catalogue showing dozens of styles of cars for all purposes.
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GEO. W. PENNINGTON & SONS'
STEEL WORKS,
HAMMERED STEEL SHOES AND DIES FOR STAMP MILLS.
Manufacturers of **Best Refined Cast Tool Steel.** Machinery and Hammer Steel, Steel Piston Rods, Shear Blades, Lathe Spindles, and all kinds of Steel Forgings made to order.
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A SMELTING PROPOSITION, "THE BASER THE BETTER"
Either Iron or Copper Sulphides, containing Gold and Silver Ore $7 a ton or over in value.
E. H. SCHAEFFLE, - - - - Murphys, Cal.
Dealer in Gold Mines of Proven Value.

# F. A. HUNTINGTON'S
## Centrifugal Roller Quartz Mill.



THE FOLLOWING WILL EXPLAIN THE ABOVE CUT:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet crushing gold, silver or copper ores, hard or soft, it has no equal.

**Huntington's Improved Rock Breaker.**
**Huntington's Patent Ore Feeder.**

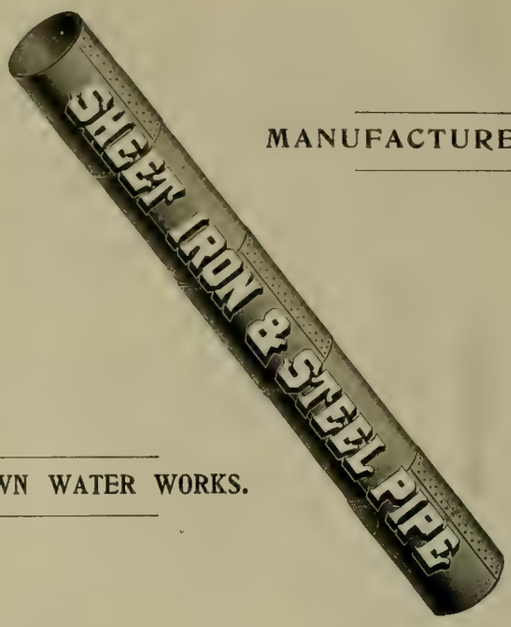
## MINING MACHINERY

Of Every Description Furnished to Order.

F. A. HUNTINGTON,

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# FRANCIS SMITH & CO.




MANUFACTURERS OF

FOR TOWN WATER WORKS.

## Hydraulic, Irrigation and Power Plants,

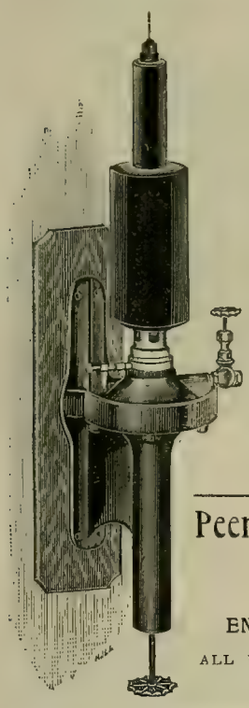
**Well Pipe, Etc., All Sizes.**

130 BEALE STREET, - - - - - - - - SAN FRANCISCO, CAL.

**Iron Cut, Punched and Formed, for making Pipe on the ground, where required.**

All kinds of Tools supplied for making Pipe.

ESTIMATES GIVEN WHEN REQUIRED. ARE PREPARED FOR COATING ALL SIZES OF PIPE WITH ASPHALTUM.



## J. C. WINANS,

220 FREMONT STREET.....SAN FRANCISCO

## Automatic DAMPER REGULATOR.

REFERENCES ARE NUMEROUS.

**HERE'S ONE.**

OFFICE JAMES G. FAIR, 230 Montgomery Street, }
SAN FRANCISCO, Saturday, June 1, 1895. }

MR. J. C. WINANS, 220 Fremont St.—Dear Sir: I wish to state that we have given your Damper Regulator a thorough test, and so far it has given entire satisfaction. I think for simplicity and economy it cannot be surpassed. It certainly does all that you claim for it, and I think that no steam plant is complete without one. Respectfully yours, D. E. EDWARDS, Supt. Fair Estate.

**AND ANOTHER.**

THE CALIFORNIA HOTEL, SAN FRANCISCO, July 7, 1895.

J. C. WINANS—It is enough to say for your Automatic Damper Regulator, I approve—it is good and does save fuel.

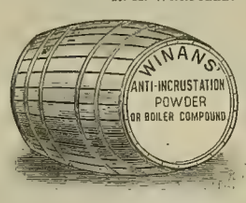
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Peerless Packing,
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ENGINEERS' SUPPLIES,

ALL WITH FULL GUARANTEE.

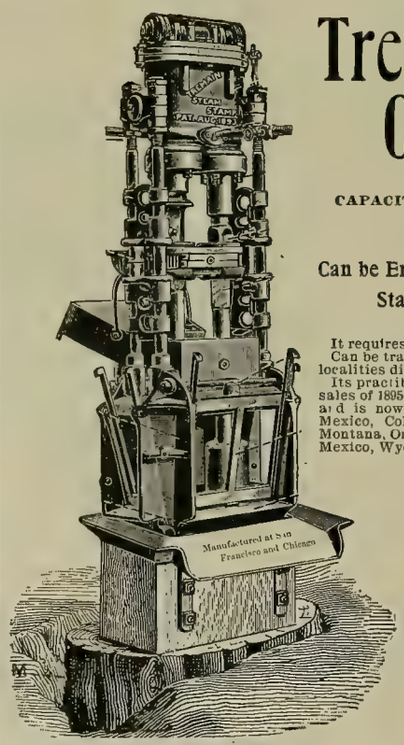
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Boiler Compound.

THE FAMOUS

# Tremain Steam Ore Stamp.




**CAPACITY FROM 8 TO 12 TONS A DAY.**

Perfectly Self-Contained.

**Can be Erected for One-Half the Cost of any Stamp Mill of the Same Capacity.**

It requires no belting, shafting, pulleys or building. Can be transmitted in section or whole. Well adapted to localities difficult of access. Weight, 3000 pounds.

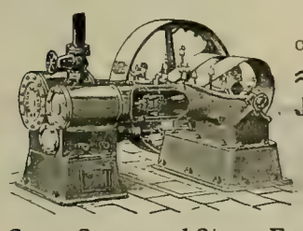
Its practibility was fully demonstrated by its enormous sales of 1895, which exceeded those of two former years, and is now in successful operation in Africa, Alaska, Mexico, Colorado, South America, California, Canada, Montana, Oregon, Central America, Arizona, Dakota, New Mexico, Wyoming, etc.

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## Prospective Mining and Machinery Co.

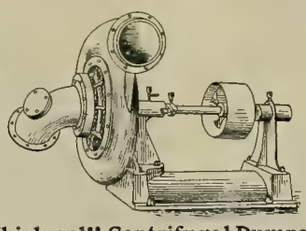
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SAN FRANCISCO, CAL.



WRITE FOR CATALOGUE NO. 15.

Jackson's GAS —AND— OIL ENGINES.



**Cross-Compound Steam Engines and "Whirlpool" Centrifugal Pumps**

FOR EVERY DUTY AND CAPACITY.

BYRON JACKSON MACHINE WORKS,

625 Sixth Street.....San Francisco.

**Hoskins' Patent Hydro-Carbon Blow-Pipe and Assay Furnaces.**



No dust. No ashes. Cheap, effective, economical, portable and automatic.

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## ROOT, NEILSON & CO.,

—MANUFACTURERS OF—

STEAM ENGINES, BOILERS,

*And all kinds of*

✦ ✦ MACHINERY FOR MINING PURPOSES.

Flour Mills, Saw Mills and Quartz Mills; Machinery Constructed, Fitted Up and Repaired.

FRONT STREET, Bet. N & O,

SACRAMENTO, CAL.

## Commercial Paragraphs.

WHEN the Westinghouse Electric and Manufacturing Co. installed an alternating current electrical power transmission plant at Telluride, Colo., in 1891, the electrical world was very much interested in the operation, because it was the first plant of its kind that had ever been installed in this country. The apparatus had been ordered by the San Miguel Consolidated Gold Mining Co., a corporation owning a vast area of gold mining territory in the Colorado mountains. Hitherto it had been commercially impracticable to operate these mines, because the excessive cost of fuel and power at an altitude of 3000 feet above the sea level made it prohibitive. It was then that electric power was suggested, which promised to overcome the difficulty, especially since the company owned a water fall in the San Miguel valley which contained sufficient amount of water power to operate all their mines, if it could be made available. It was then that it was suggested to Mr. Nunn, the general manager of the company, to investigate the Tesla polyphase system of electrical power transmission. This was done, with the result that a contract was entered into and the Westinghouse Electric and Manufacturing Co. asked to install a 100 H. P. A. C. generator and a 100 H. P. motor, with the necessary switchboard appliances. The generator was connected with a Pelton water wheel and the current was carried for three miles up the mountains to the Gold King mine. The wonderful success of this undertaking was established from the first. The owners of the San Miguel Co. have become so thoroughly convinced of this fact that they recently contracted for an extensive increase in the electrical plant. The additional machines were ordered with the Westinghouse Co. some time ago, and they are now being installed. These machines are two 800 H. P. 500 volt quarter-phase generators, running at 7200 alternations. These generators will be direct connected to two Pelton water wheels, and two 30 H. P. multipolar generators will be operated as exciters. While these apparatuses will be installed in the central power house, the company will have a number of sub-stations at the different mines throughout their property. Among these stations will be distributed twelve 50 H. P. polyphase Tesla motors, fifteen 20 H. P. polyphase Tesla motors, twelve 100 K. W., 100-11,600 volts, 2-phase-3-phase step-up transformers, ten 50 K. W., 10,000-220 volts, ten 25 K. W., 10,000-220 volts, and sixteen 10 K. W., 10,000-220 volts, step-down transformers. The motors will be attached either by belt or direct connected to operate stamps, pans, hoists, crushers, elevators or pumps. It is expected that this installation will prove the most complete electrically equipped mining plant in that State. The Westinghouse Co. will also furnish all the necessary switchboard apparatus with the plant.

THE Pelton Water Wheel Company is running its works to their full capacity. Among the more important installations recently completed are: A 2000 H. P. plant for the San Joaquin Electric Co. at Fresno, running under a head of 1400 feet; a 3000 H. P. plant for the Regla Electric Transmission Co. in Mexico, running under a head of 800 feet; a 1200 H. P. plant for the Nevada County Electric Power Co., running under a head of 210 feet; a 2500 H. P. plant for the Big Cottonwood Power Co., Salt Lake City, running under a head of 400 feet; a 200 H. P. plant for the Tuolumne County Electric Co.; a 250 H. P. plant for the Santa Ysabel mine in Tuolumne county; a 300 H. P. wheel, 18 feet 6 inches diameter, for the North Star mine in Grass Valley, running under 750 feet head; a 500 H. P. wheel for a mining company in Japan. They report also now under construction the following: A 3000 H. P. plant for the Lota Electric Co. in Chile, to run under 600 feet head; a 1200 H. P. plant for the Boza Electric Co. in Venezuela, to run under 400 feet head; a 600 H. P. electric power plant for Colorado Springs, Colorado, to run under 800 feet head; a 600 H. P. plant for the Big Creek Electric Co. of Santa Cruz; an 800 H. P. extension to the Redlands plant; a pair of 400 H. P. hoist wheels for the Central Eureka mine in Amador county; also seven wheels of varying capacity for coffee and sugar plantations in Central America.

THE Redding, Cal., Electric Light Company has received from the Westinghouse Electric Company at San Francisco a complete dynamo of 5000-light capacity to replace the incandescent dynamo now in use.

ONE of the big contracts which the E. P. Allis Company, Milwaukee, Wis., has recently secured is that of the Canal & Claiborne Street Railway, New Orleans, La. The Allis Company will build and furnish the latter concern's power-house with two 450-horse-power-tandem-compound-condensing engines, with Reynold's independent air-pump condensers. The engines and condensers will be equipped with the most modern devices for safety and economy, and will be direct-coupled to the General Electric Company's generators.


EDWARD C. BROADWELL,
Chemical Assayer.
2006 Champa St., Box 840, Denver, Colo.

Chemical assayer; no loss by fire test; truth only; gold, 75c; gold and silver, $1; gold, silver and platinum, $1.25; copper, lead, nickel, zinc, etc., according to difficulty of precise determination; tests for chlorination, cyanide or proper method of treatment.

THE CHRYSOMETER.
A CHEMICAL ASSAY OUTFIT. Anyone can use it. Chemicals enough for 100 assays with each $25 outfit. J. W. PETTEE, Sole Manufacturer, 907 17th Street, Denver, Colo.


## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING MARCH 31, 1896.

557,351.—MOLD—Geo. Armstrong, S. F.
559,354.—BOILER—M. P. Boss, s. F.
557,253.—BUCKLE—C. A. Conger, S. F.
557,255.—PLATE LIFTER—W. J. Crawford, Spokane, Wash.
557,493.—GAS ENGINE—Daly & Corson, S. F.
557,260.—FEED WATER HEATER—C. W. Eccleston, Centralia, Wash.
557,121.—ORE SEPARATOR—O. M. Graves, North Yakima, Wash.
557,529.—ORE CRUSHER—H. P. Holland, Oakland, Cal.
557,402.—PENCIL SHARPENER—J. Kraker, S. F.
557,333.—MATHEMATICAL INSTRUMENT—A. Lietz, S. F.
558,421.—SIGNALING APPARATUS—Oleson & Morrison, Roseburg, Ogn.
557,343 —WATER PIPE VALVE—A. H. Schierholz, S. F.
557,167.—WAGON JACK—B. E. Stevenson, Redding, Cal.
557,456.—BED CLOTHES CLAMP—J. W. Utter, Orange, Cal.
557,175.—DREDGING APPARATUS—Wood & Perry, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

A. E. WILLIAMS, whose office is in the Spreckels Building, 927 Market St., San Francisco, is about forming a company of local capitalists, whose object will be the disposal of mines and mining properties to Eastern and European buyers, also to furnish capital to develop prospects and ledges to those who are without means, and to furnish plants and machinery, etc., for quartz, gravel and placer mining.


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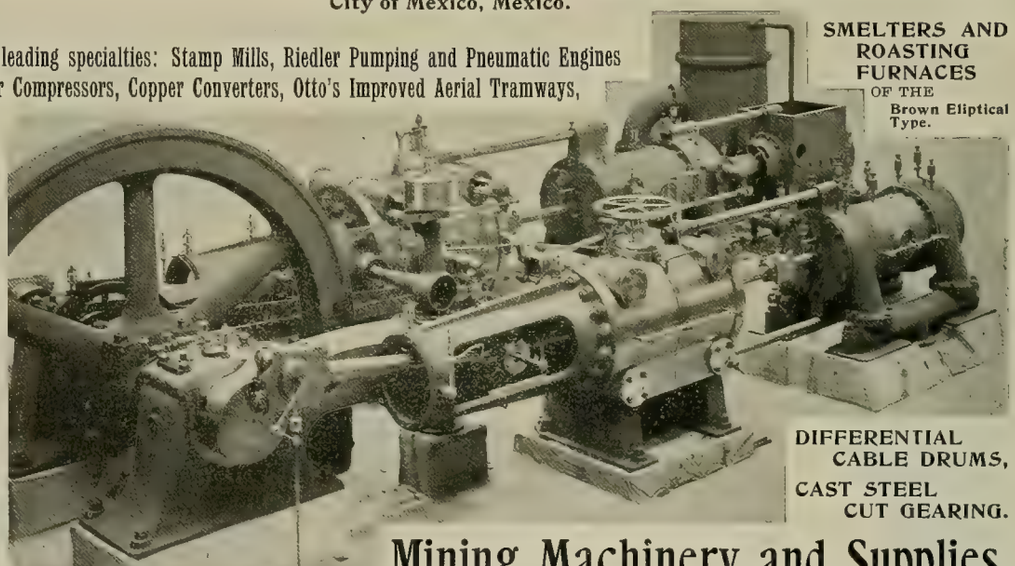
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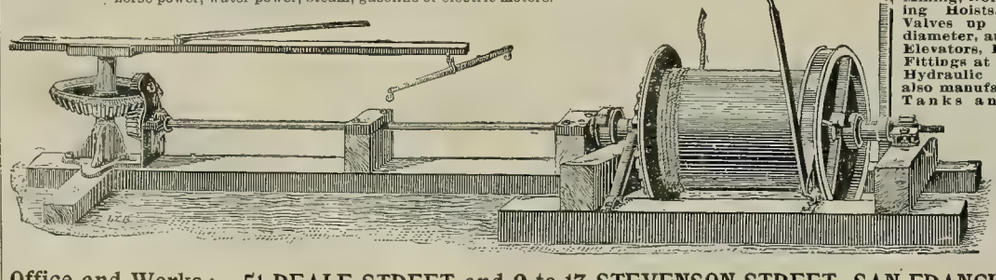
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# Practical Information.

### A Manual Is Needed for the Neophyte in Mining.

"Send me a book which will show me how to find a mine," writes a Denver *Republican* correspondent in Wyoming. Inquiry developed the fact that no such book has been published. "But why should there not be?" says a well-known local geologist and mining expert. "It is true that nothing can take the place of practical, personal investigation and knowledge of the rocks of the country acquired by painstaking effort in the field, for all the books in the world will not make a miner out of a man who reads them in the grateful glow of a parlor fire by the light of an incandescent lamp. But the inquiry of the correspondent is directly in line with what I have heretofore suggested—that some competent authority write a book on practical geology and particularly on the relations of geology to the precious metals, in language that will not require a geological education for its understanding. This can be done, and it follows as a matter of course that a book can be written which will show the neophyte in mining what kinds of rocks are indications of mineral, what kind are mineral bearing, under what conditions to look for mineral, how to recognize the different kinds of ore, how to make simple tests of values and how to determine the best methods of prospecting when the necessary conditions are found. Such a book might be imperfect at first, for it has been demonstrated recently that conditions of one camp are valueless in another, and it is impossible to say under what new conditions we may find the precious metals, but it would be a long step in the right direction, and as new conditions are discovered they can be incorporated in successive editions. One important result of such a publication would be to stimulate prospecting and consequently discovery. Thousands of young men, ambitious, intelligent and energetic, all over the country, are only deterred from an effort to find a mine which in the popular view stands for enormous wealth, by a dread of tackling the earth's crust with no other knowledge on the subject than the little smattering of geology obtained in the high school. A book which should teach the reader so far that he would pick up a piece of rock and say, 'This is quartz; there must be a ledge of this somewhere in this vicinity, which it is my business to find,' or, 'Here are strata of lime and porphyry in contact, and by following the contact I am likely to find a mineral deposit,' or, 'Here is a phonolite dike in juxtaposition to granite, and a vein of mineral is reasonably certain to be found below,'—such a book, I say, would be of great value, and written in popular style and simple language, would be interesting to anyone, especially in this period of revival in the mining interests of the country.

"Mining has in my opinion come to the front to stay. It will be one of the principal industries of the country from this time forth, and nothing would be more stimulating to this interest than the publication of a book which would tend to popularize a business about which so little is generally known."

[This is published as sufficient supplementary comment on a recent editorial in this journal saying just about the same thing.]

### Making Tight Petroleum Joints.

Mr. Hiram S. Maxim, on materials and methods for making tight joints in petroleum pipes and vessels, says: "Many have supposed it to be quite impossible to make a petroleum joint that would not leak, especially with the light varieties, such as naphtha and gasoline, when subjected to both heat and pressure. However, as a matter of fact, it is no more difficult to make a petroleum proof joint than a water proof joint. In making up steam or water joints we naturally employ something which is insoluble in water. If an ordinary steam or gas fitter is asked to make a petroleum-tight connection he is sure to employ red lead and oil, and for a gasket or washer he is equally sure to use India rubber, both oil and India rubber being quite soluble in petroleum. In my experience I find that a joint which is screwed together dry is less apt to leak petroleum than a joint made up of the orthodox red lead and oil. To make a good petroleum joint with common iron pipes, a very good system is to heat both the male and female threads sufficiently to dissipate every trace of oil; then make the joint up with thick shellac varnish, which may be combined with ordinary dry vermilion or even Venetian red. A joint of this kind I have found to stand well. A very good joint can also be made with ordinary yellow bar soap rubbed into the threads of the pipe, the grease first being removed. Treacle, honey, glue, mucilage or glycerine are quite petroleum proof. For a stuffing box, ordinary wicking saturated with common yellow bar soap may be safely employed. Canvas saturated with shellac varnish makes a good washer, but soft metallic washers are better. A very good flexible diaphragm for a regulator may be made of closely-woven cotton fabric varnished on both sides with a compound of gelatine and glycerine. About equal parts by weight make a very tough and elastic compound. Wooden vessels, bags, etc., may also be made petroleum-tight by saturating or varnishing with this compound. As a rule, all substances which are soluble in water are quite insoluble in petroleum. For stuffing boxes for standing both water and petroleum, castor oil may be employed, as this peculiar oil seems quite insoluble in either water or petroleum."

### A Distinguished Traveler.

In this city on the 2d inst. H. De Windt delivered an illustrated lecture upon "The Prisons of Siberia" before the Geographical Society of the Pacific in their hall on Post street, this city. He was introduced by Prof. Geo. Davidson. He was candid and interesting, took opposite views from those of Geo. Kennan and made out a favorable case for Siberian dungeons. He is a distinguished traveler, has had every advantage of personal inspection and his views are entitled to considerable weight. According to him, Siberian prisons are no worse than many similar institutions and far better than many other penal stations. He did not deny point blank all that Mr. Kennan has so positively affirmed, but simply said "Here are the facts as I saw them." He is now going from New York to Paris by land. He has been to Siberia three times—in 1887, 1890 and 1894—his mission this last time being to visit the Russian prisons, and finally he crossed Asia and Europe, going by land from Pekin to Calais. Upon his return from his last journey, he conceived the idea of the present new expedition. He took passage on an American vessel, the captain of which—an experienced sealer—told him that he had crossed Behring strait on the ice seven times. Mr. De Windt decided immediately that he would try to go from New York to London by Alaska, Behring strait and Siberia, and he has reached this city. At Vancouver he will meet Captain Adair, the sealer, whose stories gave him the idea of crossing Behring strait, and who will accompany him. Mr. De Windt expects to leave Vancouver by the end of April with a party of Indians or half-breeds. The crossing of an unknown part of Alaska will be attended with considerable difficulty, and, in fact, danger. Nulata will be the first inhabited point of American land passed by the expedition, which will, from there, ascend Cape Prince of Wales, so as to cross the strait at the narrowest point. Mr. De Windt expects to cross on sledges drawn by dogs and to strike land in Asia at East cape, from which he will direct his course to Irkoutsk. He has set eight months as the probable length of time required by the journey, a most difficult one because of the cold incident to four months of polar night. The crossing of Behring strait will take about twelve days, on account of the numerous accidents that will be liable to occur to the sledges. Mr. De Windt expects to return to London in the autumn of 1897, and calculates that his long journey will cost him over $25,000.


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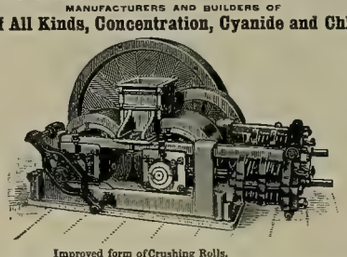
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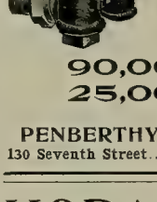


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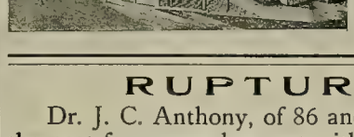


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IN SIERRA COUNTY.

On TUESDAY, APRIL 21st, 1896, at one o'clock P. M., at the front door of the Court House in Downieville, Sierra county, California, I will sell at public auction, to the highest bidder, for cash, all of that certain mining property, mills, machinery, boarding houses, tools, water rights, dams, etc., of the well known Young America mine, which consists of four contiguous patented claims and other locations; and also about 150,000 tons of tailings stored near the mine, and rich in free gold.

This sale is made by me as Trustee, and to make the sum of about $12,000.

Full information concerning the property and a full description thereof will be furnished on application by letter, or otherwise, to me at 230 California street, San Francisco, or to my Attorney in said matter, Frank R. Wehe, whose address is Downieville, Cal.

JOHN BERMINGHAM, Trustee.

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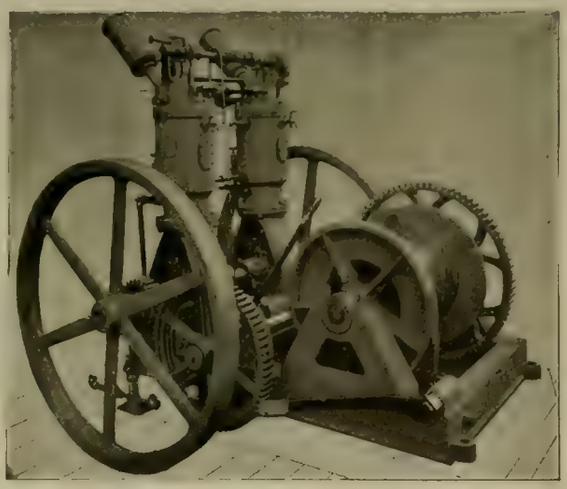



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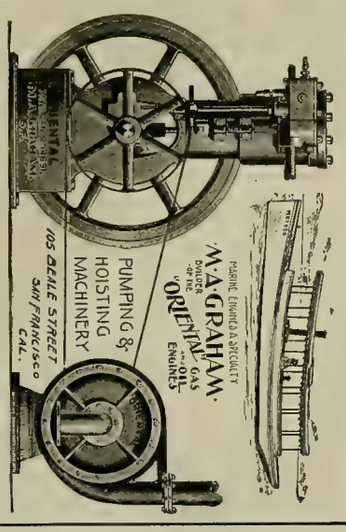
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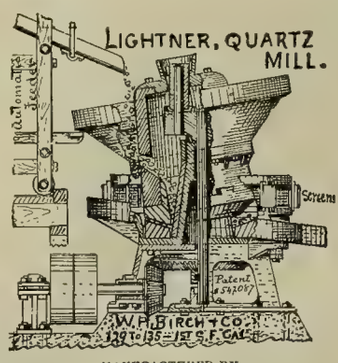
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# Market Reports.

## The Markets.

SAN FRANCISCO, April 9, 1896.

Jobbers report an improved demand for all kinds of goods, but the buying is still in small quantities which goes to show a lack of confidence. The only exception to this rule is gold mining districts and lumbering camps, which take more goods than at the corresponding time for several years. In this State about all the old mining towns have received quite an impetus by reason of the renewed interest in mining. At several of these places vacant houses are now the exception, whereas three years ago they were the rule. For hardware and various kinds of machinery a good demand is reported. Foundrymen and ironworkers in general state that general business with them shows an increase over last year. The efforts that are being made at the East to maintain recent advances in iron and steel cause a strong market with us for the finished products in these lines.

In the local money market the banks report a plethora of funds. Notwithstanding this they continue to discriminate in loans, although signs point to more leniency in the near future, provided grain crop prospects continue favorable. In the southern counties of the State there is urgent need of rains to bring the crops to maturity on unirrigated lands, but in from Merced north the ground is wet to a sufficient depth to last for some time. Collections are said to be only fair, but this is largely offset by retail dealers owing less money. From the East our advices state that there is more or less stringency in the money markets, but this is expected to be relieved before long. At New York foreign money is offering which is having a favorable effect there. Sterling exchange is strong at the recent advances.

**New York Silver Prices.**

NEW YORK, April 9.—Following are the closing prices for the week:

| | Silver in London. | N. Y. | Copper. | Lead. |
|---|---|---|---|---|
| Friday | | | | |
| Saturday | 31⅛ | 68 | 10 75 | 3 05 |
| Monday | | 68 | 10 75 | 3 05 |
| Tuesday | 31⅛ | 68⅛ | 10 75 | 3 07½ |
| Wednesday | 31 3-16 | 68¼ | 10 75 | 3 07½ |
| Thursday | 31 3-16 | 68¼ | 10 75 | 3 07½ |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.88 |
| London Merchants | $4.86 |
| London Sight Bankers | $4.89½ |
| Refined Silver, per oz., 1000 fine | 68¼c |
| Mexican Dollars | 55@56c |

SILVER.—The market has been dull throughout the week. The demand for both Japan and China is light but an improvement is looked for soon—when the new-season tea business opens. The East reports a moderate inquiry with the exports light for the time of the year. From London our advices are practically unchanged. The stock available there is said to be ample to meet present requirements, but when new-season tea begins to move a better demand is expected to rule from both China and India.

MEXICAN DOLLARS.—The market continues to rule steady. The demand is confined to small quantities, but the wants of importers from the Orient are expected to steadily increase. Dealers quote 55 to 56 cents, according to quantity wanted by buyers.

COPPER.—The impression prevails that the market will do better. This opinion is grounded on eastern advices that there is a large export movement to Europe, where the consumption steadily increases. New York mail advices to April 4th state lake copper is hard to get under 11 cents. Referring to this a leading exchange at that city says: Some significance may be attached to the statement appearing in the circular of a prominent broker that information has been received "direct from the Lake that several carloads of ingot copper every day have lately been shipped from these smelting works by all-rail to meet the urgent demand for foreign account," and that "the amount of copper now at the Hancock smelting works is not so much as it was a year ago." Other varieties are also in quite good demand, and prices are steady to firm at 10⅝@10¾c for electrolytic and 10⅜@10½c for casting stock.

The market is quoted as follows:

| | |
|---|---|
| Bolt, ¼ & 5-16, 20c; ⅜ and larger | 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

LEAD.—The market seems to have a steadier tone in sympathy with Eastern advices. The demand there seems to be somewhat improving, but buyers do not appear to anticipate their wants.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—So far as we can learn there is nothing new to report.

The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

QTICKSILVER.—The steamer for Guaymas took out 145 flasks. The call from mining districts on this coast shows a slight improvement.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| West Coast of Mexico, for Export | 34 00 |

POWDER —The demand is said to show an improvement over that ruling at the corresponding time last year. The recent advances in glycerine, aggregating fully 100 per cent, cause a strong market. At present prices manufacturers barely come out even.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " " | 8½c |

BORAX.—The shipments eastward continue free so as to meet the improved demand.

The market is quoted as follows:

| | |
|---|---|
| Refined, in car lots | 6½ |
| Refined, in sacks | 5¾ |
| Powdered, in car lots | 6⅛ |
| Concentrated, " | 5⅝ |

TIN.—The market is inactive, with canners taking only sufficient to meet current wants. At the East the market is reported unchanged, with no signs of any speculative movement.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

ANTIMONY.—The market is steady at 9 cents as an outside figure. New York mail advices quote 7⅞@8c for Cookson's, 6⅞ for Hallett's and 6¾c for Japanese, from store.

COAL.—Several vessels arrived the past week with Australia coal. The tonnage on the way and looking at Australian ports for this city aggregate 63,503 registered tons. From Japan our advices are to the effect that the Japan Mail Steamship Co. are putting a line of six steamships to run between Japan and European ports. The outward cargoes will consist chiefly of Japan coal. In our market there is nothing new to report. Considerable cutting in prices is reported, which make quotations largely nominal.

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 8 50 |
| " in sacks | — — | @ | 9 50 |
| Cumberland | — — | @ | — — |

LUMBER.—Advices from up north continue to report large export shipments. In this city the demand is said to show an increase over that ruling at the corresponding time last year.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 16 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

NAILS.—Jobbers continue to report a good demand, with the market firm for all kinds.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Wire, carloads, basis per keg | $3 07½ | | |
| " jobbing, " " | 3 20 | | |
| Cut, carloads, " " | 2 82½ | | |
| " jobbing, " " | 2 95 | | |

IRON.—The consumption in this city is said to be fair, as it is up North. Our market does not seem to respond to the recent move at the East to advance values. Referring to this movement the New York *Journal of Commerce* says: "The New York market for pig iron responds very little, if at all, to the efforts that have been made latterly at some prominent trade centers in the direction of carrying prices higher. In any event business moves along at very ordinary pace, and little difficulty is experienced in obtaining standard brands at the average prices that have ruled for a week past." Some shipments have been made of Southern iron to Europe, but it seems as if this was done more for the purpose of reducing stocks at the South. A recent Eastern exchange says: "It may be advantageous to work off an uncomfortable surplus by slaughtering distant markets. It might well suit the recently-born combination of Birmingham furnace companies to get rid of a heavy load in that way. But that is far from a systematic and sustained competition against English makers in their own or in neutral markets. We confess that we expect the time to come when our export of pig iron will be a regular business, and that it will be lucrative. But it would be misleading to assert that we have reached that point yet."

## Mining Share Market.

SAN FRANCISCO, April 9, 1896.

The market was weak and heavy on Friday, but towards Saturday noon Hale & Norcross exhibited unexpected activity, causing an advance in the price of the shares. The improved demand for it was due to authentic advices that work would be resumed in the mine. On Monday the market opened at still higher prices for Hale & Norcross. The top figure at which it sold was $1.45 a share, against $1.20 on regular call Saturday. In this advance the rest of the market sympathized slightly, causing Con. Virginia and Belcher to carry their assessments. In the afternoon of Monday the bears commenced hammering Hale & Norcross, and as the price sat off, they started in on Con. Virginia, Sierra Nevada and Union. Under their selling the market went off. Tuesday it was still weaker, with outsiders selling their long shares, while a few sold short. The bulls tried to stand under Hale & Norcross, owing to advices that work in the mine would be commenced the next day, but their support was only temporary, for with a steady raising of the north end shares and Ophir giving way, Hale & Norcross sold at $1.25. Yesterday morning the market opened weak along the entire line, and as the forenoon passed shares in the Gold Hill mines, as also those in the north end, shaded off still more. In the afternoon the market had a steadier tone, notwithstanding heavy sales by a plunger of shares in three or four of the mines. There can be no doubt that at the declining prices outside holders sold quite freely, and when this occurs it is only a question of a short time before the market rallies, particularly if there is quite a line of assessments to collect, for the small pools were never known to pay the latter when they could unload on the public, and to do this a higher and a more active market becomes a necessity.

It looks now as if the Hale & Norcross affairs have been arranged so there will be no further trouble about working the mine. This has been done by appointing a general manager at Virginia. This move, and also the appointing of an assistant secretary of the company in this city, creates the impression that the reformers have accepted the inevitable, and therefore the expenses are not cut down much. If the new management should succeed in finding ore and make the shares sell higher, it is thought that no one will seriously object to the change in the programme.

Since writing the above a report is current that owing to the Hale & Norcross shaft having swollen they could not get the cage down, which prevented the miners going down to work. The shaft will have to be repaired before active work can be resumed in the mine.

The contest for the control of the Bulwer mine, in the Bodie district, resulted in the contestants voting a majority of the shares, but the old management took "snap judgment" by retaining possession of the company's books and office at this city. This action will precipitate a lawsuit and bring up one or two points for decision by the courts, and in the meantime two boards of officers will claim control. This is considered unfortunate, but it may result in good in the end.

The news from the Comstock mines continue to report a fair degree of active work in Alta, but as no ore has been found an assessment is inevitable. In the Gold Hill group our advices state that work is being done in Caledonia. In Overman the work, so far as publicly given out, is practically unchanged since our last review. A few tons of fair grade ore is being raised. In Seg. Belcher and Belcher no change is reported in the character of the work. The latter company milled the past week over 300 tons of ore, the battery assays of which go a little over $23 a ton. In Crown Point the work seems to be shaping for more active exploiting before long. In prosecuting the work some low grade ore has been found, but unless it increases very much in value it will not cut any figure for the market value of the shares. From Yellow Jacket it is almost an impossibility of getting information regarding work in the mine. The joint west drift that is being run by Confidence, Challenge and Con. Imperial is in over 475 feet. Unless the west lode for which they are running diverges to the west they ought to be near that lode. In Alpha the work is essentially unchanged as is that in Bullion. In the middle group they are doing considerable work in Potosi, Chollar and Savage. Some ore is raised but the quantity is not large enough to attract attention while the assays are only fair. Some look for better things in one of these mines within the next few weeks. What this opinion is based on it is difficult to say. It may be that the wish is father to the thought. In Hale & Norcross work has been resumed. From all that can be learned it is the intention to explore the ground between the 900-foot and 750-foot levels. It is claimed that there is some ore there unless it has been extracted by the old management. This company has arranged to mill about 500 tons of ore now on the dumps. The long west drift in Gould & Curry is still being carried forward. In Best & Belcher a fair degree of active work is being done, but an impending assessment is against the market value of the shares. Official letters from Con. Virginia report continued active work on several levels, but with no improvements in the mine. Last week's advices gave more tons raised and a slight increase in the assay value. In Ophir some low grade ore continues to be found. The work is on the same levels heretofore reported. From Mexican nothing new is reported. The work does not attract but an impeding assessment does. The work in Sierra Nevada and also that in Union has failed to strike ore going above $3 or $4 a ton, but the work is being pushed ahead in the hopes of finding something of value. The work in Utah is of the same character as that heretofore reported, as is that being done in Andes.

On the Brunswick lode attention continues to be centered on the work in Occidental. It is stated that ore has been found the past week, but its extent and value seems to be unknown so far as the public is concerned. The management seems to be well pleased with the prospects. The work done by the other companies on this lode indicates that they have either commenced or else are about ready to commence drifting for the lode. It would seem from our advices that this work ought to attract more attention before long.

From the Bodie district the same old stereotyped letters come to hand from Bodie. They continue to report low-grade ore. From Bullion and Standard the official letters are about as heretofore received in this city.

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alpha Con M & M Co, Nev | 16 | 5c | Apr 7 | May 12..June 2 | C E Elliot, 309 Montgomery |
| Belcher S M Co, Nev | 52 | 25c | Mar 3 | Apr 7..Apr 28 | C L Perkins, Mills Building |
| Bodie Con M Co, Cal | 19 | 15c | Mar 7 | Apr 10..May 4 | M E Willis, 309 Montgomery |
| Bullion M Co, Nev | 47 | 10c | Mar 18 | Apr 22..May 13 | R R Grayson, 331 Pine |
| Caledonia S M Co, Nev | 46 | 5c | Apr 1 | May 6..May 27 | A S Groth, 414 California |
| Challenge Con M Co, Nev | 21 | 5c | Mar 27 | Apr 29..May 20 | C L McCoy, Mills Building |
| Con Cal & Va M Co, Nev | 6 | 30c | Mar 4 | Apr 8..Apr 28 | A W Havens, 309 Montgomery |
| Crown Point G & S M Co, Nv | 67 | 20c | Apr 2 | May 6..May 26 | J Newlands, Mills Building |
| Gould & Curry S M Co, Nev | 78 | 15c | Mar 25 | Apr 28..May 20 | A K Durbrow, 309 Montgomery |
| Inyo Marble Co, Cal | 28 | 10c | Mar 30 | May 4..June 4 | M A Cahn, Phelan Bldg |
| Lady Emma M Co, Cal | 1 | 15c | Feb 26 | Apr 6..Apr 27 | W W Boughton, Mills Building |
| Occidental Con M Co, Nev | 22 | 10c | Apr 2 | May 6..May 28 | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 2 | 3c | Apr 3 | May 10..May 26 | F L Olmstead, 315 Montgomery |
| Ophir S M Co, Nev | 68 | 25c | Mar 17 | Apr 20..May 11 | E B Holmes, 309 Montgomery |
| Summit G M Co, Cal | 14 | 5c | Mar 17 | Apr 20..May 12 | J E Jacobus, 309 Montgomery |
| Utah Con M Co, Nev | 22 | 5c | Apr 3 | May 6..May 27 | A W Havens, 309 Montgomery |

## ANNUAL MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Champion M Co, Cal | J F Holling, Crocker Building | April 14 |
| Jamison M Co, Cal | Sam W Cheyney, 120 Sutter St | May 4 |

The following illustrates the changes of the week:

| Mines. | Apr. 2. | Apr. 9. |
|---|---|---|
| Alpha | ..... | $ 06 |
| Alta Consolidated | ..... | 09 |
| Andes | $ 32 | 27 |
| Belcher | 23 | 43 |
| Best & Belcher | 62 | 52 |
| Bodie | ..... | ..... |
| Bullion | ..... | ..... |
| Challenge | ..... | 24 |
| Chollar | 45 | 44 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 1 65 | 1 70 |
| Consolidated New York | ..... | ..... |
| Crown Point | 42 | 35 |
| Exchequer | ..... | ..... |
| Gould & Curry | 27 | 23 |
| Hale & Norcross | 1 15 | 1 30 |
| Justice | ..... | ..... |
| Mexican | 50 | ..... |
| Ophir | ..... | 1 10 |
| Overman | 13 | 11 |
| Potosi | 39 | 36 |
| Savage | ..... | ..... |
| Sierra Nevada | 66 | 60 |
| Union | 63 | 55 |
| Utah | 09 | 05 |
| Yellow Jacket | 36 | 34 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, April 9, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 200 Alpha | 06 | 300 Gould & Curry | 23 |
| 100 Alta | 09 | 1900 Occidental | 1 00 |
| 200 Best & Belcher | 52 | 800 Ophir | 1 10 |
| 100 Challenge | 24 | 100 Overman | 10 |
| 200 Chollar | 44 | 400 Potosi | 36 |
| 500 C. C. & Va | 1 70 | 50 Yellow Jacket | 33 |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 500 Gould & Curry | 23 | 200 Sierra Nevada | 60 |
| 500 Chollar | 43 | 100 Utah | 05 |
| 400 | 42 | 400 S Belcher | 03 |
| 700 Potosi | 31 | 200 Overman | 11 |
| 100 Hale & Norcross | 1 30 | 100 Union | 55 |
| 100 Crown Point | 35 | 100 Alta | 08 |
| 200 Yellow Jacket | 34 | 100 Occidental | 96 |
| 100 Belcher | 42 | 350 | 94 |
| 100 | 43 | 100 Andes | 27 |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., April 8, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| California Stations. | Total Rainfall for the Week | Total Seasonal Rainfall to Date | Total Seasonal Rainfall Last Year to Same Date | Average Seasonal Rainfall to Date | Maximum Temperature for the Week | Minimum Temperature for the Week |
|---|---|---|---|---|---|---|
| Eureka | 1.18 | 37.07 | 38.72 | 26.97 | 62 | 42 |
| Red Bluff | .18 | 16.91 | 27.72 | 22.08 | 74 | 44 |
| Sacramento | 1.60 | * | 22.74 | 14.10 | * | 42 |
| San Franc'co | 1.44 | 16.81 | 23.37 | 21.16 | 66 | 46 |
| Fresno | .28 | 5.37 | 13.16 | 8.21 | 76 | 42 |
| S. L. Obispo | .08 | 15.49 | 24.90 | * | 78 | 42 |
| Los Angeles | ..... | 8.88 | 15.45 | 16.44 | 80 | 44 |
| San Diego | ..... | 5.68 | 11.90 | 5.73 | 74 | 48 |
| Yuma | ..... | .88 | 3.01 | 2.08 | 88 | 46 |

* Indicates no record.

## Recent Mining Dividends.

THE Le Roi Mining and Smelting Company last Tuesday declared a $25,000 dividend, making a total of $125,000.

THE Quincy Copper Mining Co. of Michigan paid a dividend of $4 per share yesterday.


## KENDALL GOLD AND SILVER
EXTRACTION CO.

The Kendall Process is the most efficient method of using cyanide for the extraction of precious metals from their ores. Wherever this process has been adopted the result has been increased percentages of values recovered and saving of time. Material reduction in consumption of chemical has also been demonstrated with respect to several classes of ores.

*The Kendall system is covered by patents which this company will defend.*

The American Cyanide Gold and Silver Recovery Co., organized in Denver more than a year ago to introduce and operate the Kendall Process in several States, have closed contracts with some ten mines for the use of this process after exhaustive comparative tests with the ordinary plain cyanide method.

Capt. De Lamar has adopted the process at his Nevada mines, where a 250-ton plant is being completed. He writes that he is saving 95 per cent of his gold values, and regards the Kendall Process as the cheapest and best he is aware of for the treatment of gold ores.

*All ores, without exception, amenable to cyanide treatment can be treated to better advantage by the Kendall Process. This can be accepted as an axiom.*

Owners of mines and reduction works can obtain full information on application to

KENDALL GOLD AND SILVER
Extraction Company,
47 BROADWAY, - - - NEW YORK CITY.

# CALIFORNIA ELECTRICAL WORKS.

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**Office and Factory: 35 Market St., San Francisco.**


## Such Letters Are Daily Received.

SAN JOSE DE GRACIA, SINALOA, MEXICO, March 31st, 1896.

I enclose $3 for the MINING AND SCIENTIFIC PRESS for another year. There is never a number but that more than pays for itself by the intrinsic value of one or more articles.

E. A. H. TAYS.

## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice. There are delinquent upon the following described stock, on account of assessment (No. 3) levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| John E. Todd | 5 | 2,500 | $125 00 |
| John E. Todd | 6 | 2,500 | 125 00 |
| John E. Todd | 9 | 2,500 | 125 00 |
| John E. Todd | 55 | 2,500 | 125 00 |
| Wm. H. Cahn | 7 | 2,500 | 125 00 |
| Wm. H. Cahn | 8 | 2,500 | 125 00 |
| Chas. A. Moore | 102 | 7,222 | 361 10 |
| Chas. A. Moore, Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6,000 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore, Trustee | 130 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 100 | 6,967 | 348 35 |
| C. H. Neuhaus | 59 | 100 | 5 00 |
| C. H. Neumaus | 145 | 120 | 6 00 |
| F. K. Harris | 42 | 1,000 | 50 00 |
| F. K. Harris | 43 | 1,000 | 50 00 |
| F. K. Harris | 44 | 1,000 | 50 00 |
| F. K. Harris | 45 | 1,000 | 50 00 |
| G. B. Libby | 83 | 2,000 | 100 00 |
| N. L. Bell, Trustee | 128 | 250 | 12 50 |
| A. U. Rugg | 16 | 1,000 | 50 00 |
| A. U. Rugg | 67 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 155 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg, Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg, Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 109 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 141 | 1,667 | 83 35 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 133 | 5,195 | 259 75 |
| E. C. Godfrey | 134 | 4,000 | 200 00 |
| Jos. A. Pratt | 3 | 2,500 | 125 00 |
| Jos. A. Pratt | 54 | 2,500 | 125 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Nos. 37 and 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

## Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees held on the twenty-fifth day of March, 1896, an assessment (No. 78) of Fifteen cents (15c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-eighth (28th) day of April, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on WEDNESDAY, the 20th day of May, 1896, to pay the delinquent assessment, together with the cost of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

FAIRFAX VILLA COMPANY. Location of principal place of business, San Francisco, California. Location of works, Fairfax, Marin county, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 6th day of March, 1896, an assessment (No. 5) of Fifty Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 76, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of April, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 4th day of May, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

J. STADTFELD, JR., Secretary.

Office, Room No. 76, No. 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 2d day of April, 1896, an assessment (No. 22) of ten cents (10c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of May, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on THURSDAY, the 28th day of May, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

CHALLENGE CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Gold Hill, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 27th day of March, 1896, an assessment (No. 21) of Five Cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 35, third floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 29th day of April, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on WEDNESDAY, the 20th day of May, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors

C. L. McCOY, Secretary.

Office—Room 35, third floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business, San Francisco, California. Location of Works, Inyo, Inyo county, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 30th day of March, 1896, an assessment (No. 28) of ten (10c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 323, Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 4th day of May, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 4th day of June, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

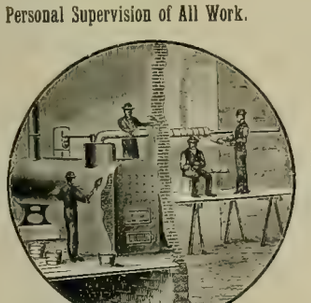
M. A. CAHN, Secretary.

Office, Room 323, 5th Floor, Phelan Building, San Francisco, California.


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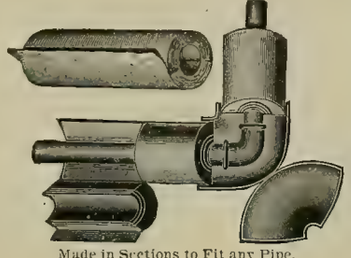
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**Steam Pipe & Boiler Covering.**

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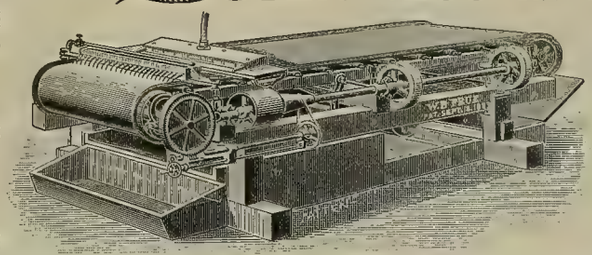
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RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.

The mills require very little attention. At our mill an ordinary peon," earning one dollar per day, has complete charge.

In regard to silming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK. Pres.
SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly,

JOHN BECK. Pres.
SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY.
S. BAMBERGER, President and Manager.
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly.

[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO.
C. C. MCIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year.

CHAS. C. MCIVER, President.

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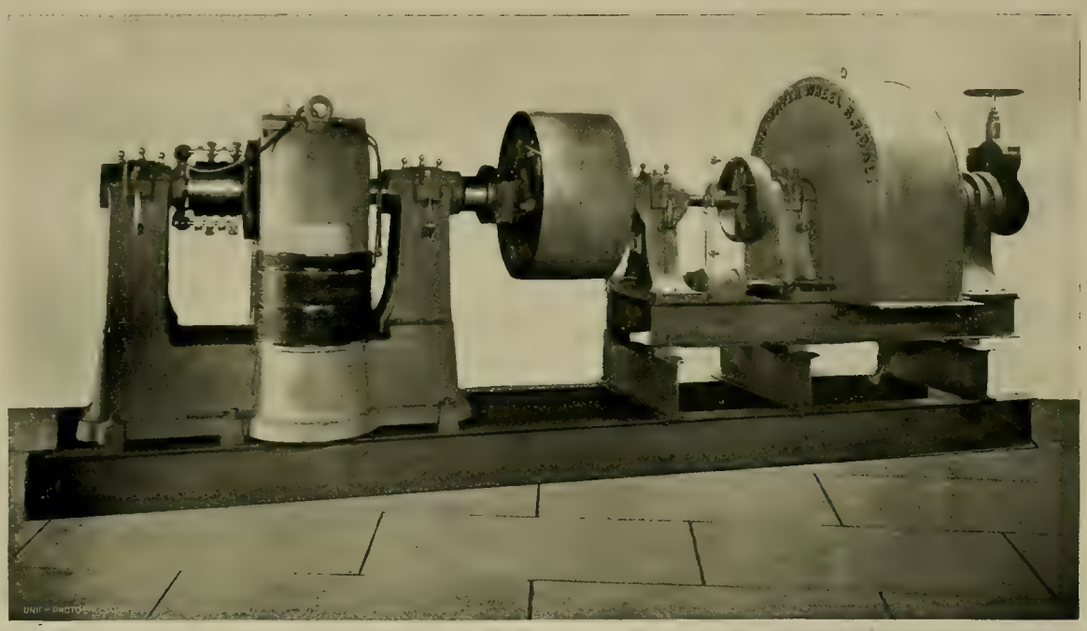
MINING AND SCIENTIFIC PRESS.
AND PACIFIC ELECTRICAL REVIEW.

VOLUME LXXII. Number 16. SAN FRANCISCO, SATURDAY, APRIL 18, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

## A California Electric Mining Plant.

An interesting plant for the generation and transmission of power is about to be installed by the Mammoth Bar Gold Mining Co. at a point on the Middle Fork of the North Fork of the American river, nine miles from Auburn, Placer county, Cal. It consists of a 300 H. P. 30-inch special Girard water wheel, coupled direct to a 150 H. P. 1000-volt direct current generator, and provided with a pulley for driving a similar generator, when it becomes desirable to increase the capacity of the plant.

The mining operations consist in sluicing the gravel from the bed of the river. At Mammoth Bar the river spreads out to about 1000 feet in width, and in summer the water is shallow enough to allow of diversion by means of rock and brush dams. This is done as soon as the water goes down in the spring, and work is carried on day and night until the autumn floods set in. The gravel is extracted down to bedrock and raised to the sluices by a hydraulic elevator, one or two monitors being used to wash the grave. down to the sump. For these purposes water is taken from the ditch of the California Ditch Co. at an elevation of about 1500 feet above the mine, run down a canyon and piped at a point which gives a fall of 400 feet. A 7-inch throat is used in the elevator, and it has been found that it will handle all the gravel that can well be supplied to it, but that it cannot raise the quantity of water necessary to wash down the gravel. Pumping was resorted to; the pump was placed in the pit and driven by a water wheel from above. This entailed so much additional expense for water that it was decided to put in a power transmission plant to generate power at the head of the old pipe line and transmit it electrically to the mine, a distance of more than half a mile. Accordingly, a pipe was put in and the water taken from the canyon farther up, thus using the same water twice and obtaining about 300 H. P. before the water entered the old pipe. Part of this is transmitted to the mine and used for pumping and lighting, while the surplus is available for any demand that may be made upon it.



GIRARD WATER WHEEL AND 150 H. P. GENERATOR.

In accordance with these plans, an order was placed with the Electrical Engineering Co. and the Girard Water Wheel Co. of San Francisco for the necessary machinery, to consist of water wheel, generator, switchboard, motor and accessories.

The cut shows the wheel and one of the 150 H. P. generators. The wheel is 30 inches in diameter and will develop 300 H. P. under a head of 400 feet, at a speed of 560 revolutions per minute. A short section of pipe, put on with an angle flange, may be removed to clear the nozzle of any obstruction which may get into the pipe. The large pulley shown serves as a cover for the governor and to drive the second 150 H. P. generator, while the small pulley runs the separate exciter. The governor is the S. & V. Inertia, which indicates load changes by moving a balanced valve, the actual work of operating the nozzles being done by the hydraulic cylinders shown near the back-bearing. These are contracting nozzles, which are simple and durable, and which limit the amount of water used in proportion to the work being done. This results in a great economy when the load varies.

All bearings are self-oiling and self-adjusting. The generator is of the direct-current, bi-polar type, wound for 1000 volts, with separately excited fields; it is connected to the wheel by a heavy insulating coupling.

Both machines are mounted on heavy steel I-beams, which are imbedded in concrete. The power house is situated near the head of the pipe line supplying water to the monitors and elevator, and the tail water from the wheel is used a second time.

From the power house the pole line runs down the hill to the mine where the shunt-wound motor driving the pump is placed on a temporary wooden foundation. The centrifugal pump is located in the pit and is driven by means of a belt carried on idler pulleys. The motor is placed above, so as to be free from the danger of a sudden rise of water from any cause. The mine will be lighted by clusters of lamps hung on wires stretched above on poles.

---

H. K. Thurber is a good example of how a clever man will change his opinions with a clearer conception of facts. But recently he was a merchant prince of New York, with the usual monometallic ideas of that most provincial of all American cities. Now he is a resident of Idaho, and contributes to the Hailey *Times* excellent articles on the necessity for the remonetization of silver. He has as much money as when in New York, and has the additional advantage of possessing the ability to admit his mistake and state his reasons for the faith that is in him.

---

The lists published in New York and elsewhere of dividend-paying mines in California are misleading, making meager showing alongside similar lists from other States where it is the fashion or custom to incorporate. Counties like Calaveras that turn out over $2,000,000 per annum are unrepresented. It is not generally understood that California gold mines, as a rule, are private, unincorporated concerns; and even of the comparative few that are incorporated, most of these make no formal declaration of dividend, but divide the profits pro rata. It is part of the non-advertising character of the gold mining industry of this State, the owners being content to have their property pay well without broadcast announcement of the fact. When, however, comparative lists of dividend-paying mines in different States is made up, it makes a poor showing for California though. The truth is that in no place on earth is gold mining of more present profit, and in no other section is the individual gold seeker so well off as in this favored land of California.

---

Recent mining disasters in Montana emphasize the need of the enforcement of mining legislation as well as the necessity for constant personal vigilance. On the surface, generally, a man can look out for himself: underground, he largely has to depend for safety not only on his own precaution, but upon the care and prudence of his associates. The horror at the Hope mine, Basin, Montana, where a mine with a shaft 300 feet deep and extensive workings had but one outlet, resulting in seven poor fellows being roasted alive, calls for the enforcement of legislation in that State making a recurrence of such a tragedy impossible so far as law can prevent.

---

The man or men who want to hold all the claims in sight even without doing the requisite $100 worth of annual work or improvements will be given a close rub this year. Too many claims are held by those who, whether unwilling or unable, do nothing but hang on from year to year, some of them looking for the purchaser who never comes, and never will come till something more than a mere "prospect" can be shown.

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J. F. HALLORAN.....General Manager

San Francisco, April 18, 1896.


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## California Will Be the Leader.

Of all California industries, gold mining under present conditions promises most profit. It is the industry the development of which should at this time most largely engage the attention of the people of the State. Gold mining should now again be given its old place as the leading California industry. The fact that the whole world is being explored and ransacked in search of the yellow metal shows that the time is now ripe for a revival of gold mining in California. For years some mines have been permitted to lie fallow, while industries in other lines were being pushed, but the time has now arrived when mining should again be brought to the front. With all her auriferous deposits developed, California will soon lead all the mining regions of the world in gold production.

There is nothing surer than this, and every Californian should do all he can to fill the mountains with miners and prospectors in order that the hidden wealth of the State may be brought to light and utilized. It is to the interest of farmers, merchants, manufacturers, and men in every line of business, as things now stand, to do all in their power for the development of the mining resources of the State. By lending their assistance in the opening of the mines men in other lines of business will not only have a chance to get a hold in good mining properties but will also get their share of the money expended for the supplies of all kinds that will be required in every camp in the mountains. Thus they will not only develop their mines, but will also keep their money in the country where it will come back to them. The industry of mining the precious metals is the mother of all the industries. It furnishes the "sinews of war" for all kinds of enterprises. It is the rival of no other industry, but on the contrary is the promoter of all others. The greater the success in it, the greater the prosperity in all the other industries. As all will admit, the majority of the ordinary industries of California are suffering an almost distressing degree of depression. They have got into a rut, out of which they are at present powerless to rise. In themselves the industries are helpless; they have gone as far as they can go. What they need and must have is the stimulus of a big revival in mining, and a largely increased output of the golden stores of the mountains; therefore, it is evident that, for their own good, the people should push mining to the front and keep it at the head of all the other industries, where it properly belongs. As mining flourishes so will flourish all else, for it furnishes the motive power for all else.

On page 322 appears a detailed exhibit of the gold yield by counties of this State for 1895, as furnished from official tabulation by Mr. Chas. G. Yale, statistician at the U. S. Mint in this city. The aggregate of $15,334,317.69 could be doubled. Conditions permit of it. California is the only State and gold mining is the only industry of which such a statement can truthfully be made. Ordinary business rules of supply and demand, of competition and marketing, do not apply in this case. The buyer seeks the seller; the price is fixed, the terms are cash; there is no overplus, the freight charges are minimum. The usual handicaps in California to the business of production are absent.

Californians who wish to try their luck at mining can nowhere find a better field in which to operate than in their own State, along the mother lode and in the numerous systems of fertile quartz veins outside of that great central gold-bearing belt. No better place can be found in which to put money into mines, whether in Colorado, Utah, South Africa, Australia or South America, than is to be found in their own State, and almost at their own doors. In fact, many men of capital from Utah, Colorado, and other mining States, and from the Atlantic States and Europe are now eagerly investing in the mines of California. This being the case, Californians would not be likely to better themselves by going abroad in search of mining properties.

In the California mining field are also found advantages of which no other gold region can boast. The mines of California are in the midst of civilization; they are near to the markets where all kinds of supplies may be cheaply obtained; there are at hand whole forests of the best of timber, and many rivers, creeks and canyons afford power for water mills and for electrical plants, while the climate is the finest in the world. It is a region in which there are no longer any hardships to be endured; indeed, the mountains about and above the mines are popular places of resort in summer for people from the towns of the agricultural valleys.

Contrast this mining region with the worthless wastes of West Australia, the wilds of South Africa, the ice fields of Alaska, the snows and storms of British Columbia, or even with the less frigid Pacific Coast States of the arid sections between the Sierras and the Rockies. We find California the paradise of mining countries. Indeed, in many places semi-tropical fruits are grown in the midst of the mines, flowers bloom in the gardens in January and it is "summer all winter." But, best and most important, right here in this region are found the best and richest gold mines yet discovered in any place in the world. And these mines are just beginning to be worked in a really systematic and scientific manner. Rich finds have been made here and there in years past in the big gold belt and fortunes have been made by mere working with crude machinery and inefficient appliances, but the great bulk of the gold of the California mines remains to be extracted, even in the veins best known and most worked. Then there are thousands of veins, great and small, yet to be discovered. For many years to come rich finds will continue to be made, for in many places quartz veins are hidden beneath such a depth of surface soil that they will only be discovered through accident or by expert prospectors carefully searching for them.

Californians know and recognize the truth of all this, but it is not known nor understood elsewhere as generally as it should be. Letters of inquiry daily received in this office show that there is considerable incredulity as to the existence of so much unmined gold in this State. A good many non-residents seem to imagine that the $1,269,115,604 officially accounted for, besides as much more unrecorded gold mined in this State from 1849 to Jan. 1st, 1896, has depleted the source of so much wealth, when, as a matter of fact, that enormous amount is but an index of the amount yet remaining. Much of that sum was secured by rude and wasteful methods. To-day scientific mining is nowhere receiving greater practical attention than in this State.

It is not generally understood that every kind of gold mining is followed here; the three principal kinds are quartz, drift and gravel, the two latter being hydraulic methods, though in some cases drift mining is prosecuted through shafts. The remarks in this article may apply mainly to California quartz mines, yet there is more gold to be yet won by hydraulic methods in California than has hitherto been taken out. From '80 to '93 California hydraulic mining was a suppressed industry in a large part of the State, and during the last three years has only been permitted under pains and penalties for non-compliance with State and Federal restrictions, the nature of which are not combatted and do not need present discussion.

The people of California should take hold of the mines and open and work them for the pay that can be got out of them, not as a basis for the issuance of stocks to be peddled out through the country or knocked about in the markets. It is now a very difficult matter to dispose of mining property either in the cities of the Atlantic seaboard or in London or Paris. The people of the East and Europe have become very suspicious of stocks and mines that, with big names and a flourish of trumpets by promoters, are sought to be put upon their markets. They now fight shy of the "big things" that are being hawked about. Over in London they say: "The Americans keep and work their good mines themselves; it is only their wildcats that they bring to us."

Many Eastern people and men from across the sea are now investing in mining properties in this country, but they are going into the mining sections and buying mines that are either paying or are being held and worked on merit. They now deal directly with the owners of mines. Men who have locations on good veins with fair prospects will now be able to sell at fair prices if they wish to do so even if their mines are not already on a paying basis, for there are now purchasers in the field who are willing to take chances either on their own judgment or the judgment of trusted experts. Californians need not fear to put money into any of their mines that have a fair showing of ore or are in belts known to be fertile. The people of Colorado have, through their own enterprise, brought their mines to the front. The people of Utah are also making a big showing, yet in neither State have they the foundation for the grand mining operations and big results that are found in California's great mother-lode gold belt. This is beginning to be seen and acknowledged. Men of capital are now freely investing in properties along the big lode. The people of the East who wish to try their luck in gold mining do not fear to take chances in, or buy outright, a mine in which Californians themselves have confidence, and in the development of which they are working and putting up their money.

In California in the early days hundreds of small companies were formed for the opening and mining of the placers and river bars, each member contributing his labor, and as a rule the plan worked well. Quartz mines might be prospected and worked in much the same way, but with larger companies than those of the placers in the early times. Each member of the company would take as many shares, or as few, as he wished to have in the venture. A small force of good men would then do the prospecting work and the other members would pay the light assessments that would be required. A location on a good vein, with prospects at the surface sufficient to show the ground to be fertile, would have some value at once, and in case of an improvement in the lode this value would increase. In case a man found himself unable to keep up his assessments he would be able to sell his shares at a fair price, for there are always those who are willing to take chances in a vein showing good prospects and situated in a favorable section of any one of the principal gold belts. Once a lot of mines were started in this way by the home people of California, and what they were doing became generally known, plenty of people in the Eastern States would be ready to take a portion of their shares and go in with them, for at present many persons in the East who have money that cannot be profitably invested in any business or industry on the Atlantic side have an itching to try their luck in the gold mines. All they ask is fair and square dealing. They are willing to take such chances as are being taken by our own people.

Also, there are plenty of men in all the other Pacific Coast States who would stand in with the Californians and take shares here and there in the old "Golden State."

People still turn fondly toward the mines of "old California." There are big mines and mining booms at Cripple Creek, Colorado, at Mercur, in Utah, and at other places in the States between the Rockies and the Sierras; still, men of capital from these States are investing in the mines of California. Utah mining men are taking hold of properties. Among the Salt Lakers who have recently become interested are A. N. Butts, Col. Woodrow, E. S. De Golyer, E. T. Wall, F. Enzensperger, W. C. Thomas and W. S. McCormick. All of these men are delighted with the outlook in California and with the properties they have secured.

Instead of getting up a wild boom, locating everything in sight and putting upon the market all manner of wildcats, we of California will do well to put forward no mines except those that have merit, present or prospective. Then the people and the State will derive solid benefit from the mines. A boom in which men would be induced to throw away their money on wildcat locations would soon come to an end; then people would go away cursing the country. Having the best and richest mines in the world, California will soon have an abundance of "boom," and all on solid merit. The very fact that the mines are being opened and worked for what is in them for the money that can be taken out of the ground—not for what can be made by selling the stock, will attract investors among the careful, who otherwise would not put in a cent.

With the present mining outlook, it would not be a bad speculation for men who do not care to put money into mines that are already found and located to send out prospectors. It would cost but little to keep two men and a burro in the field all summer. In San Francisco and other places in California can be found plenty of reliable old prospectors, who would be glad to make such a trip through the mountains. The cost to four or five men joining to send out the prospectors and keep them in "grub" would be but a trifle. It is not difficult to find good, trustworthy men among the prospectors knocking about, waiting for something to turn up, and a pair of them in the field during the summer would be very likely to discover something of value. As they progressed they could very easily send in samples and descriptions of their finds and receive instructions from headquarters. A small army of prospectors might easily be sent forth into the mountains this summer, and, with a little care in the selection, the force would average well as regards honesty and industry. Not a few would consider it a godsend to have a chance to go out on a big prospecting trip.

## Concentrates.

MINERAL PAINT is being shipped from Spenceville, Butte Co., to Chicago.

STATEHOOD for New Mexico and Arizona is among the probabilities of the 54th Congress.

FIFTY stamps are now crushing ore at the mill of the Champion Mining Co., Nevada City.

THE fire in the Hope, Montana, mine is extinguished. The seven imprisoned miners are dead.

THE aggregate capital of the 526 Australasian companies floated in London in '95 was £53,796,394.

THE closing of the Eureka mill, on the Carson river, Nev., throws about fifty men out of employment.

IT is believed that the present number of stamps in operation in this State aggregates a little over 4,000.

THE Merced Mining Co. at Coulterville, Mariposa Co., is going ahead all right, and with satisfactory prospects.

THE Cœur d'Alene, Idaho, Miners' Union has boycotted the Cœur d'Alene *Miner*. The paper has not yet found it out.

THE men who are at present making money in mining in California are more numerous than those making money in anything else.

THE Yuba County Board of Supervisors have adopted a resolution endorsing the $250,000 debris appropriation now before the Senate.

IT takes three days for a loaded steamboat to go from Jennings, Mont., to Fort Steele, B. C., while the return trip can be made in nine hours.

THE California mineral land bill is still before the Senate committee, where Senator Mitchell, of Oregon, is doing his best or worst to defeat it.

O. JACKSON of Prescott, Arizona, states that there are 350 stamps in present operation in Yavapai Co. There are 245 stamps dropping in Pinal Co.

THE Yuma *Sentinel* gives fair notice that it has quit buying out new rival concerns in the publication business, thus discouraging a local industry of long standing.

THE British miners' member of Parliament, B. Pickard, who is also secretary of the Miners' International Federation, is mailing circulars to the United States asking for assistance for the Austrian miners who have been on a strike for several months. The number involved is 32,000, of whom nearly 5000 are women.

A UTAH man has found a borax deposit, but declines to impart to any one the secret of its location. Competition has set the present price of refined borax at 6¼ cents per pound.

IN several States "road improvement" is all the go. When the movement for good roads becomes more prevalent in California, it will be a good thing for the mining industry of the State.

TUOLUMNE COUNTY SUPERVISORS will hurt their county and do miners a serious injustice if they grant the Michigan syndicate the franchise asked for to float logs down the Tuolumne river.

ANOTHER disastrous explosion of giant powder at Butte, Montana, last Saturday, at the St. Lawrence mine, killed six men on the 1100-foot level. The bodies were recovered twenty-four hours after.

AN old idea of this journal, the creating of a new cabinet officer to be called the Secretary of Mines and Mining, is being again agitated. There should be such a cabinet officer, and some day there will be.

REPORTS from the southeastern part of Kern Co., Cal., are to the effect that the more recent gold discoveries there are in quartz. Camp Randsburg, sixty miles east of Mojave, is the center of the new locations.

TO enjoy the benefits of State legislation, Utah mining companies are informed by the Secretary of State it will be necessary in each case to pay him $8, which, under the circumstances, seems reasonably dear.

CALIFORNIA'S mineral product for '92 aggregated $16,000,000 in value; in '93, $18,806,261; in '94, $20,203,294. It is believed the '95 aggregate is about $21,000,000. The gold yield for the State for '95 is reported at $15,334,317.69.

STATISTICS show that the average result of the labor of one man engaged in mining in this State is nearly four times the average result of each man's labor in the business of agriculture and horticulture in the United States.

THE demand from British Columbia for the issue of the 4th inst., containing the illustrated article on the hydraulic gravel elevator, was so great that it is out of print, and the back numbers of that date cannot be supplied.

AN annoying typographical mistake in this column in last week's issue in an item contrasting present purchasing powers of gold and silver made the current quotation of silver 8¼ cents per ounce, when, as is evident, 68¼ cents was meant.

CHINESE miners working near Towles, Placer Co., would not comply with the requirements of the Caminetti law. United States Marshals arrested seven of them and took them to Sacramento, where they have been bound over for examination.

FOURTEEN YEARS of continuous service is a long period of life for any form of machinery, much less for furnaces. After that term of active work the sulphuret furnaces of the chlorination plant of the Zeila Mining Co., Amador Co., have been rebuilt.

MONTANA State Mineral Land Commissioners Irvin of Butte, Mitchell of Deer Lodge and Merrill of Helena have tendered their resignations to the Governor. The State Board of Land Commissioners will now assume charge of the State's land affairs.

THE United States Mineral Land Commissioners for Montana examined and classified in that State last year 1,367,525 acres, 1,257,195 agricultural and 110,330 mineral. Helena district—Agricultural, 261,460 acres; mineral, 67,610 acres. Bozeman district—Agricultural, 725,055 acres; mineral, 6,680 acres. Missoula district—Agricultural, 270,680 acres; mineral, 36,040 acres.

THE Northwestern Mining Association is in communication with the United States Senators and members of Congress from Oregon and Washington, requesting them to introduce a bill in Congress providing for the appointment of three commissioners in each land district within the two States wherein portions of railroad grants lie, the commissioners to be residents of the State in which they are to serve.

AT Johannesburg, South Africa, a mine staff usually consists of a general manager with a salary varying from $6000 to $15,000 a year, and the following managers of the different departments under him: Battery manager, $200 to $400 a month; underground manager, $200 to $350; cyanide manager, $200 to $300; chief engineer, $200 to $300; compound manager, $150 to $250; secretary, $125 to $250; surveyor, $150 to $200; assayer, $125 to $200; storekeeper, $125 to $150; timekeepers, $100 to $125; boarding houses charge $35 per month.

THE *Review* says the cessation of the Utah mining incorporation flood simultaneously with the approval of the incorporation fee bill was so abrupt and complete as to be almost ludicrous. And it was quite time the incorporators ceased capitalizing. During March there were incorporated in Utah 110 mining companies, with an aggregate capital of $119,600,000. Sixty-six of these companies, with a capital of $73,900,000, were organized for the purpose of operating in the Camp Floyd and adjacent districts, and forty-four companies, with a capital of $45,760,000, are to operate in other portions of Utah and neighboring States.

ACTING SECRETARY OF THE TREASURY WISE has issued the following regulations to collectors and other officers of the customs: "The special regulations of July 17, 1889, as amended by Department's circular of July 17, 1891, which provides that 'in determining the value of lead contained in Mexican ores, such value will be computed at the latest known price of bar lead in the New York market, less 1½ cents per pound,' are hereby supplemented as follows: Whenever the market value of lead at the port of importation is ascertainable, such value shall be taken as the basis of computation; otherwise the above stated rule must be applied."

THE Treasury department has ruled that the duty on all lead ores which are shipped into the United States shall be three-fourths of a cent on every pound shipped, provided the value of the lead in the ore exceeds the value of the silver. Heretofore this has been considered to mean three-quarters of a cent on the lead that is contained in the ores. If the ore runs 60 per cent lead, duty was paid on 60 per cent of the ton. But the department has notified the smelters that hereafter this will be construed to mean three-quarters of a cent for each pound of the gross ore tonnage, if the lead in the ore is of greater value than the silver, which causes a protest from the Northwest Miners' Association against such ruling.

THERE is always a little good-natured rivalry between some of the leading gold-producing counties of this State as to which has yielded the most gold throughout the year. Statistics are secured by the U. S. Mint as closely as possible, though it is obviously difficult to get exact figures. In 1894 Calaveras stood first, being credited with a gold production of $2,119,365.67; Placer came second, with a yield of $1,851,214.52; Nevada was a close third, $1,830,154.80: Amador fourth, $1,331,916.54; Trinity fifth, $1,012,665.84. The returns for '95 are made up and show that, as in '92 and '93, Nevada county is first. This year Calaveras Co. is second, Placer third. The fire at the Utica mine in Calaveras Co. cut down that county's yield considerably.

OUTSIDE of the silver seigniorage in the treasury, there is no idle silver in the treasury which can be paid out into the circulation. All the silver authorized is in circulation already in the form of actual silver coins or silver certificates, and the silver cannot be paid out legally except when silver certificates are presented for redemption. In 1893 the demand for silver dollars was so great that $500,000 worth of silver or silver certificates was issued in excess of the legal amount authorized. The Secretary of the Treasury apologized to Congress for the over issue. It goes to show that the actual demand for silver as represented by silver certificates actually exceeded the demand in 1893, when the great cry was on for the repeal of the Sherman silver bill.

THE Cripple Creek *Mail*, explaining why so many properties are idle, says: "It is not safe or wise for the owners of unpatented claims to announce a strike or work them after it has been made. To do so is to invite a lot of human cormorants and devilfish to swoop down on you and take away what you worked hard and long for. The district is crowded with scoundrels who are here just for that purpose, and many of them are backed in their nefarious work by men enjoying good standing and wealth. Men who have owned and worked mines here for two or four years have lost them by the thieving trickery of men who have been here but a few weeks. The results of the operations of these scoundrels can be seen occasionally in our report of mineral adverses filed."

IN a protest to be filed at the Redding Land Office on behalf of E. N. Breitung and against the patenting of 280 acres of land in Siskiyou Co. to the railroad company, R. L. Dunn makes affidavit that the deposit of auriferous conglomerate in that section "is not identical with placer deposits heretofore known and mined extensively in the State of California, but more nearly approaching in character and occurrence the deposits of auriferous conglomerate which have been and are now being mined in the Transvaal, South Africa." The twelfth report of the State Mineralogist contains a report in extenso from Mr. Dunn on these Siskiyou Co. deposits, which, with the accompanying map, gives an intelligent idea of a form of gold-bearing rock comparatively rare in this State.

A SANTA CRUZ resident asks: "Where can I go to do placer mining on a small scale?" To specialize is not easy, for in a good many places the Chinese with their rat-like thrift have occupied areas where, without anything but the possession of ability to work, one can clear from $1 to $2 per day, and it is this, "Concentrates" assumes, that the enquirer means. There are two companies comparatively close by that own placer ground and water, and that are somewhat liberal in their dealings—the Natoma Ditch Co., near Folsom, and the North Fork Ditch Co., on the other side of the river. Chas. Webb Howard of this city is president of the former company; H. K. Buchanan of Sacramento is manager of the latter company. They allow an individual who means business to work on his own account, supply him with water at very reasonable rates, and, even if he is not successful, are easy with him in settlement. There is a large area of virgin placer ground yet in California; in Trinity Co. alone is a great extent, but without capital little can be done. The locality referred to is the only one that at present occurs to mind as being of practical promise to the enquirer.

A CALIFORNIA MINING ENGINEER who has been spending some months in New York writes "Concentrates" that there is a better feeling in regard to California mines, and that in his opinion the principal factor in securing a correct idea of values in that respect has been the MINING AND SCIENTIFIC PRESS, which, he said, he found taken in many mining men's offices throughout New York City. He particularly noted the attention paid to an article in the issue of March 7th, entitled "The World's Greatest Gold Lode," which he says prominent mining men of New York declare to be one of the best articles on the gold wealth of California that they ever saw; that that article, in their judgment, was worth to the State one million dollars. This paper has personally received a number of such assurances, and is pleased to know that its efforts to place before the mining world facts relative to the gold wealth of this State are met with such intelligent approval. Referring to the article alluded to, one New York mining man, who sent for all the copies of the paper that could be supplied to him, finding that was insufficient, has had the article in question reproduced in pamphlet form. Its length has probably precluded its republication in many of our contemporaries.

MR. G. A. TREADWELL, the general manager of the Red Hill gold mine, a new property now being opened up with most flattering results in Nevada county, last Saturday showed the writer some of the finest specimens of gold, both in value and appearance, that have been seen in this office this year. Inasmuch as the mine is not for sale, this paper overlooks its usual custom and makes special mention thereof; not from any desire to note the Red Hill, which is a fair sample of the California gold mine, but to note two facts. One is that some of our best gold properties are passing into the hands of foreign companies by reason of the apathy or indifference of our own people. The other is the fact of how little the outside world realizes the mineral wealth of California. Mr. Treadwell, who is an old Nevada miner, was some time ago in London, where the Scotch company who now own the Red Hill asked him to go to South Africa and look up a good mining property for them there. Mr. Treadwell, who knew of California's gold wealth, said: "Very well; but why go to South Africa? Authorize me to spend one-fourth the amount you name and I will get you a better property in California." After the usual shrewd negotiations which characterize the Scotch investor, Mr. Treadwell was given full power to make such purchase as he saw fit; and using this power with discretion and judgment, got an excellent property at what seems a very reasonable figure. Were any other country possessed of one-fifth the gold wealth of this State, it would be blazoned to the world. Californians have got so used to seeing the annual output of gold, though now diminished by reason of hydraulic repression, that it is taken as a matter of course; and the opening of a gold property that would be a world's wonder anywhere else is here given brief chronicle. Chauncey Depew and Cornelius Vanderbilt, when here last week, chanced to meet Mr. Treadwell, who was stopping at the same hotel, and asked him to name his own price for the specimens, telling him that they would create considerable interest in New York City. Mr. Treadwell promptly told them that the specimens were not his property—they belonged to the Scotch company, of which he was simply agent and general manager in this country. It might be a good investment, however, for some of our mining brokers to send similarly valuable ones to these gentlemen. To forestall the probable collection of letters that might be received at this office in answer to this—were this paragraph to stop here—telling the MINING AND SCIENTIFIC PRESS it should remember it is not the value or prettiness of nice picked specimens that determine the value of a mining property, but the amount of ten and twenty-dollar ore that can be assured, it is simply supplemented by saying that while Californians understand that a good many New Yorkers do not, and that nothing advertises any production so well as a good display of it. Seeing is believing the world over, and any one who sees such specimens as those exhibited by Mr. Treadwell must realize the enormous gold wealth of the region that can produce them.

## Lixiviation of Silver Ores in Mexico.

A recent paper by J. H. Clemes of the Institution of Civil Engineers, on the lixiviation of silver ores, refers largely to the manner of operations in Mexico, where in the lixiviation process of extracting silver the ores are roasted in admixture with sodium chloride, for the purpose of converting the silver salts into silver chloride, and, after being cooled, are leached with water for the removal of soluble impurities. They are then lixiviated with a cold dilute solution of sodium of calcium hyposulphite; the latter solution being used in Mexico. In this lixiviation the silver chloride contained in the ore is dissolved, and, by the addition of calcium sulphide, the silver is precipitated as a sulphide, which is dried in filters and is reduced to the metallic condition by fusion or by cupellation.

The plant for the lixiviation process comprises machinery for breaking and pulverizing the ores, roasting furnace, leaching and precipitating vats, and apparatus for treating the final product.

In northern Mexico the ores are almost always ground in a dry stamp mill. In the 40-stamp mill at the Yedras mines the ore—much of which arrives partially broken from the picking floors—is fed into two rock breakers in the upper part of the mill, and from them dropped into the ore bin, through sliding doors in the bottom of which it is run into cars.

The Yedras mines are situated about five days' journey from the coast, in a spur of the main Cordillera, at an altitude of more than 7000 feet above the sea level, and all freight has to be carried to them on pack animals. The battery posts are made of thoroughly seasoned timber. The feed side and the front of the batteries below the line of the braces are unobstructed, so that the automatic feeders, the mortars, and the pump conveyors are readily accessible. Instances of the employment of the double mill for dry stamping are to be met with. In this type of mill two parallel lines of battery posts are set facing each other, and are united by heavy tie beams braced one against the other. This mode of construction gives a strong and steady battery frame, but for dry crushing purposes it is attended with disadvantages.

The best weight for stamps appears to be between 950 and 1000 pounds, when, as is nearly always the case, the preliminary breaking of the ore is limited to passage through a rock breaker set to crush 1½ to 1¾ inches. Whether the practice of breaking the ore to a much smaller size before feeding it into the batteries, and of using light stamps for the final pulverization, would sufficiently improve the physical condition of the pulp to justify the increased complexity of the mill is a matter worthy of investigation. In one or two instances, where a somewhat coarse grade of crushing sufficed, roller crushers had been used in Sonora for grinding ores. The results obtained had, however, not been entirely satisfactory. In one or two excellently built mills the crushers, when submitted to the test of continuous hard work, had failed to supply the furnaces with the amount of fine meal required of them. The roll crusher, although without a rival as a reducer of ore to a small gravel size, had but a limited capacity when used as a fine pulverizer. So that if roll crushers are to be successfully employed for the production of fine meal, for such purposes as those of the leaching process, the principle of graduated reduction in a series of machines must be thoroughly applied. In view of the wear and tear of the rolls and sieves, it is doubtful whether any cheapening of the operation of crushing would be brought about by substituting rolls for stamps. The advantage to the lixiviation process would be the improved condition of the crushed ore, both for chloridizing purposes and for the filtering vats.

The chloridizing roasting is the most important and expensive part of the manipulation. It is usually carried out in long reverberatory furnaces, divided into several hearths. In the cooler parts of the furnaces a large part of the sulphides is converted into sulphates, and, in the hotter parts, the chlorine necessary for the chloridization of the silver salts arises from the mutual decomposition of these sulphates and the common salt added to the charge. The chief requisites for good roasting are carrying out the operation in a highly oxidizing atmosphere, and at the lowest practicable temperature. When ores are roasted with an insufficient supply of air reactions occur in the roasted mass after discharge from the furnace, and particularly after being washed with water, which interferes with the extraction of the silver. The loss of silver which occurs in roasting is affected more by the temperature at which the operation is carried on than by any other influence.

The ore is leached in large circular vats. The first leaching with water has to be thorough, since any soluble impurities which are not removed enter the chemical solution used in the second leaching. The solvent employed in the second leaching or lixiviation is a dilute solution of calcium hyposulphite. Operations at the new works were begun with a solution of sodium hyposulphite, the strength employed being ten or fifteen parts of the crystallized commercial salt in one thousand parts of water.

The rate of filtration in the vats depends on the physical condition of the ore pulp, so that the mechanical preparation of the ore has to receive special attention. The pulverized ore should be in the condition of fine meal, as free as possible from dust. When base and refractory ores are treated rapid solving with dilute solutions is very desirable. Under these conditions a minimum quantity of the salts of the base metals is extracted with the silver. Besides silver chloride, various salts of silver, such as silver antimonate and silver arsenate, are partially or wholly soluble in solutions of hyposulphites. The precipitation of the salts dissolved by the hyposulphite solution is effected by a strong solution of calcium sulphide, which is freshly prepared as needed. At places where caustic soda is readily obtainable there is good reason to believe that the earlier practice of using sodium hyposulphite as solvent and sodium as precipitant was more economical.

The precipitate obtained from pure ores is often converted to the metallic condition by fusion in crucibles with scrap iron and borax. The product from base ores is, however, largely mixed with impurities, and is refined in German refining furnaces. Furnaces of ample dimensions are used in order that the sulphides might be mixed with a large amount of litharge. The rich lead obtained is refined in an English test furnace. The precipitation is sometimes so conducted as to furnish two grades of sulphides. The precipitate, rich in silver from the earlier stages of leaching, is treated by fusion or cupellation, and the poor variety, from the later stages, is shipped to smelting works.

The process successively treats a wide range of ores which contain too much impurity to be reducible by roasting and amalgamation. The cost of working either process is much influenced by local conditions, but if the nature of the ore is such as to require a chloridizing roasting the silver contained in it could be more cheaply extracted by a solution of hyposulphite than by means of mercury. Ores which contain a small percentage of copper are treated by the Patera process with excellent results, and the rapidity with which the use of the process is extending in Sonora is partly due to the fact that nearly all the silver ores found in that State are accompanied by some copper mineral.

Considerable loss of silver takes place in the operation of chloridizing roasting. The fine ore dust which escapes from the furnaces is mostly recovered, but a large portion of the fume escapes. The flues which conduct the furnace gases from the furnaces to the stacks are generally too small in sectional area. The current in them is too rapid, and the fume has a poor chance to settle. For the development of the process the reversal of this state of things is to be desired.

In reduction of cost, as distinguished from the avoidance of loss, the greatest room for improvement occurs in the roasting. The more extended use of furnaces in which the stirring of the ore is effected by mechanism, or the adoption of reverberatory furnaces of very large dimensions, would undoubtedly decrease the cost of this part of the operations.

## The Adventures of a Mining Item.

A few weeks ago an item appeared in the "Concentrates" column of the MINING AND SCIENTIFIC PRESS of San Francisco relative to the finding of placer gold after the heavy spring rains in a certain famous placer district of California, where such an occurrence is not uncommon at this season of the year. Shortly after the publication of the item in the coast journal it was stolen by a Denver newspaper, and the words "Cripple Creek" substituted for the name of the real locality. Finally, the London *Financial Review* printed the garbled paragraph and the *American Gold Mining Record* of Chicago copied it, commenting as follows:

"One of the most recent instances of exaggeration which have come to our notice concerning Cripple Creek may be found here. It is from the London *Financial Review* and reads as follows:

"'Since the rains of the first weeks of this month in Cripple Creek, coarse gold and nuggets are being picked up at various points in the gulleys and ravines. When surface gold is brought to light by the mere action of rainfall, it is pretty clear that immense wealth is somewhere about in that self-same region.'

"This is all right, with the exception of a few minor details, which are inaccurate. There have been no rains in Cripple Creek for several months past, there has been no coarse gold or nuggets picked up as a result of these rains or as a result of anything else except hard work with drill and dynamite, and the surface gold isn't brought to light by the mere action of the rainfall. Having said this, it gives us pleasure to heartily concur in the last statement of the *Review:* 'That there is immense wealth somewhere about in that self-same region.'"—Cripple Creek, Col., Prospector.

## A Paraphrase of an Old Saying.

TO THE EDITOR:—In the course of the article on Rhodesia (in your issue of the 28th ult.), which Mr. St. Auburn made so interesting alike by the literary style which characterized it and the information which it contained, there is a reference to the old saying, "Gold is where you find it." It may interest your readers to know one of the earliest forms of the story in which it has been at times enveloped. I say one advisedly, because "in the days of old Rameses this saying had paresis."

In July, 1851, when the rush broke out at Ballarat (Australia), Governor Philip, accompanied by his staff, visited the diggings. As he guided his horse amid the holes so liberally scattered over the surface of the hills at Bunninyong, he pulled up occasionally to exchange greetings with the 'boys.' By and by he found himself talking to a Cornishman of more than average intelligence, so he put to him a question which many have asked since, "And where do you think the gold came from, my man?" The old fellow standing in the prospect hole, leaning on his shovel, scratched his head and replied: "Wheer it it is, theer it is; and wheer it ain't, theer be Oi!" That is the epitome of geological statement and mining realization.

Yours faithfully,
Denver, Col., April 5th. T. A. RICKARD.

## Lead Statistics for 1895.

The returns for the calendar year 1895, as received by the Division of Mining Statistics of the United States Geological Survey, show that the production of lead in the United States during the year was as follows: Total production of desilverized lead, as shown by the return from all refining works, was 201,992 net tons in 1895 as compared with 181,404 net tons in 1894. This desilverized lead included 6,244 tons of hard lead. Desilverizers reported that 51,613 tons of their product were obtained by refining foreign base bullion in bond. Of this quantity 17,282 tons were exported. The production of soft lead in Missouri and Kansas in 1895 was 39,890 tons.

The following is the estimate of consumption in 1894 and 1895, net tons:

| SUPPLY. | 1894. | 1895. |
|---|---|---|
| Product, desilverized lead | 181,404 | 201,992 |
| Product, soft lead | 37,686 | 39,890 |
| Imports, foreign refined lead | 8,200 | 22,947 |
| Stock, domestic, Jan. 1, 1894 and 1895 | 7,496 | 8,586 |
| Stock, foreign in bond, Jan. 1, 1894 and 1895 | 3,302 | 7,181 |
| Total supply | 238,088 | 280,596 |
| DEDUCT. | | |
| Foreign base bullion refined in bond and exported | 29,000 | 17,282 |
| Lead in manufactures exported under drawback | 950 | 2,000 |
| Stock, domestic, Jan. 1, 1895 and 1896 | 8,586 | 9,557 |
| Stock, foreign in bond, Jan. 1, 1895 and 1896 | 7,181 | 9,865 |
| Total deductions | 45,717 | 38,704 |
| Leaves apparent home consumption | 192,371 | 241,892 |

THE occurrence of ice in the comparatively low latitudes of Cape Horn and the Falkland Islands is noticeable. The ice has originally formed part of the great barrier which, with very few breaks, surrounds the vast Antarctic continent, rising to an average height of from 150 to 200 feet above and sinking from 1100 to 1400 feet below the level of the sea, and having, moreover, a thickness of something like 1200 or 1500 feet. It is a solid perpendicular wall of ice, formed by the descent over the low lands into the sea of the ice and snow which form on the mountains inland, and when the forefronts are pushed into depths of about 300 or 400 fathoms large stretches are broken off and float away northward with the current. When they start on their aimless career they may be miles in extent; and though, as a rule, they break up by collision and erosion, it is not at all unusual to encounter an island miles long in the neighborhood of the extreme ice limit. For instance, the Coldinghame in this region passed about 200 bergs, one of which was ten miles long, The Cutty Sark, again, in latitude 50 south, longitude 47 west, found by cross bearings and distance run that the east side of one berg which she encountered was nineteen miles long. At first the masses are straight, flat-topped and horizontally stratified—altogether unlike those met with in the north. By the action of the waves they are cut at the water's edge into coves and caverns of a blue color. Then, as they collide or get melted away at the base by the action of the water, they turn over and show to the wandering mariner fantastic shapes. As they travel farther north, they become smaller and still more strangely shaped and ultimately melt away.

A UNITED STATES JUDGE has decided that natural gas piped from Canada under the Niagara river is a crude mineral product, and therefore exempt from duty.

AN inch of rain falling upon an area of one square mile is equivalent to nearly 17,500,000 gallons, weighing 145,250,000 pounds, or 64,844 tons.

## Assays of Copper and Copper Matte.

Discussion of the Results presented at the Florida Meeting of the American Institute of Mining Engineers.

W. M. Courtis, Detroit, Mich.: Except for free-gold ores, I have always believed in scorification. I think the crucible assay gives silver low. We found this out at the Wyandotte works in assaying Silver Islet ore. The mine managers made us, and also the check assayers, run one of the duplicates by crucible. As we took the mean of twelve assays for ore running from 700 to 10,000 ounces of silver per ton, they soon found that the crucible assay reduced the average result. So it was left out, and scorification was employed for all the assays.

Cabell Whitehead, U. S. Mint, Washington, D. C.: After studying, in connection with my own experiments, the results reported by the various assayers co-operating in Dr. Ledoux's plan, I have no doubt that the results obtained by the combination method are too low, and while this loss can be greatly reduced by using dilute acid, I have been, up to the present time, unable to devise any method of preventing it entirely. The results show that scorification gives about one-tenth of an ounce per ton more gold than the combination method. I consider this difference greater than it should be if dilute acid be used, but even a few hundredths of an ounce is not to be disregarded, when the total amount present is usually less than half an ounce.

In the case of silver the results are not so conclusively in favor of scorification. While the figures obtained are fully up to, and in some cases beyond, those given by the combination method, the additional work of assaying slags and cupels, as well as the doubt concerning the purity of the buttons, would suggest the desirability of a less laborious and more accurate method. While a second cupellation with a "proof" greatly reduces the chance of error from impure buttons, I am not sure that it entirely removes that chance, as the fire assay of silver is far from satisfactory.

I am inclined to believe that the combination method as modified by "J" leaves little to be desired. The advantages are, first, the use of bromide instead of chloride as a precipitant for silver; second, there need be no correction for loss of silver in slags and cupels (the amount of silver cupelled being not more than five or ten mg., these losses may be disregarded without introducing an appreciable error); third, a larger sample can be taken than is possible with scorification.

In a large copper works, recently visited, I observed a great improvement in the method of parting small amounts of gold. The buttons are placed in small test tubes, and twenty c.c. of dilute nitric and (1:7) was found in each. The tubes were set in a beaker of cold water, and was then put over the lamp and brought to boiling. With acid of the strength specified the gold did not break up, but retained the shape of the button, remaining as a black ball. The weak acid was now poured off and 20 c.c. of 32° B. acid was added, and the water in the beaker was boiled for ten minutes longer, when the gold was washed and taken out in glazed porcelain crucibles. When this method is used it makes little difference how small a proportion of gold the buttons contain.

H. Van F. Furman, Denver, Colo.: The results as presented by the different assayers taking part in the investigation are of general interest to those engaged in gold and silver assaying, and should result in benefit, even if they do not lead to the adoption of some standard method for the assay of the material under consideration.

The wide divergence in the results as reported shows that an investigation of this nature was timely. Through analysis and discussion of the results it appears to the writer that much may be gained, and it is hoped that the discussion may be full.

That some of the reported results are unquestionably too high and others too low is apparent. Without going into a complete analysis of these, I venture to point out some possible sources of error.

1. Some of the assayers have stated that the test-lead and litharge used were free from silver. The writer does not believe that any commercial test-lead or litharge in the market is entirely free from silver. Gold is rarely present; but silver is invariably present, at least in the experience of the writer. The lead which I am using at present shows 0.3 mg. of silver in 100 grammes. This would be equal to about 133 oz. of silver per ton, reported in the ordinary scorification assay of an ore or matte, when $\frac{1}{10}$ A. T. of the sample was taken. This lead is sold by one of our standard dealers and is made by one of our oldest and most reliable refining establishments. I am informed that the lead was treated with zinc seven times in order to extract the last traces of silver. Every one who is familiar with zinc desilverization knows that it is impossible to remove the last traces of silver, even should the zincing be continued almost indefinitely. In order to determine the silver in the test-lead it is not sufficient to take one A. T. and cupel it. More frequently than otherwise the result would be no button of silver. From 100 to 300 grammes of lead should be scorified until a lead button of not over 3 grammes is obtained. This button is then to be cupelled quite cold for silver. The same is true of the litharge; but the ordinary litharge usually contains more silver than the test-lead, and its silver contents are often unevenly distributed.

Another cause of too high results, where the proper precautions are not taken, is the imperfect elimination of the base metal on the cupel. This is especially the case with material high in copper, as is instanced by some of the reported results in this case, where the silver buttons were shown to contain over 3 per cent of copper. The only safe rule is to eliminate nearly all the copper from the lead buttons prior to cupellation, or to run a synthetic proof and make corresponding deductions, as was done in some of the instances reported. Should the lead buttons contain considerable copper, the latter method is at best only an approximation, as it is impossible to estimate closely the amount of copper present. In all cases the cupel should be pushed back into a hot part of the muffle, just before the "blick."

Another source of error, probably more common than is generally supposed, is due to the cupel used. If the cupel is made of too coarse bone-ash, or has not been compressed sufficiently, it is liable to be porous, and the cupel absorption will be quite heavy. I notice in one case reported that 15 ounces of silver (to the ton of matte) was recovered from the cupel; certainly an excessive amount. The writer uses XX bone-ash, and gives the cupels such pressure that when thoroughly dry they may be dropped from a height of about 3 feet without danger of breaking.

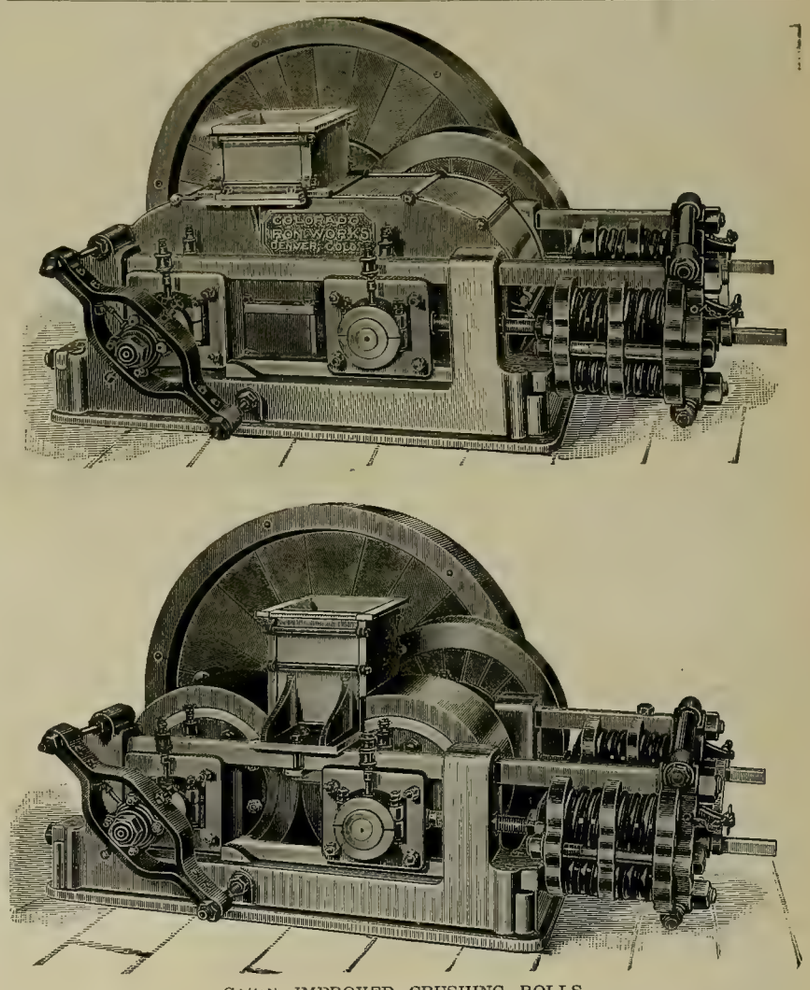
Another important point is to heat the cupel to the temperature of the muffle, and when it has been thus heated, open the door for a few minutes before dropping in the lead button. This serves to destroy any organic matter which the cupel may contain, and which might cause the button to "spit."

Another important point, and one to which the writer has more than once traced differences in assays, is the inaccuracy of the milligramme weights ordinarily sold by the dealers and manufacturers. It is extremely difficult to obtain sets of these weights which are concordant among themselves, and are exact subdivisions of a gramme. Two instances of this have recently come to my notice. A set of gold-assay weights from 1000 (= 0.5 gramme) to $\frac{1}{1000}$ (=0.5 milligramme), consisting of 20 pieces, was ordered from a prominent manufacturer. On receipt of the weights, I found that the 1000 weight was not only not exactly 0.5 gramme, but that there was quite a wide difference among the individual weights. Some of these weights were too heavy by quite 0.3 milligramme. The weights were returned to the maker with the request that they be made correct. When I received them again from him, I found them more nearly correct, but some were still so far from accuracy that I had to readjust them. Of over 100 riders recently examined, and which were marked 1.2 milligrammes, every one was found to be too light. The weights as purchased should never be used until they have been subjected to a thorough test and found to be correct.

In addition to the set of my own results contained in the report presented to the Institute by the Secretary, the following determinations, made on the same material after sending in my statement of assays and methods, may be of interest:

| Material. | Silver, Oz. per ton | Silver, Oz. per ton, average. | Gold, Oz. per ton | Gold, Oz. per ton, average. | Copper, per cent | Copper, average. |
|---|---|---|---|---|---|---|
| Matte. | 133.6<br>132.5 | 133.05 | 2.25<br>2.30 | 2.275 | 54.28<br>51.13 | 54.20 |
| Copper. | 153.3<br>153.2 | 153.25 | 0.28<br>0.26 | 0.27 | 97.65<br>97.23<br>98.08<br>97.65 | 97.65 |

(*To Be Continued.*)




CAZIN IMPROVED CRUSHING ROLLS.

## Improved Cornish Crushing Rolls.

From Designs by Franz Cazin, M. E.

The Colorado Iron Works, of Denver, Colo., have lately introduced important improvements in ore crushing rolls, commonly termed "Cornish rolls." They are from plans by Mr. Franz Cazin, M. E., and are designed to meet all requirements, but are especially adapted for very fine crushing, as is usually necessary in cyanide, chlorination and bromine processes of ore treatment.

In the construction of these rolls the main frame is cast in one solid part, insuring a perfectly rigid machine under all conditions. Rolled steel tires or shells are used, which are far superior to any cast metal shell made, the texture of the steel being so evenly pressed in, being rolled to shape, that it is impossible for any soft spots to appear, as usually happens to cast shells when crushing hard ores. The shafts are forged under steam hammer from steel blooms, and are much tougher and more rigid than when made of rolled steel or iron bars. The journal boxes are universal—that is, the journal boxes proper are pivoted in box frames in such manner as to always conform to shafts however much more one side of the rolls may be fed than the other. The Cazin end adjustment is applied on one end of roll shaft, by which same may be adjusted longitudinally to provide for the even wearing of roll faces. This appliance is of great value as, when shells wear down with use, the faces are kept smooth and a uniformly crushed product is maintained until new shells are needed. It is very simple and can be manipulated instantly while machinery is in motion and without removing housing; an advantage over the old style adjustments, which involves the stopping of machinery, taking off housings, changing parts, etc., etc.

Heavy wrought-iron guide bars are provided above and below which carry the universal boxes; they also extend through the corner posts at one end and carry the springs on the two sides of the machine. The springs are in cages, of which there are two, each being independent of the other and set in constant spring tension high enough to crush the hardest ore without any sliding movement of the boxes, they yielding only when some hard unbreakable substance, as a hammer, gad, bar or pick point (which might get between rolls by accident) passes through. The guide boxes take all the working strain, the main frame simply furnishing rigidity and carrying the working parts in position and alignment. Where high speed and fine crushing are desired the rolls are housed in to prevent the escape of dust. Solid built wood pulleys are furnished with these rolls unless otherwise ordered, as they are much stronger and last longer than any other kind. It is generally admitted now by progressive millmen that bolted rolls are more efficient than when geared. The two pulleys are placed on one side of the machine, and on removing the housing every part is easy of access without danger. These rolls are manufactured in five sizes, viz:

| | | | | | |
|---|---|---|---|---|---|
| 20 | inches | diameter x | 12 | inches | face, |
| 27 | " | " | 14 | " | " |
| 36 | " | " | 16 | " | " |
| 40 | " | " | 16 | " | " |
| 54 | " | " | 8 | " | " special. |

This company has issued a sixteen page pamphlet, "Explaining Ore Crushing," which will be mailed to interested parties on application.

# Electrical Progress.

### Chlorination vs. Cyanide.

Mr. E. R. Holden of Colorado suggests a new process for making chlorine at less than one-tenth of the present cost by means of bleaching powder and sulphuric acid. He says the cost per ton of ore is now 80 cents, and by the plan he suggests it can be reduced to 7 cents per ton of ore. He proposes to utilize the immense salt beds in Utah, worth there say $10 a ton, transport the same to points in Colorado, where there are immense water powers unused, use this water power to generate electricity, "which has the power of decomposing the chloride of sodium, or common salt, from which the chlorine escapes in the form of a vapor and is then condensed into a liquid form, after which it is ready to be placed directly in contact with the high or low grade ores of the States of the West." Ores to be treated by chlorine must be free from zinc, copper, arsenic, antimony and lead. He claims to save one-half the silver in the ore, and instances an ore containing $6 gold and $6 silver, and says he can recover $5 gold and $3 silver. Pyrite must be roasted, but this is now done by the Pearce turret roaster at from 35 to 65 cents per ton. He claims for chlorination a higher extraction than by cyaniding, which on ores from $15 and upwards amounts to a large loss, being the difference between a recovery of 90 to 98 per cent and that of 80 to 85 per cent. He practically admits the superiority of the cyanide method on very low grade ores, say from $6 to $10, providing they can be treated without roasting, but declares that the large cyanide works in operation at Florence on Cripple Creek ores are putting in roasters and eventually will roast all their ore. He argues that the success of the cyanide method in South Africa argues nothing for the treatment of American ores, as the conditions here are different and are changing with the depth of the mines. As to the cyanide mill at Mercur, Utah, he claims that a higher extraction could be secured by chlorination at a less cost per ton. Mr. Holden figures that crushing for the cyanide method costs 20 cents per ton more than for chlorination; that there is a difference of 7 cents per ton in precipitation in favor of chlorination, and adding $1.50, difference of extraction, and royalty, 50 cents per ton, makes a total difference of $2.27 in favor of chlorination. It is not likely that all of Mr. Holden's claims can be proved.

If anyone, in looking over articles on electric railways in the German language, should come across the word strassenbahnwagenuntergestelle, he need not be alarmed or discouraged nor be afraid to use it in good society. Instead of getting at the subject directly, as is done in English, this single word relates quite a little story—a sort of riddle of which you are expected to guess the answer. The story is briefly as follows: In about the middle of the word we find that the object referred to has some connection with a car, and, returning to the beginning, it appears that this car is intended to run on rails (as cars usually do, by the way); that these rails are in the streets of a city, and that the car is supported on some structure. Near the end it is explained that this supporting structure is below, and not above, the car, and, finally, it is added that it refers to the apparatus in general and not to any one form in particular. With the aid of this description it will not be difficult to guess correctly that the German writer would have said trucks instead had he been privileged to use the English language. It seems to us that this verbal machine is somewhat overcompounded.—Electrical World.

J. B. Schalkenbach, the organist Polytechnic Institute, London, has invented and constructed an electrical orchestra. An organ with two keyboards and a number of stops is connected by electric wires with a large number of musical instruments, which are distributed over the space usually given up to the orchestra, and kept in place by various stands. While a chair is located next to each instrument, the only man in the entire orchestra is Schalkenbach himself, who takes a seat at his organ, from where he conducts, so to speak, his mysterious musicians. The entire arrangement is mechanical and electricity is the agent doing all the work.

The long distance telephone used at the *Transcript* office is in a small room that is separated from the composing room by a thin wooden partition. Yesterday while an attache was receiving a telephonic message from Sacramento our pressman began to "plane down" a form. The striking of the mallet upon the planer produced quite a sound. Almost instantly the gentleman at Sacramento inquired: "What is that infernal pounding?" The pressman was requested to cease his tattoo, and the message from Sacramento was received without interruption. It seems strange that although the party who was causing the noise stood fully 20 feet from the telephone, with a partition intervening, the vibrations produced operated upon the sensitive instrument to such an extent that the pounding was not only plainly heard at Sacramento, sixty miles distant the way the wires run, but actually interrupted the party who was talking at that end of the line.—Nevada City Transcript.

Acting Secretary of the Interior Reynolds this week denied the application of the Electric Power Company for right of way for canals across the San Gabriel reserve in California on the ground that the law restricts the right of way through public lands or reservations to canals or ditches for purposes of irrigation. The company claimed that its application should be approved for the reason that the canal was located and partly constructed before the land was reserved, but the Secretary is of the opinion that there is no authority in law for approving the application.

At Alameda, Cal., the expert employed by the Municipal League to report on local electric matters last Monday gave a detailed account of what the electric light plant has cost the city. He calculated that the plant had cost the city, charging interest at the rate of 5 per cent, $49,112.61; without interest, $41,059.50. An inventory of the plant shows it to be worth $50,170.57. He estimates that it has cost Alameda about $1,000 a month to operate its electric light plant and that during 100 months the net loss to the city has been $112,842.

A new subject for photographers is the flames of explosives. Several of these pictures have been published in Vienna, an extremely beautiful one, it is said, having been furnished by the demon gunpowder. Some materials, nitro-glycerine and gun-cotton, send out large flames, while others give short flames of an entirely different character. A remarkable connection is found to exist between the size of the flame and the relative safety of the explosives.

The property of the Victoria Electric Railway and Lighting Company, including the franchises, was sold at auction last Saturday. F. S. Barnard of the Consolidated Electric Railway and Lighting Company of Vancouver secured the property for $340,000.

The owners of the North Star mine in East Kootenay, British Columbia, contemplate installing an electric tramway from the mine to the river landing at Delgardno, a distance of twenty miles.

A bill to grant a franchise for an electric railway through Yellowstone park has been reported adversely by the Senate Committee on Territories.

The San Francisco and San Mateo electric railway was sold last Saturday to J. A. Buck and N. Ohlandt for $300,000. It cost $925,000 to build.

# Scientific Progress.

Heibling has invented a process for producing alumina from clay in a form absolutely free from silica, and readily convertible into sulphate and other aluminic salts. Such a process may be extremely valuable, as the manufacture of the salts of alumina is largely on the increase. The clay is incorporated with a mixture of equal parts of ammonium and potassium sulphates in the proportion of three molecules of ammonium sulphate to each molecule of alumina. The mixture is pressed into the form of hollow bricks and is heated in a furnace to 270 to 280° C. Gaseous ammonia and acid ammonium sulphate are given off at this temperature, while acid potassium sulphate is formed and combines with the alumina of the clay to form alum. The alum is leached from the bricks with water and freed from iron by recrystallization. The insoluble silica which remains behind may be employed in the manufacture of cements. By spreading out the powdered alum in thin layers on shelves arranged in a vertical tower, on passing over it the warm moist ammoniacal vapors from the brick oven the alum is transferred into alumina, which retains the form of the original powder while ammonium and potassium sulphates are obtained as side products.

By forming on the surface of iron and steel a double carbide of hydrogen and iron, which is extremely hard and adhesive, protection of the metal from rusting is said to be insured. This is a French process, and the treatment is effected in a pair of gas retorts, set side by side, and raised to a temperature of from 600 to 700 degrees, Cent. The articles in this case are placed in a retort for about twenty minutes, when a current of hydrogen is turned into the retort and kept on for forty-five minutes, a small quantity of naphtha being now introduced, the supply of which is kept on for ten minutes. After this, the naphtha is shut off, a current of hydrogen is turned on for fifteen minutes longer, when the process is finished. All that remains is to cool the retorts down to 400 degrees Cent., and as soon as this temperature is reached the retort lids may be taken off and the product removed. The coating thus produced has a bluish color, and is stated to be so adherent to the metal that a treated bar can be bent through an angle of forty-five degrees without disturbing it.—The Tradesman.

Oppermann, in his German patent for galvanizing aluminum with metals, cleans the surface very carefully and places the article in a bath consisting of a solution of a mercury salt in potassium cyanide. Then he washes in water and makes the article, the cathode in a solution of the metal to be precipitated in the ordinary bath used for galvanizing. The addition of a little ammonia to the purifying bath is of assistance. Gomes coats metals with aluminum or aluminum alloy electrically by placing them in a bath consisting of 10 aluminum tartrate, 0.5 ammonium chloride, 100 water. The temperature of the bath is about 26 to 40° C. If the anode is insoluble the bath must be emptied and fresh aluminum tartrate dissolved. If aluminum is the anode, the bath should be kept entirely or weakly alkaline. Four to ten volts or more are required for the deposition of the aluminum.

Some singular experimental results connected with the mobility of metals, according to *Nature* have been obtained by Prof. Roberts-Austen. Many experimenters, especially Prof. Graham and Lord Kelvin, have studied the diffusion of gases and saline solutions, and Prof. Roberts-Austen has measured the rate at which certain metals will penetrate each other. He finds that solid gold, for instance, will diffuse into and move about slowly in lead, even at the ordinary temperature of the air, and with considerable rapidity if the lead be warmed, though far from melting. Evidence as to the presence of wandering atoms in a solid possesses much interest now that views as to the nature of metals and other solids have been extended by the discovery that certain rays of light will penetrate them.

Lord Kelvin declares Maxim has solved three out of the five problems of artificial flight. The two remaining ones, Dr. G. H. Bryan points out, have been now solved by Lilienthal and Pilcher, and all that remains is to combine the advantages of the two forms of apparatus in a single machine.

An expedition, headed by Professor Schaeberle, will be sent from Lick Observatory to observe the total eclipse of August next in Japan. The expenses of the party will be met from a fund provided by Colonel C. F. Crocker, one of the Regents of the University of California.

A chemist of Rouen, France, has succeeded in producing from acteylene a distillation of alcohol which can be sold as low as five cents a gallon. Its exhilarating effect is equal to that of the ordinary alcohol, and it is used to adulterate cheap wine.

# Mechanical Progress.

The ingenuity of H. Y. Castner, the young American whose remarkable inventions in the production of sodium and in electrolytic processes have made such a marked effect upon manufacturing industry, continues to be manifested in his patents. It is to be regretted that the chemical manufacturing industry of the United States has not reached a sufficient degree of development to allow of inventors like Mr. Castner being kept at home. One of his late English patents on the production of cyanides claims a direct combination of carbon, nitrogen and a metal, the latter being prepared in a particular way. The reaction takes place at a very much lower temperature and produces a much greater yield when instead of the metal carbonate or hydroxide are used. The reaction is carried out in a vertical iron retort which stands in a furnace. A filling tube in the form of a syphon connects with the tube of the retort and through this melted sodium flows. At the bottom of the retort is an emptying pipe also provided with a syphon, through which the melted cyanide is drawn off. Side pipes near the top and the bottom of the retort allow of the introduction of nitrogenous gases, while an automatic cover on the top of the retort allows of the introduction of small coal or other solid materials; so the process goes on without interruption, in which case nitrogen is conducted through it, or the retort may be filled with broken porcelain, iron or similar materials, in which case a mixture of nitrogen and hydrocarbons are brought into action. In a subsequent patent instead of introducing nitrogen into the retort, ammonia gas is used so that the nitrogen may be utilized in the nascent state. One of the most remarkable instances of the great progress in manufacturing chemistry is the ease with which large amounts of substances are now produced and handled which a few years ago were considered as rarities. By the Castner process sodium is now produced at a low price and handled in any amount, so that the full value of its immense chemical activity may be taken advantage of.

Edison has been warning experimenters with the Roentgen rays to be careful of their eyesight. He reports that his eyes were very sore after working several hours with the fluorescent tubes, but he is not yet certain that this result is entirely attributed to the X rays. An almost similar experience, however, is now mentioned by Dr. W. J. Morton, who reports that he sees brilliant flashes of light after he has discontinued work. As Dr. Morton has been for many years an indefatigable worker in electrical experimentation, and has never suffered in any way from the constant use of various kinds of electric light, he is

strongly inclined to the belief that the X rays are injurious to the eye. The latest contribution to this feature of the Roentgen rays comes from Mr. Tesla, who says: "When working with highly strained bulbs I frequently experience a sudden, and sometimes even painful, shock in the eye. Such shocks may occur so often that the eye gets inflamed, and one cannot be considered over-cautious if he abstains from watching the bulb too closely." Mr Tesla sees in these shocks a further evidence of large particles being thrown off from the bulb.

BLUMENBERG'S new process of manufacturing chlorate of potash from the chlorine by electrical action is about to be put into practical operation upon a large scale by a recently organized Chemical Construction Company, which will begin in July to manufacture chlorate of potash by Blumenberg's process at Niagara Falls, N. Y. The company will use immediately electricity from the famous tunnel amounting to 500-horse power daily, and is under contract to take at the end of a year 2500-horse power. The immediate output of the factory will be one ton of chlorate of potash daily. The company is building two structures. The electrical current will be introduced into the smaller building by means of copper bars four inches square, and there, by rotary transformers, will be converted from an alternating to a direct current. Thus transformed it will be carried to the second story of the larger building and introduced into tanks containing a solution of chloride of potash in water. The solution will be thus electrolized, and, as a consequence, oxidized into the desired chlorate, with important by-products. The chlorate will be run into tanks on the first floor, crystallized and packed for shipment. The electric current will be used at a low voltage. The chloride is now obtained from Germany, and is worth $25 to $30 a ton. It is expected, however, that deposits of the chemical will be worked in this country.

AN ingenious application of the well-known transparency of very thin metallic films has been utilized in the German patent of Alfred Rost on the production of silver mirrors. The deposition of the silver upon glass plate is stopped before too great density has been obtained. The glass is then washed and dried and coated with a colorless lacquer. The mirrors thus obtained have some curious properties. They reflect the image and yet are transparent. The rays of light which fall obliquely are reflected, while those that fall at right angles pass through. These transparent mirrors appear to be well adapted for a number of practical uses and doubtless will be found valuable for advertising purposes.

AN alloy which may be used to replace gold for certain purposes is composed of 94 parts of copper and 6 parts of antimony. The copper is first melted and then the antimony is added. When the metals are melted some magnesium carbonate and calcium carbonate are added which increase the density. The alloy can be hammered and soldered like gold. Nitric acid does not affect the color. In Germany it is quoted at about two marks per kilo.

CEMENTATION steel may be made by placing an electric current of 35 ampers and 2.5 volts through steel rods packed in charcoal. The temperature rises to about 1,000° and after three hours the negative rods are deeply cemented with carbon.

THE merits of the MINING AND SCIENTIFIC PRESS have made it an authority in its particular line and one of the leading publications of the West.—Inyo Register.

THE MINING AND SCIENTIFIC PRESS is considered the ablest edited mining paper in this country.—Oakland, Cal., Times.

## The Real and the Unreal Business Paper.

By an Advertising Expert not Connected with any Journal.

Imitation is the order of the day.

Imitators are everywhere.

The real and the unreal live side by side.

The good and the bad are neighbors.

There are trade papers which trade on the trade, and have nothing to trade with.

First-class trade papers make money.

All first-class men are successful.

All honest men succeed.

Dishonest men try to, and sometimes do.

There are papers masquerading under the names of legitimate publications which are nothing but advertisements bound together in pamphlet form.

There are so-called trade papers which have no circulation, and which cannot get any circulation.

There are trade papers run by men who know nothing about the trade they claim to represent.

The impression that all trade papers are successful have thrown upon the market numerous illegitimate publications which attempt to float on the water which has passed, and to sail by the wind of others.

The trade paper which is a trade paper contains part advertising, part original matter, part clippings, and is of interest and benefit to its readers, and such a trade paper is obliged to have circulation.

There is many a trade paper with part of its circulation in the form of sample copies, but that does not seriously handicap its advertising value, for each sample copy is sent out as a means to obtain a new subscriber, and each sample copy reaches people of its trade, because it would not pay to send sample copies to folks of any other class.

The trade paper which is all sample copies is illegitimate—it has no right of existence.

The trade paper which contains nothing but puffs is not worthy of consideration.

The trade paper which has all of its reading columns for sale, and sells nearly all of its reading matter space, is worthless as an advertising medium.

The trade paper can legitimately speak well of its advertisers—it ought to—the advertisers expect it.

The trade paper which speaks ill of those who do not advertise in its columns is a trade paper which has no standing, and which is worth little.

There are trade papers in this country which are nothing more or less than blackmailing sheets, which the Government ought not to transmit through the mails, and which are a detriment to the trade they represent, and to the honesty of the craft.

The legitimate trade paper, the trade paper of character, and the trade paper which pays the advertiser, is the trade paper which carries a large amount of advertising, for such advertising is as valuable to the reader as the reading columns themselves. These pages of advertisements present pictures of progress, and tell the buyers what is best to buy as well as where to buy.

The legitimate paper prints legitimate reading notices.

It speaks well of its advertisers, but it is not a paper of puffs—it is a paper of news and comment, simply the right combination of all that which makes up a first-class publication.

The trade paper can be known by the quality of its representatives.

First-class advertising men work for first-class papers.

Beware of the trade paper which has a different rate for every advertiser.

Look out for the trade paper that puffs everybody.

Look out for the trade paper which has a "Seeing-it's-you" concession for everybody.

Look out for the trade paper which does not stand on its own dignity and say to the advertiser: "My space is merchandise. If you want it, you must buy it as you buy your clothes or your shoes."

Second-class advertising men work for second-class papers.

The representative of the legitimate trade paper is a gentleman—a man worthy of your confidence.

When he calls he is entitled to your consideration, and should be given an audience.

You should discourage the illegitimate trade paper.

It is your business to encourage, with your money and your interest, the trade paper of character, for it is as much a part of your business, and is as necessary to your business as your desks and your counters.

This Clever Analysis of the Real and Unreal Business Paper is copyrighted by Mr. NATH'L C. FOWLER, Jr., "Doctor of Publicity."

TO THE STOCKHOLDERS OF THE SOUTH PALOMA GOLD MINING COMPANY, LIMITED:

Notice is hereby given that by resolution of the Board of Directors of the corporation, adopted on the 21st day of March, 1896, a meeting of the stockholders of the corporation was called for the purpose of increasing the capital stock to the amount of two hundred thousand dollars, to be divided into one hundred thousand shares of the par value of two dollars per share, and of determining the disposition to be made of the increased capital stock; and it was resolved that such meeting shall take place at the principal place of business of the corporation being the same building where the Board of Directors usually meet, to wit: No. 222 Sansome street, room 17, in the City and County of San Francisco, on WEDNESDAY, the 10th day of June A. D., 1896, at 11 o'clock in the forenoon of that day.

Dated San Francisco, 2nd of April, 1896.

JOHN A. WRIGHT, President.

CHAS. WEBB HOWARD, JR., Secretary.

ANY QUARTZ MINING OPERATOR REQUIRING a superintendent can secure the services of a first-class man, who is also a surveyor and assayer, by addressing "HESTER," care this office. References given.


**John Taylor & Co.**

63 First St., San Francisco, Cal.

OLDEST AND LARGEST HOUSE ON THE PACIFIC COAST.—Established in 1852.

Manufacturers and Importers of

**ASSAYERS', MINE AND MILL SUPPLIES,**

**Chemicals and Chemical Apparatus.**

Sole Agents for the Pacific Coast for the W. S. TYLER WIRE WORKS CO., manufacturers of

**Steel and Brass Wire Battery Screens.**

We frequently have Second-Hand Assay Balances, which we put in order and sell at reduced prices.

We now have on hand One Becker's No. 5 Scales, list price, $85, which we will sell for $65; One Becker's Pulp Scale, list price, $32, sell for $16; One Becker's Analytical Balance, with agate knives, list price, $95, will sell for $60. One Oertling's Assay Balance, price new, $175, sell for $125. All the above scales are in good order.

**When You Get Tired**

Using Poor Belting you can buy

**B. C. & D. LEATHER BELTING, 2-X-L RUBBER BELTING,**

—ALSO—

Genuine Dodge Wood Split Pulleys, Grant Corundum and Detroit Emery Wheels.

Simonds Saws. Simonds Genuine Babbitt. ONLY THE BEST.

**SIMONDS SAW CO.,**

31 Main Street, San Francisco.

**HORACE F. BROWN,** CONSULTING ENGINEER



Special attention given to preparing plans for the Chlorination and Bromine Processes of Treating Gold Ores.

PATENTEE { Brown's Complete Automatic Mill Process. Brown's System of Mechanically Stirred Roasting, Cooling and Conveying Furnaces, Etc.

821-822 Manhattan Building, Chicago, Illinois.

**HAMMOND M'F'G. CO.**

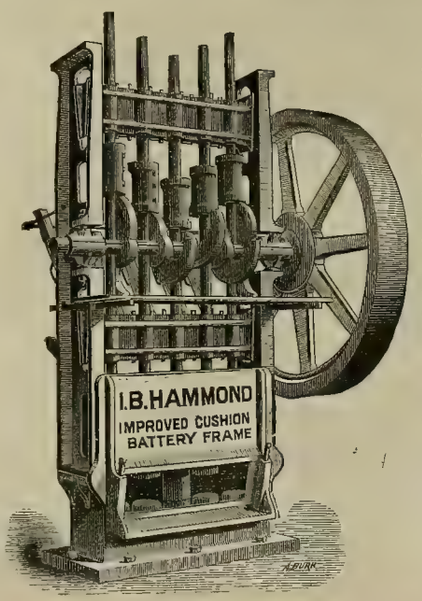
**69 First Street, PORTLAND, OR.**

MANUFACTURERS OF

**Stamp Mills, Ore Feeders**

**DETACHABLE BUCKET WIRE-ROPE TRAMWAYS,**

**Roller Grinding Pans, Desulphurizing Furnaces, Etc.**




Improved Self-Contained Cushion-Frame Five-Stamp Mill.

Patented in the United States and Foreign Countries.

**The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Setf-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill**

**FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.**

**SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.**

**THIRD: The Large Amount of Space Saved.**

We refer by permission to Mr. N. A. McMillan, Haines, Oregon, manager of the Blue Mountain Mining Co., at Rock Creek, Or., where ten of our stamp mills are in operation; also to Mr. John S. Miller, Helena, Montana, manager of the Diamond Hill Mining Co., operating one of our forty-stamp mills at their mines at Townsend, Montana.

Send for Catalogue and Price List.

CORRESPONDENCE SOLICITED.

# Practical Information.

### Manner of Packing an Important Matter.

Machinery builders who intend to cater to foreign buyers, especially to those in very far-off countries or in countries accessible only by round-about routes, will serve themselves, says Albert Spies in *Cassier's Magazine* for April, if they will have an eye to the way in which their goods are packed for shipment. English builders are almost proverbially careful in this respect, with the result that what they ship generally reaches its destination in good order, and will operate satisfactorily when put to work, while the products of their less painstaking competitors — often Americans—come to the purchaser battered and broken, perhaps, with possibly some parts missing, and become at once annoying provocations to the man who wants them, and wants them in a hurry, with no time to spare to send perhaps thousands of miles for a duplicate piece, or even a new machine. There can be but one result from such an experience—the careful shipper will secure the bulk of the trade, even though his machinery may not be the best nor the lowest in price. The time which he saves for the purchaser, and the an noyance from which he relieves him, more than make up for the difference.

Take the case of an ordinary engine to go say to South America. The English builder will fix the engine to heavy skids, and build what will be, practically, a substantial house around it, strong and secure against all possible battering of a long voyage and rough handling. When this engine reaches its destination there is little to be done to get it into shape for work. Everything is complete and in good order. The American builder, per contra, will, in most cases, secure the engine to the lightest skids that he thinks can be made to stand; a flimsy bit of timbering will go around the outside, and the governor, perhaps, will be wrapped up in some brown paper and tied on with a bit of string. Then the whole thing will be sent off with a trust in Providence that, unfortunately, does not always work in favor of the buyer. The engine is almost certain to suffer in transit, or the governor to be lost, and the builder's or shipper's reputation likewise. What is true of engines is true of all other machinery. The far-away purchaser naturally will prefer those goods which come to him with the least effects of travel wear and tear, and which can be put to work with a minimum of trouble and loss of time. There is a lesson in this which the export machine builder should heed.

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LITHIUM is a rare but widely diffused metal resembling potassium and sodium and remarkable as being the lightest known solid not containing air, its specific gravity being only 0 59, or a little more than half that of water. Some interesting compounds have been announced by Guntz, a French chemist. It is the first substance known to absorb nitrogen gas at ordinary temperatures, lithium proving to be capable of absorbing it rapidly at a temperature below dark red. Deslandres has verified the discovery and made use of it in separating argon from the atmosphere. Continuing his experiments and wishing to heat some lithium in an inert gas, Guntz raised the metal to a bright red in a current of hydrogen, when, to his astonishment, the whole took fire and burned up, depositing a white powder. Analysis showed the powder to be hydride of lithium. It is more stable than previously known hydrides of the alkali metals, and when treated with water it yields the remarkable proportion of one-fourth of its weight of hydrogen, or more than 300 gallons to the pound.

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IT was Dr. John Hopkinson who first drew attention to the fact that when illuminating gas is burnt in a gas engine to drive a dynamo, much more light is produced, if incandescent lamps are used, than can be produced by burning the same quantity of gas in burners in the usual way. Such a statement seems anomalous; but it is not only true that more light can thus be gotten, but that one can buy city gas at ordinary rates, burn it in a gas engine and light his house with electricity more cheaply than he can with the same gas direct or with electricity bought from electric light companies at usual meter rates.

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ACETYLENE GAS is believed to have one of the most abominable odors devised by chemistry, a fact urged in its favor, as it can be detected at once when it escapes. M. Moissan, who discovered it, says, however, that the pure gas, made from pure crystallized carbide of calcium, has an agreeable etheric odor, which he has inhaled in small quantities without inconvenience. When the carbide is obtained with impure coal and lime, it may contain sulphides and phosphides of calcium, and in that case the stench is nauseous.

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EXPERIMENTS lately made in England show that, if a ball of solid iron is lowered into a mass of liquid iron by means of a metal fork, the ball at first sinks to the bottom with the fork. But in a few seconds it leaves the prongs and rises to the surface, where it continues to float until it melts. The rising is explained by the expansion of the ball, due to heating, whereby it becomes, bulk for bulk, less dense than the molten metal.

---

"THE miner's inch is a perfect analogy for the ampere," says T. O'C. Sloane, discussing the analogue of the ampere. "The head of water represents the E. M. F., the aperture the resistance, the rate of flow (the miner's inch) the ampere."

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A RECENT writer on "profit-sharing" says that the plan may work all right in good, prosperous years, but it fails in hard times, when the business is run at a loss.

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**"HISTORY OF CRIPPLE CREEK."**

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address. *Illustrated Weekly*, Denver, Colorado.

**Cripple Creek Gold Stocks.**

**F. H. PETTINGELL,**

Member of the Exchanges.

10-11 Bank Block, - - Colorado Springs, Colo.

M. H. WALSH, Secretary and Manager. C. G. BACON, President.

**SONORA LAND AND MINING ABSTRACT BUREAU,**

Sonora, Tuolumne Co., Cal.

Abstract of Titles to all lands in Tuolumne County made under the Durfee Self-Correcting and Adjusting System.

Mining properties for sale or bonded on desirable terms. Correspondence invited from principals desiring investments in quartz mining properties or in the development of promising claims. Reliable information given on all matters.

**ORES! ORES!**

**Gold, Silver and Lead Ores and Concentrates**

PURCHASED AT REDUCED RATES FOR TREATMENT.

**SELBY SMELTING & LEAD CO.**

416 Montgomery St., San Francisco.

Consign shipments to Vallejo Junction, Cal.

**THE HARRINGTON & KING PERFORATING CO. CHICAGO.**



METALS PERFORATED AS REQUIRED FOR

**MINING SCREENS OF ALL KINDS**

AND FOR USE IN

| | |
|---|---|
| Milling and Mining Machinery | Stone, Coal and Ore Screens |
| Reduction and Concentrating Works | Stamp Battery Screens |
| Woolen, Cotton, Paper and Pulp Mills | Brick and Tile Works, Filters |
| Rice, Flour and Cottonseed Oil Mills | Spark Arresters, Gas and Water Works |
| Sugar and Malt Houses | Oil, Gas and Vapor Stoves |
| Distilleries, Filter Presses | Coffee Machinery, etc., etc. |

Standard Sizes Perforated Tin and Brass Always in Stock.

Main Office and Works: 222 to 240 North Union Street, Chicago, Ill., U.S.A.

Eastern Office: No. 284 Pearl Street, New York

**Just What You Have Been Looking For.**

**P. & B. MANILLA ROOFING.**

A SUPERIOR ARTICLE AT A SMALL COST.

250 Square Feet, with Nails and Paint Complete.....$4.00

**PARAFFINE PAINT CO.** 116 BATTERY STREET, SAN FRANCISCO. 111 SOUTH BROADWAY, LOS ANGELES.

**The General Gold Extracting Co., Ltd.,**

PELATAN-CLERICI PROCESS.

Patented in U. S. and Other Countries. Capital, £100,000.

London Head Office.....8 Drapers Gardens.

Laboratory and Ore Testing Plant, 1530 Wynkoop St., Denver, Colo.

This process has a well-demonstrated merit in treatment of low-grade Gold and Silver Ores, especially those of a complex character, talcose and clayey combinations or slimes, which class of ore, as is well known, cannot be treated by leaching or lixiviation.

Gold and silver values, both fine and coarse particles, are by the PELATAN-CLERICI PROCESS recovered direct from ore without roasting as pure amalgam, and the precious metals are saved in the form of fine bullion without any refining costs.

F. CLERICI, Manager for U. S.

**The Midas Gold Saving Machinery Co.**

— MANUFACTURERS OF —




**THE GOLD KING AMALGAMATOR.**

The only successful device for saving fine free gold from clay, talc or slimy ores. Has been proven far superior to horizontal plates in every instance. Indorsed by leading millmen. Send for catalogue and price list. Highest award at 28th Industrial Exposition.

MIDAS GOLD SAVING MACHINERY CO., 114 First St., San Francisco, C. A. RUMBLE, Gen'l M'g'r.

**Mining Pipe!**



STEEL OR IRON.—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.

COATING.—We use great care in COATING our pipe with a HOT solution of Double Refined Asphaltum and Maltha.

COMPETITORS.—Our competitors say we have the best appointed Pipe Shop on the Coast.

**SCHAW, INGRAM, BATCHER & CO., Hardware Merchants,**

SACRAMENTO, CAL.

**RUPTURE CURED.**

Dr. J. C. Anthony, of 86 and 87 Chronicle Building, who for the past four years has met with universal success in the cure of Ruptures, now guarantees a cure in from 10 to 16 days. There is no pain, no blood drawn and absolutely without danger. Usually but a single treatment required.

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING APRIL 7, 1896.

557,754.—BILL FILE—Baldwin & Goodwin, Spokane, Wash.
557,838.—STEERING GEAR—C. E. Bergman, Everett, Wash.
557,790.—POCKET KNIFE—A. K. Bruner, Los Angeles, Cal.
557,653.—WINDOW—W. H. Dean, West Berkeley, Cal.
557,799.—HOSE PIPE NOZZLE—H. H. Gorter, S. F.
557,841.—BICYCLE SEAT—W. F. Focke, New Whatcom, Wash.
557,809.—PENCIL CASE—E. Pape, Portland, Or.
557,869.—WAGON BRAKE—A. Pirch, Los Angeles, Cal.
557,715.—DRAFT REGULATOR—H. Stutsman, Portland, Or.
557,926.—BATH TUB—S. F. Williams, San Diego, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AIR VALVE FOR WATER PIPES.—August H. Schierholz, San Francisco, Cal. No. 557,343. Dated March 31, 1896. This invention relates to that class of air valves or water pipes which prevent the accumulation of air in high points of pipe lines, which accumulation of air would seriously interfere with the free flow of the water through the pipes, and also to a mechanism which allows the air to enter the pipe in case of breakage in lower places in the pipe line, thus preventing the collapse of the pipe through the vacuum thus formed. It consists essentially of an inward opening vertically movable valve, a casing containing the valve with guides through which the valve stem is slidable, a radially slotted chamber within the stem having a passage therefrom to the outer air, a valve movable in the chamber controlling said passage, wings extending from the valve through the radial slots in the stem, a float exterior to the stems connected with the wings and valve, and a spring surrounding the upper end of the main valve stem, with nuts adjustable upon the stem whereby the tension of the spring is regulated.

GAS ENGINE.—John F. Daly and Wm. F. Corson, assignors to the Union Gas Engine Company, San Francisco. No. 557,493. Dated March 31, 1896. This invention relates to improvements in gas or explosive engines, and its object is to provide such improvements that it may be applicable to engines of large size, in which two or more cylinders are used, with a common crank-shaft for propelling vessels or for other similar work. It consists essentially of a hollow base plate so shaped as to fit the timbers and run of a vessel having an air passage through it, pillow-blocks cast with the base plate to support the crank shaft, independent frames or standards bolted to the end of the base plate and enclosing the pillow-blocks, these frames extending upwardly and forming a support for the cylinders. One of these frames has an air passage through it coincident with the passage in the base-plate, and the cylinders above have a surrounding air space coincident with the passage through the frames, and means for connecting the air passage with a carburetor so that the air circulates freely around the cylinders and oscillates in keeping them cool while it is at the same time heated before passing into the carburetor. By means of a suitable valve the air may, if desired, be drawn directly into the carburetor without passing around the cylinders. The cylinder heads are cast with all the necessary ports and passages and valve chambers in a single piece adapted to be fitted upon the heads of the cylinders, and suitable surrounding passages are made through which water may be circulated to keep the parts cool. The pistons of the air and water pump are fixed to the same piston rod so as to be reciprocated simultaneously, and a suitable connection is made from the air pump with a whistle which is used for signals whenever necessary. A receiver may be employed in which the air under pressure may be stored for this purpose to be used when the engine is not running. The air pump is water-jacketed and receives its supply from the water pump. The cylinder head has exhaust passages common to both cylinders and intermediate between the two. The valves are actuated by cams upon a counter-shaft driven from the main shaft by a train of gearing and two different forms of cam faces are formed upon the peripheries of the exhaust valve cams, these cams being movable so that either face may be employed. One of the cam faces serves to open and close the exhaust valve regularly when the engine is in full operation, and the other cams are so constructed that the exhaust valve will be held open for a considerable portion of the stroke, while the engine is being started, and the back pressure is thus reduced until a revolution or two of the engine is effected so that the regular operating ones are brought into service. By means of intermediate mechanism between the crank shaft and the propeller shaft the motion of the propeller may be reversed or stopped without stopping the engine.

PENCIL SHARPENER AND POINT GUARD.—Joseph Kraker, San Francisco, Cal., assignor to Charles J. Wagner, same place. No. 557,402. Dated March 31, 1896. The object of this invention is to provide a pencil-sharpening device, with a means for always retaining it upon the pencil and advancing it as occasion requires during the sharpening, so that the device remaining on the pencil will serve to protect the point and prevent breakage. It consists of a thin sheet of steel blank bent to form an elongated cone at one end, the apex of the cone being cut diagonally and on one side, having an open slot formed therein, the base of the slot being intersected by a transverse cut made between the base and the cylindrical portion, so that the sharpened edge of the slot may be slightly bent inward to form a cutter. Screw-threads are formed in the interior of the cylindrical portion of such diameter, so as to engage the exterior surface of the pencil to hold the device thereon and cause it to advance longitudinally when turned upon the pencil, and the exterior surface has milled edges, or rings, struck up to form a hold by which the device may be turned upon the pencil.

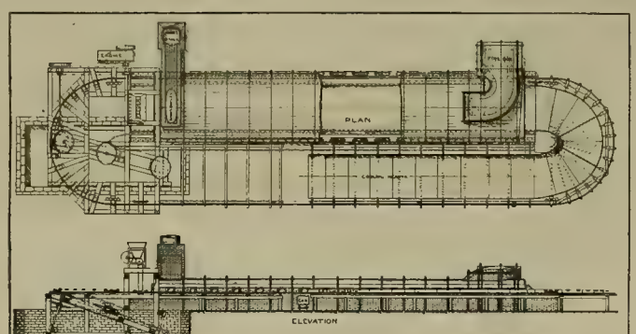
BOILER.—Martin P. Boss, San Francisco, Cal. No. 557,354. Dated March 31, 1896. This boiler is one of those in which an annular series of water tubes encircle the fire chamber, which has within it a water column, communicating with the chambers in which the water tubes terminate. The main object of this boiler is to provide a means for obtaining ready access to the tubes. This object is accomplished by rendering the tube chambers easily separable.

## H. F. Brown's System of Mechanical Roasting Furnaces.

The illustration herewith gives one of the modifications of the Horace F. Brown roasting furnace, especially adapted for the roasting of concentrates where a comparatively small capacity is required.

This furnace is the same in principle as the Brown horseshoe furnace, as far as the application of heat and the protection of the stirring mechanism are concerned.

The protection of the mechanical appliances employed for rabbling the ore is really the essential feature of the Brown system of furnaces, and consists in a construction of the brickwork of the




furnace so arranged as to form a protection for the driving cables and traveling carriages, by means of a slotted wall, the rabbling being accomplished by suitable rabble points attached to an arm which projects through the slotted wall, and extends over the bed of the furnace. By this simple means the tracks, cables and other driving mechanism are so thoroughly protected that they are not affected in any manner by the heat or gases of the furnace.

The first furnaces embodying this principle were built by the inventor in 1891 at the Cortez mines, limited, Nevada, and in the fall of the same year at the Argo Smelting Works, near Denver, Colorado, and the merit of the invention was at once recognized by the leading metallurgists of the country.

Dr. Richard Pearce of the Argo smelter expressed himself as being very much astonished that, with all of the time, money and talent that had been expended within the last fifty years, no one had thought of so simple a remedy for overcoming the difficulties of mechanical roasting long before, and as a compliment to the ingenuity of Mr. Brown the slotted wall system of construction became the essential feature of the Pearce turret furnace, which, while differing slightly in details of construction and operation, is identical in principle with the Brown system of furnace construction.

Several furnaces have been devised embodying the principle of the Brown slotted wall construction, among the latest of which is the "Ropp" furnace, now in use at the Selby smelters.

The adoption of the slotted wall system in this manner by some of the leading metallurgists of the country is a high endorsement of its utility and efficiency, very gratifying to the originator of the principle.

There are now twenty-four of the Brown roasting furnaces in successful operation, covering nearly the entire range of metallurgical work, and representing the experience of several years of constant application in improving and perfecting the same by actual work.

A large furnace, substantially on the plan shown in the accompanying illustration, has recently been erected at the chlorination works of the Golden Reward Mining Company, Deadwood, South Dakota, for roasting the refractory or what is locally known as the "blue ores" of the Black Hills country. All previous attempts of roasting these ores have been by Bruckner cylinders and White-Howell furnaces, and it has been found impossible to get the ores properly oxidized so that a high extraction by the chlorine process was possible.

The difficulty in the White-Howell system of furnaces seemed to be the lack of time to which the ores were exposed to the proper degree of heat, and in the Bruckner cylinders it was found impracticable to regulate the heat and to get the proper surface exposure to get a uniform oxidization of the ore. All these objections are removed in the Brown furnace, as ample time is given and a perfect oxidization of the ore secured.

The results have been very gratifying, as the average work of the furnace is upwards of sixty tons per day, roasted down to three-tenths of one per cent of sulphur, requiring the labor of two men each twenty-four hours and six cords of pine wood, the ore being automatically cooled and delivered to the elevator at the same time at a total cost of less than 50 cents per ton for labor, fuel, power and repairs.

The operation of the furnace will be very readily understood by referring to the illustration. In general terms the Brown system of furnaces can be considered as cable railways, each stirring carriage representing the ordinary cable-grip car. The driving mechanism is identical in principle with that employed for driving street railway cables.

The ore properly crushed is charged into the automatic feeder. This feeder is so arranged that, after delivering the required amount of ore to the furnace hearth, it is automatically thrown out of gear and is again set in motion by the passage of the stirring carriage, so that any required amount can be fed in, and, being governed by the stirring carriages, the furnace can never become overloaded.

The ore is gradually drawn through the furnace, being stirred as often as the nature of the material requires, and is automatically discharged on to a cooling floor, over which it is advanced in the same manner as in the furnace, until sufficiently cooled for delivering to chlorination barrels or leaching tanks.

The cooling hearth can be brought back parallel with the roasting hearth, as shown in the illustration, or carried out to pass over store-bins, feed-hoppers or other receptacles, as may be required, there being no arbitrary fixed shape for the ground plan.

This flexibility is one of the peculiar features of the Brown system of furnaces and is of great advantage in adapting the furnace to local conditions, and also in automatically cooling and delivering the calcined product direct to the charging hoppers, or barrels, or leaching tanks, without extra cost or loss in dust.

While simplified so that it can be furnished at a minimum cost, the Parallel furnace contains all the improvements and requisites of the larger furnace, and in proportion to the square feet of roasting area will have equal capacity.

A furnace erected complete, including stack, having a capacity from 10 to 20 tons per day, depending on the nature of the material to be roasted, can be erected at a total cost of from $3500 to $4000, depending on the accessibility of the location to railroad transportation.

It is especially adapted to the "sweet" roasting of concentrates for after-treatment by chlorination or kindred processes, as the advancement of the ore can be so completely regulated as to insure a uniform and completely oxidized product.

The cost of roasting per day will be largely governed by the amount roasted, as it requires the same labor to attend to a ten-ton furnace as to a furnace that will average sixty tons per day. Basing the cost on a ten ton plant, there would be: two furnace men (at $2.50 each) $5; about 1¼ cords of wood (at $2.50 per cord) $3.25; oil, power and repairs, 50 cents; or a total of 87½ cents per ton.

On the same ore, with a furnace averaging sixty tons per day, the cost would be only about 30 cents per ton.

The perfection of mechanical roasting furnaces has gone very far towards solving the question of the economical reduction of low-grade ores.

In all processes now in general use the first condition necessary is the perfect oxidization of the ore, and, owing to the low grade of many of our largest deposits, the question of cost to properly oxidize the ore has been of paramount importance, which question has been practically settled by the perfection of the type of mechanically-stirred furnaces illustrated herewith. *

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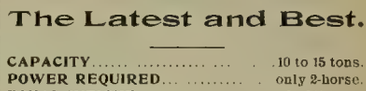
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# Mining Summary.

## Bullion Production of California for 1895.

The statistics of bullion product of California for the calendar year 1895 have just been forwarded from the San Francisco Mint to the Director of the U. S. Mint at Washington for publication in his annual report on the "Production of Gold and Silver in the United States." By permission of Superintendent Daggett, the statistician, Charles G. Yale, who collected the data, furnishes the following statement showing the gold and silver yield of the State by counties for 1895:

| COUNTY. | Gold. | Silver. | Total. |
|---|---|---|---|
| Amador (1)..... | $ 1,391,929 40 | $ 1,089 00 | $ 1,393,018 40 |
| Butte..... | 697,260 85 | 8,935 53 | 706,196 38 |
| Calaveras..... | 1,717,916 14 | 77 00 | 1,717,993 14 |
| Del Norte..... | 8,250 00 | ..... | 8,250 00 |
| El Dorado..... | 700,101 31 | 447 68 | 700,548 99 |
| Fresno..... | 47,249 00 | ..... | 47,249 00 |
| Humboldt..... | 92,635 20 | ..... | 92,635 20 |
| Inyo..... | 92,142 28 | 188,329 23 | 280,471 51 |
| Kern..... | 231,433 31 | 46,064 28 | 277,497 59 |
| Lassen..... | 25,000 00 | ..... | 25,000 00 |
| Los Angeles ... | 23,350 00 | ..... | 23,350 00 |
| Madera..... | 162,323 74 | ..... | 162,323 74 |
| Mariposa..... | 216,622 39 | 7 07 | 216,629 46 |
| Merced..... | 1,500 00 | ..... | 1,500 00 |
| Mono..... | 553,690 54 | 84,910 37 | 637,600 91 |
| Nevada..... | 1,789,815 66 | 400 00 | 1,790,215 66 |
| Orange..... | 144 00 | ..... | 144 00 |
| Placer..... | 1,599,634 79 | 5,372 53 | 1,604,907 32 |
| Plumas..... | 602,951 05 | 271 52 | 603,222 57 |
| Riverside..... | 283,106 00 | 2,550 00 | 285,656 00 |
| Sacramento..... | 145,872 75 | ..... | 145,872 75 |
| San Bernardino | 131,360 00 | 219,410 30 | 350,770 30 |
| San Diego..... | 344,807 57 | 600 00 | 344,907 57 |
| S. Luis Obispo. | 3,000 00 | ..... | 3,000 00 |
| Santa Barbara.. | 4,000 00 | ..... | 4,000 00 |
| Shasta..... | 781,686 32 | 28,417 20 | 810,113 52 |
| Sierra..... | 694,469 67 | 106 96 | 694,576 63 |
| Siskiyou..... | 950,006 43 | 177 30 | 950,183 73 |
| Stanislaus..... | 26,481 50 | ..... | 26,481 50 |
| Trinity..... | 1,166,745 13 | 1,257 28 | 1,168,002 41 |
| Tulare..... | 16,320 00 | ..... | 16,320 00 |
| Tuolumne..... | 666,754 15 | 312 62 | 667,066 77 |
| Yuba..... | 111,482 34 | ..... | 111,482 34 |
| Unap'r'ned (2). | 53,786 17 | 11,153 83 | 64,940 00 |
| Totals ..... | $15,334,317 69 | $599,789 70 | $15,934,107 39 |

(1) Based on returns at San Francisco Mint.
(2) "Unapportioned" includes product of single mines, etc., in counties so as to conceal their identity; and also includes estimates of product of properties known to be working, but from which no returns were obtained.
Counties not mentioned in this third list (95) made no returns for 1895.

In 1894 the yield of gold of the State was $13,923,281.89, and that of silver was $297,331.55, a total of $14,220,613.44. A comparison of these figures shows that the gold yield of 1895 increased over that of 1894 by $1,411,035.80, and the silver product increased $302,458.15, a total increase of precious metals in California over the previous year of $1,713,493.95. In 1893 the gold yield of the State was $12,422,811.60; in 1892, $12,571,900.57. For purposes of comparison is appended the gold and silver product of California for 1894:

| COUNTY. | Gold. | Silver. | Total. |
|---|---|---|---|
| Amador..... | $1,331,916 54 | $280 27 | $1,332,196 81 |
| Butte..... | 473,672 65 | ..... | 473,672 65 |
| Calaveras..... | 2,119,365 67 | 5,182 80 | 2,124,548 47 |
| Del Norte..... | 8,000 00 | ..... | 8,000 00 |
| El Dorado..... | 396,707 67 | 356 00 | 397,063 67 |
| Fresno..... | 8,202 00 | ..... | 8,202 00 |
| Humboldt..... | 41,326 00 | 13 86 | 41,339 86 |
| Inyo..... | 52,638 91 | 83,640 00 | 136,278 91 |
| Kern..... | 310,706 91 | 39,700 00 | 350,406 91 |
| Lassen..... | 35,283 00 | ..... | 35,283 00 |
| Los Angeles.... | 34,500 00 | ..... | 34,500 00 |
| Madera..... | 167,791 60 | 180 00 | 167,971 60 |
| Mariposa..... | 153,707 51 | 38 75 | 153,746 26 |
| Merced..... | 762 50 | ..... | 762 50 |
| Mono..... | 358,824 46 | 11,549 12 | 370,373 58 |
| Monterey..... | 8,000 00 | ..... | 8,000 00 |
| Nevada..... | 1,830,154 80 | 475 51 | 1,830,630 31 |
| Placer..... | 1,831,214 52 | 664 37 | 1,831,878 89 |
| Plumas..... | 499,358 83 | ..... | 499,358 83 |
| Riverside..... | 93,322 50 | ..... | 93,322 50 |
| Sacramento..... | 70,326 00 | ..... | 70,326 00 |
| San Bernardino | 130,419 78 | 148,242 89 | 278,662 67 |
| San Diego..... | 266,408 73 | 189 60 | 266,598 33 |
| San Luis Obispo | 1,200 00 | ..... | 1,200 00 |
| Shasta..... | 667,436 68 | 5,032 31 | 672,468 99 |
| Sierra..... | 604,721 54 | ..... | 604,721 54 |
| Siskiyou..... | 760,781 83 | ..... | 760,781 83 |
| Stanislaus..... | 26,368 50 | ..... | 26,368 50 |
| Trinity..... | 1,012,665 84 | 325 00 | 1,012,990 84 |
| Tuolumne..... | 547,448 06 | 1,072 16 | 548,520 22 |
| Yuba..... | 107,480 20 | ..... | 107,480 20 |
| Unapportioned | 32,568 66 | 388 91 | 32,957 57 |
| Totals ..... | $13,923,281 89 | $297,331 55 | $14,220,613 44 |

From the above it will be seen that, comparing '94 and '95, there was last year an increase and decrease in the gold yield of the several counties named herein as follows:

| COUNTY. | Increase 1895 over 1894. | Decrease 1895 from 1894. |
|---|---|---|
| Amador..... | $61,101 86 | ..... |
| Butte..... | 232,523 73 | ..... |
| Calaveras..... | ..... | $406,555 83 |
| Del Norte..... | 250 00 | ..... |
| El Dorado..... | 303,485 32 | ..... |
| Fresno..... | 39,047 00 | ..... |
| Humboldt..... | 51,295 24 | ..... |
| Inyo..... | 144,192 60 | ..... |
| Kern..... | ..... | 72,909 32 |
| Lassen..... | ..... | 10,283 00 |
| Los Angeles..... | ..... | 11,150 00 |
| Madera..... | 54,352 14 | ..... |
| Mariposa..... | 62,883 20 | ..... |
| Merced..... | 737 50 | ..... |
| Mono..... | 267,227 33 | ..... |
| Nevada..... | ..... | 40,414 65 |
| Orange..... | 144 00 | ..... |
| Placer..... | ..... | 226,971 47 |
| Plumas..... | 103,863 74 | ..... |
| Riverside..... | 191,333 50 | ..... |
| Sacramento..... | 75,546 75 | ..... |
| San Bernardino..... | 72 107 63 | ..... |
| San Diego..... | 78,309 24 | ..... |
| San Luis Obispo..... | 1,800 00 | ..... |
| Santa Barbara..... | 4,000 00 | ..... |
| Shasta..... | 137,644 53 | ..... |
| Sierra..... | 89,855 09 | ..... |
| Siskiyou..... | 189,402 90 | ..... |
| Stanislaus..... | 118 00 | ..... |
| Trinity..... | 155,011 57 | ..... |
| Tulare..... | 16,320 00 | ..... |
| Tuolumne..... | 118,546 55 | ..... |
| Yuba..... | 4,002 14 | ..... |
| Unapportioned ..... | 31,982 43 | ..... |

### Amador.

Thirty miners are at work underground at the Newton copper mine, three and one-half miles from Ione, prospecting under a three months' bond to ascertain the extent and character of the ore body.

*Record:* The hoisting and other machinery for the Central Eureka (formerly Summit) mine arrived at Ione this week. As soon as the machinery is placed in position the work of cleaning out the old 800-foot shaft will be commenced. One hundred feet of it has already been commenced.

### Butte.

Eight men are working underground at the Osgood mine at Bangor.

The tunnel is steadily being driven ahead at the Golden Butterfly mine.

Thirteen men are at work in the Golden Summit mine.

Shaw, Watkins and March have opened a quartz vein west of Kanaka Peak and near the Middle Fork of Feather river. They expect in a short time to have a mill upon the property.

W. Treat has forty men and eleven teams employed in his mine on the west side of the Feather river. There is nearly twenty feet of rich soil to move before pay gravel is reached and this is being done with teams, scrapers and wagons. A large spot is being cleared off and when this is done the bottom gravel will then be washed.

### Calaveras.

The Gwynn shaft is down 1132 feet. They expect to sink the shaft 1500 feet before prospecting for the ledges.

A contract has been let to put up a hoist at the Bund & Bennet mine on the San Andreas road.

In the Bovee mine the ore now being milled is taken from the stopes on the 100-foot level. The mill is running day and night.

*Echo:* Pumping out the Bald Hill mine at Albany Flat is going on for inspection by a company intending to purchase.

The Jones mine, at the mouth of Carson creek, daily yields about six tons of sulphurets, which average $50 per ton.

*Prospect:* E. K. Stevenot of the Calaveras Consolidated mines at Robinson's Ferry has five men at work cleaning out and retimbering old works, and the mill has been moved to a more convenient site on the river. This property was sold by Mr. Stevenot to an English company who ran a tunnel 1400 feet and did a large amount of other work, but owing either to lack of knowledge in mining or mismanagement, the mine did not pay. Mr. Stevenot's faith in the property was never shaken, and when the company had finished with it, he bought it back, and the work now being done is only preparatory to beginning operations on a large scale.

### Del Norte.

C. Goodrich, near Gasquet's, has recently sold to a Chicago man his property, comprising about 400 acres of gravel. S. K. Higgins, of Chicago, a representative of the company, is now in San Francisco. He will run four giants and put on a large force of men.

### El Dorado.

(Special Correspondence)—The Philadelphia, fifteen miles southwest of here, owned by J. J. Crawford, is reported sold to-day to an English syndicate.

L. Hoag has plodded for years on a property seven miles west of Placerville, on which he has stoped, tunneled, "shafted" and drifted to the amount of several thousand feet. He has many tons of good ore ready for milling and a very large ledge uncovered from foot to hanging wall, a distance, he maintains, of 300 feet. He owns nine claims.

Antioch and San Francisco people have organized a company to be known as the Blanchard Mining Co., and have bonded and begun development work on 160 acres of ground obtained from the Judge Blanchard heirs. The first shaft is about 160 feet, and the work is going ahead at a lively pace.

S. C. Lewis of San Francisco has bonded one of the several claims owned by W. H. Reinbold near Garden Valley and will continue the development work to greater depth.

A 60-horse power engine and a 75-horse power boiler are being placed on the new Salisbury mine for hoisting and milling power.

The old Tullis mine, famous in its day as a rich producer though under crude methods, is again receiving attention. Work was started quite recently in rehabilitating this property, whose story, truthfully told, reads as the fairy tales of old. This is owned by a stock company, among whose members are Morehouse & Huff of San Leandro and D. W. C. Morgan of Placerville.

The 4000 feet of pipe for compressed air power to the Big tunnel having been successfully laid, a new pump placed in position and other improvements made, during which time the stamps were hung, new life and activity are moving the mill and machinery about the Gentle Annie group under the supervision of Supt. Parlow, who, with John Melton, is also a part owner in the property.

Favorably known from California through Nevada, New and Old Mexico to New York and London, is Col. D. H. Jackson, who for twelve months past has traversed this county with pick, mortar and pan, and bonded a few properties, one of which he developed and recently sold to Monroe Salisbury, and two that he is developing quite extensively (on the mother lode) has proven himself a John the Baptist in El Dorado's mining world. He ties up nobody's property except to develop it. His reliability and steadfastly persevering qualities, coupled to his success, have endeared him to the people here.

John Melton, interested in the Brown Bear, Trinity county, in the Gray Eagle, Grizzly Flats, twenty-six miles east of here, and in the Gentle Annie, two miles from town, is among those doing good work for the mines of El Dorado.

O. S. Buckbee, who for years has had charge of the mining interests of the Wilmans Bros. at Monte Cristo and Everett, Washington, and latterly in Tuolumne county, reached here last week to manage the interests of the same firm on Weber creek, this county.

Monroe Salisbury is giving his personal attention to the active work in progress on his recently acquired Salisbury mine.

Placerville, April 15th.

### Mariposa.

*Gazette:* The Dorse mine near Hornitos is in active operation. Burleigh drills are used throughout the mine in the development work. It is expected that the owner, Charles E. Stuart of Ohio, will build a mill in the near future.

R. B. Stockton, of the Santa Rosa mine, has been running a ten-stamp mill on ore piled up on the dump. It is paying the owner a good sum. As soon as the rock is all worked, the mill will be closed down and the sinking of the shaft 200 feet deeper will be commenced.

Quite a number of men are working on the Mariposa Grant, and all are said to be doing fairly. Ludwig's old five stamp mill has been torn down and moved to the Lura LaGrande mine at Hazel Green. A new mill is to be built at Mount Ophir to work the ores of the Grant.

The prospective purchasers of the Washington, No. 9, Pool and Quartz Mountain, known as the Mose Rogers group, were in Hornitos last week looking over the property. H. H. Clark of Horseshoe Bend was there to meet the gentlemen, who, should the deal be consummated, will use electricity as their motive power.

The Tendron mine, at Whitlock's, is running steadily, under the able supervision of A. G. Briggs. The working expense of this mine is about $8000 per month. A two-compartment shaft is being sunk, the 500-foot level having just been reached. William Johns, the general manager, has just made a tour of inspection of the property and is well pleased with the outlook.

### Nevada.

At the annual meeting of the stockholders of the Champion Mining Company the following officers were elected: G. Kartschoke, president; H. Mohr, vice-president; F. Zeitler, superintendent; A. Wilhelm, J. Assion, J. S. Schuster, J. Moock, J. S. Ott, directors.

Walter Turnbull, President of the Gold Mining Exchange, has bought the Sebastopol mine.

*Transcript:* In the Gold Point mine, Grass Valley district, present operations are going on below the drain tunnel, and the last crushing paid $14 per ton, exclusive of the sulphurets.

### Placer.

*Sentinel:* Supt. Gassaway of the Mayflower intends to make an upraise in the main tunnel, when a larger force of men will be employed.

D. N. Kent, representing the Horseshoe Bar Mining Company, will work their claim near Michigan Bluff extensively this season. A force of men is now engaged in repairing the ditch, which is to furnish power for hydraulic elevators. More than a year ago this company drove a tunnel, which takes the water from the river and conveys it for about one mile.

Eighteen men are employed at the quartz mine at American Bar and the ten stamps are dropping continuously. Alfred Dixon has a force of men engaged at his Center mine, near Deadwood. The Hidden Treasure mine at Sunny South is operated on the most extensive scale of any drift mine in California. Between five and six hundred cars of gravel are mined and washed through the sluices each day. Supt. H. T. Power informed the *Sentinel* that the company has 200 men on the payroll. Thirty men are engaged in development work on the property. An upraise is being made in the Dam tunnel at a point 6,000 feet from the surface to reach the white gravel. Mr. Power thinks that if prospects hold up to present indications, the company would be able to work a total force of 400 men. Supt. Felix Chappellet Jr. says that the tunnel to tap the channel at the Eureka mine is now in over 700 feet. The company expects to make the upraise into gravel during next September or October. The Eureka Company owns more than six miles of channel and will be able to work from 300 to 350 men when they are ready to breast gravel. This, with the increased operations at Hidden Treasure mine will give employment to more than 500 new miners on the Forest Hill divide.

### Plumas.

*National-Bulletin:* Dr. J. P. Welch has secured an extension of his option on the Glazier mine, on the North Fork, after making a payment of about $6,000.

Standard & McGill are making extensive repairs on the Kittle mill at Rouud Valley, preparatory to the resumption of crushing ore from their large mine in North Canyon. Before closing down last fall, this mine yielded big returns, about $14,000, in the month of October.

The usual force of men is employed at the Plumas Eureka mine.

### San Diego.

Samples of rich copper ore have been received in San Diego from mines in Picacho district, on the Colorado river, owned by a company in which G. L. Jesselyn of San Diego is interested. The specimen shows the ore to be at least 75 per cent pure copper, and it carries enough gold to pay for being worked.

S. W. Dorsey, who is becoming largely interested in mines at Picacho, has filed in the recorder's office notice of his purchase from J. M. Mendivil and others of all their right, title and interest in the Apache, Control, Eastern California, Western Pacific, Golden Casket, Mina Rica, Rica Tierra, Gold Seal, and Mars southeastern extension, with millsite.

At Julian the Owens Mining Company has opened a ledge at the 350-foot level, two feet wide, which shows free gold. Fifteen men are continuously at work.

H. E. Holland has sold his third interest in the Elevada mine to V. E. Shaw, of San Diego, for $6500.

On the desert in the eastern portion of the county, the headquarters of the Chucauwalla district is the mine of the Sterling Gold Mining Company, where a ten-stamp mill costing $27,000 is being erected. The company owns several mines in a group and have sunk several shafts to a depth of 75 and 100 feet, enough to show something permanent. Near by this mine is the Bowlder mine, down 100 feet, and the Granite, down 100 feet, with a crosscut 75 feet across the ledge. The Buckeye mine, three miles away, is owned by Dr. Kellar, of Los Angeles, and is down 80 feet.

### Shasta.

*Free Press:* The case of George W. Meyers vs. the Empire Mining Company in which Meyers sued for $2800 damages, a writ of ejectment and restitution of his mines, mills and premises and that the provisional injunction issued and served on October 22, 1895, be made pepetual, and in which said case the defendant, the company, denied the allegations of the complaint and demanded judgment for damages against the plaintiff in the sum of $20,519 on account of false representations made to the company, was submitted to the court without argument, whereupon the judge ordered that a judgment be entered in favor of the plaintiff, Meyers, for restitution of the premises, mill and mines and that the provisional injunction be made perpetual.

The Original Quartz Hill gold mine is yielding good ore, which is being crushed in the 20-stamp mill of the Calumet Mining Company at Calumet spur. On Monday last a cleanup was made, and a gold brick about a half-inch in thickness shipped to the refinery.

### Sierra.

AROUND SIERRA CITY.—Eleven men are working at the Sierra Buttes quartz mine. The Butte Saddle has hired a new crew of miners to replace those recently discharged. An upraise and drift is being run on the Roman ledge, which mine has been bonded by Mr. Copeland. The Rising Sun and Early Dawn Companies are still putting down their incline—now 200 feet in length. They have plenty of gravel and find an occasional rich pay streak. Six men are working at the Northern Belle quartz mine, recently purchased by I. Copeland. An upraise is being made from the lower tunnel of the Bigelow quartz mine to the upper one, to be 280 feet long. The work has been contracted for by Hansen and Cox at $2.50 a foot.

*Messenger:* In the northern part of the county no work is being done in the St. Louis mines. There is a general stoppage of work in the Scales' claims. J. H. Thomas has ten men hydraulicing La Porte. Operations have been temporarily suspended at the Belle Union drift mine. A number of men have been temporarily laid off at the Thistle shaft. There is a lull in mining matters in Gibsonville at present.

### Siskiyou.

*Journal:* Work is resumed at the Columbia mine, near Scott Bar, long idle.

The Gum Boot mine on Mill creek, owned by A. and C. Simon, has started up.

The hydraulic miners in the vicinity of Oro Fino anticipate fully as long a run this season as last. Although the fall of snow in the high mountains has not been as heavy as usual, still the cold weather we have had has served to keep the snow from melting too rapidly. During the last storm considerable new snow fell on the mountains, which is also of great benefit. All the hydraulic mines are in full blast.

### Trinity.

AT TRINITY CENTER.—The Oro Fino quartz mine and mill, the property of the Strode brothers, has started up.

G. L. Carr is working three shifts on his quartz mine. He has been making the mine pay with an arrastra, but this has been discarded for a stamp mill.

A force of men is running a tunnel on the Big Bonanza King, in which W. Vollmers and E. Ellery are interested. As soon as spring opens in earnest, the mine will be run full blast. There is a fiv-estamp mill on the property.

The Nash Company on Coffee creek have put in a pumping plant.

At Minersville, at the H. G. M. Co., the new flume which crosses the bedrock of the Lappin mine on a trestle 36 feet high, is to be completed shortly. Thirty men are employed.

*Journal:* From the Highland mine, opposite Taylor's Flat, Pelletreau & Hedges are taking out $200 a day.

At Vance's Bar Wallace & Harrington are preparing to run a tunnel on the lower end of their drift mine.

At Cox Bar Geo. Tinsley is drifting on leased ground near Manzanita Flat and is taking out from $6 to $10 a day.

*Expositor:* E. and J. Jones, two placer miners holding a claim three-quarters of a mile north of Coarse Gold, found a nugget last week weighing five and one-twelfth ounces. In 1893 a nugget of the value of $700 was taken from the same mine.

### Tuolumne.

OLD TUOLUMNE MINES, AND FUTURE PROSPECTS.—(Special correspondence)—It is at last beginning to dawn upon us, beyond the question of a doubt, that capital is seeking and investing in our mines. The demand for paying properties and good prospects is greatly on the increase, owing chiefly to the rich developments now being made on the mother lode, as, for instance, the daily output from the Rawhide mine, now operating entirely by electrical power very successfully; the immense discoveries in the App, at Quartz mountain, of ore bodies of high grade; the Jumpers' continued richness of large slate

and quartz veins, yielding auriferous rock of highest grade. The Rappahannock has just encountered and is developing great bodies of payable ore, 38 feet so far as crosscut at the 350 level and no hanging wall in sight. Gold shows freely in the quartz and slate, similar to Rawhide, and in some places is of great richness. A personal visit to the mine so testifies. Naturally, it will take some time to systematically open up this newly discovered shoot. The same has been found on the 100-foot level, but its width has not yet been determined, as crosscutting for footwall is now in progress. Here, also, the same class of rich ore is found as in the lowest level. The above showing indicates that a rich and payable mine will be found as deeper developments are made. There are many other mines along the mother lode in this county, between the Stanislaus and Tuolumne rivers, that are mining successfully on the same rich belt; that it would seem there is an unbroken chain of most valuable properties continuously located between the two rivers named; that Tuolumne as a great gold producer is assured, not only on the mother lode, but in the upper belt, as for instance, the Golden Gate with its twenty-stamp mill and complete chlorination plant, turning out golden bars a dividend payer as regular as the end of the month comes around; the Belle View, its ten-stamp mill pounding out monthly profits of no mean order from its large vein; the Dead Horse, 1400 feet deep, steadily paying; the Black Oak group's ten-stamp mill crushing rich rock, value largely in bare ore; the Keltz, a steady payer, with fifteen stamps; the old Soulsby mine vigorously being worked; the Mountain Belle, now crushing; the rich Star mine, on Rose creek, continuously crushing with their new ten-stamp mill. The ore is exceedingly rich, the richest being sent to the Selby Co., San Francisco, for special treatment. One carcarload (R. R.) produced $16,000 recently. The Star is equipped with a perfect reduction plant; concentrates are shipped to San Francisco. The Ham and Birney, running a ten-stamp mill all the time, with good payable results. It is needless to recapitulate other mines, but will sum up thus: We have twenty-five mines carrying mills aggregating 281 stamps; 140 of the above have been added since the Rawhide was opened. From what has come to my personal knowledge, there will be several mills added this summer to those already built. Referring back to the mother lode, I must state another decided advantage we possess is the fact that 600 feet in width generally covers all that is most valuable on this great fissure; for instance, on the footwall is west vein, the boulder center vein, east vein and the east stratified series at hanging wall, are mostly found on one location, being in such close contiguity and continuity. Hence the mother lode veins are consolidated, so to speak, in close proximity; thus the shoots are richer, for it is a well-known fact that contiguity of veins produce richer deposits than if isolated and separated by ungenial rocks. The formation of mother lode is black or blue mineral slates, being intersected and paralleled by eruptive dikes, diabase, diorite, etc., which are genial for gold; the quartz veins being interpolations between the slates and eruptive rocks, of larger or lesser degrees, gaining in size as sunk on. Serpentine is generally the main footwall.

Admitting Tuolumne is all that I claim for it, nevertheless capital is needed, and it is the duty of all who have their own interests at stake and a general desire to help the county, to see that incoming capital is fostered, not driven away and deterred from investing in our mines. Only the other day a large deal would have been consummated but for the avariciousness of some of the owners of a group of mines. The buyers came but were peremptorily informed one of the group had been sold, then demanding an immense advance on the original price as previously agreed upon. The buyers would take nothing but the entire group, would not tolerate the excessive demand and left disgusted with Tuolumne; thus the sale collapsed, and capital was turned out of the county. But for this contretemps $250,000 would have been paid down as the initial payment. Such an unwise course is much to be deprecated, and is manifestly unjust to capitalists who were so desirous of locating and investing here. Two hundred and eleven millions of dollars have already been extracted from this county; the major quantity came from the erosions by time from our quartz veins. This placer or alluvium enriched thousands, yet some of the old quartz mines produced millions of the above amount in free gold, but until later years the sulphurets or base ores were not worked. The knowledge of treatment was not known; there was a lack of the proper appliances in the early days of quartz mining. The sulphurets were looked upon as valueless and allowed to run to waste. All this is changed; everything of value is worked for all there is in it. Inventors are vying with each other to produce the most perfect method of saving and concentrating the base ores.

Capital is about convinced that this country has its merits auriferously. French and English coin is being placed with a certainty of coming our way at last. Our golden regions are but scratched over. The output of our Utica, Kennedy, Champion, Rawhide, etc., mines is of sufficient evidence to warrant investment. The area is large and the opportunities are unequaled. ARGUS.

Sonora, Cal., March 31, 1896.

### NEVADA.

The *Silver State* says: L. J. Crook has discovered a large deposit of cinnabar ore in a spur of the East range, about forty miles south of Winnemucca. The ore has been thoroughly tested and found to contain quicksilver to a per cent that leaves no doubt as to the value of the discovery. There are three different grades of the ore, the richest of which is in appearance exactly like that of the cinnabar found in the quicksilver mines at New Almaden, Cal.

#### ESMERALDA COUNTY.

Ex-Governor Colcord is having some Esmeralda Con ore of Aurora worked at Bodie by the cyanide process. If the result is favorable, a cyanide plant may be erected at Aurora and its mines started up again.

#### LYON COUNTY.

Two carloads of copper ore from the Dunlap mine near Soda have been shipped to Empire for a test.

### OREGON.

Baker City *Democrat*: The Exploring Syndicate of Mines and Mining Company, of France, represented by E. L. Giroux, resident agent and manager, has started mining operations at Clark's Creek on an extensive scale. Arrangements are being made for equipping the mines with pumps for the purpose of sinking to bedrock with a view of putting in a bedrock flume, starting at the mouth of the creek and running up to the old town. This will give fall to carry off all the gravel and debris washed by the giant hydraulics and enable the bed of the creek as well as the hill sides to be washed down.

The practicability of a bedrock flume in these mines has been one of certainty for many years, but the absence of the necessary capital to carry out such a project has been lacking until the present time. The syndicate having all the money necessary at its command the successful carrying out of this modern project for mine operation is assured.

#### JOSEPHINE COUNTY.

W. J. Strong, superintendent of the Waldo copper mine says that an increased force will soon be put at work there.

Pollock & Phillips of Jump-off-Joe district lately cleaned up $175 from an eight-days' run with an arrastra.

Development on the Yank ledge in Galice Creek district is progressing. The rock is very hard to work, but the prospects are good for the uncovering of a large deposit of low-grade ore.

Hougham and Stanley, lessees of the Braden mine in Kane's Creek district, recently sent the result of crushing 52 tons of ore to the mint at San Francisco. They expect to realize $500.

Gold Hill *Miner*: It is quite a sight one sees along the river between Gold Hill and Grant's Pass. The mining camps are thick and men at work on every gravel bar, picking, shoveling, panning and rocking. Most of these claims are worked on a small scale and with a limited force of hands. One claim—a large bar of twenty acres or more—is being worked by Dr. W. H. Flanigan, of Grant's Pass. The doctor has placed an engine and pumping plant on his claim and is working just as fast the water will allow. The water as yet is too flush in the river to admit of the best results on these claims.

### WASHINGTON.

Jno. Davenport, owner of the Daisy, Jerome Creek district, twenty-four miles east of Palouse, is going to put in a five-stamp mill.

At Methow, Griggs & Durr report a rich strike in their Friday claim—"solid sulphurets running thirteen ounces in gold."

### BRITISH COLUMBIA.

Wm. Kirkup of Revelstoke and G. J. Atkins of Chicago have organized the French Creek Hydraulic Mining Company—capital $2,000,000—for the development of placer properties in the big bend of the Columbia in British Kootenay. The head office will be in Spokane.

Nelson *Tribune*: While Canadians are looking wistfully towards Kootenay as a promised land, Americans are gobbling up the mines that promise large returns in the future. The War Eagle at Rossland is a good showing for a great mine, and were its output smelted in Canada and the matte refined and made into golden coins and copper wire in Canada, surely Canada would be none the loser. But this is not likely to happen. D. C. Corbin of Spokane has the mine bonded, and if he takes it up every ton of ore from the mine will be smelted in the United States, and that country will be just that much enriched at the expense of Canada. Mr. Corbin controls the Spokane & Northern railway, a branch of which is to run from Northport to Rossland, and in acquiring the War Eagle he is getting tonnage for his railway.

The Hall mines tramway has been cut in two, and is now in successful operation, delivering from 125 to 150 tons of ore at the smelter daily. The smelter's successful working is best shown by the weekly shipments of matte. The weekly shipments are worth $25,000 on an average, which means that the company is clearing close on to $75,000 a month. Eighty-odd men are employed at the mine, twenty-odd on the tramway, and about fifty around the smelter.

### ALASKA.

Under date of March 25, a miner writes from Dyea, Alaska. "Dyea is 100 miles north of Juneau and the fare is $10 cabin, no steerage. All freight is $4 per ton. On account of the heavy winds which prevail at Dyea, steamers cannot always go to that place; being frequently obliged to stop at Hames Mission twenty miles distant, until the weather is favorable. The Willapa anchored at this place for two days on her last trip. From Dyea there is a strip of water which runs directly north and south for sixteen miles; and as there is no wharf at the above place steamers are obliged to unload with small boats; and this can only be done in fair weather. Indians charge $5 per each canoe load of freight taken from the boat to shore. The Willapa will unload your freight free of charge from shore to the store, a distance of three miles, freight costs $5 per ton; and great care must be exercised in order to get your goods off the beach, as the water is very shallow, and the tide comes in very fast. From the store to Sheep camp, a distance of fourteen miles, freight costs four cents per pound, and from Sheep camp to the Summit, a distance of three miles, freight costs five cents per pound; so that one ton of freight would come to $198.75 from Seattle to the top of the Summit. No Yukoner goes in with less than one thousand pounds. One's fare and his outfit would cost $121 to get to the top of the Summit to say nothing of the first cost which is from $75 to $100. No person should think of going to the Yukon with less than $500, as any one can see from the above figures. The above is only the cost at this end. Some of this cost can be reduced by doing a part of one's own packing. But it is impossible to do it all, as it would take a person all summer to do it * * * It costs $1 each to get letters from Dyea at present, so correspondng is expensive. To-morrow we leave Dyea for Circle City a distance of 860 miles."

The Alaska-Willoughby Gold Mining Company has levied an assessment of 20c, delinquent May 25.

The March report of the Alaska-Mexican mine on Douglas Island, Alaska, shows 7262 tons of ore milled and 126 tons sulphurets treated, the last yielding $6,122. The gold product for the month was $21,761, expenses $13,139. The ore averages $3 per ton.

### IDAHO.

Judge Beatty of the United States Circuit Court has rendered judgment in the case of the Tyler Mining Company vs. Charles Sweeney, Frank R. Moore, Kennedy J. Handley, J. Quackenbush, Alexander Ross, John Pressley, Frank Hyatt, the Last Chance Mining Company, the Idaho Mining Company, and the Republican Mining Company.

"It is now ordered and adjudged," says the decision, "that the plaintiff do have and recover of the Idaho Mining Company and the Republican Mining Company the possession of those certain premises described in the complaint and in said agreed statement of fact, to wit: that certain ledge or vein of rock in place containing valuable minerals having its apex within the limits of the Tyler mining claim, with the right to follow as against the Republican and Idaho mining companies such vein upon its descent into the earth to any depth between the two perpendicular planes, prolonged in their own direction, which pass through the two parallel end lines of said Tyler mining claim, even though such vein in its downward course shall extend outside the vertical side line of such Tyler mining claim and under the Republican Fraction, the Last Chance Fraction and the Skookum Fraction mining claims, which are claimed by said defendants, the Republican and Idaho mining companies.

"And it is further ordered and adjudged that the plaintiff, the Tyler Mining Company, take nothing against the defendant, the Last Chance Mining Company, but that said Last Chance Company is entitled to the possession of all the premises and mining ground and claim and the ledge and ores therein in controversy in this action which lies between the planes which descend vertically from those two lines of the Last Chance mining claim which were located as its side lines, and as the same are now described in United States patent for said Last Chance claim."

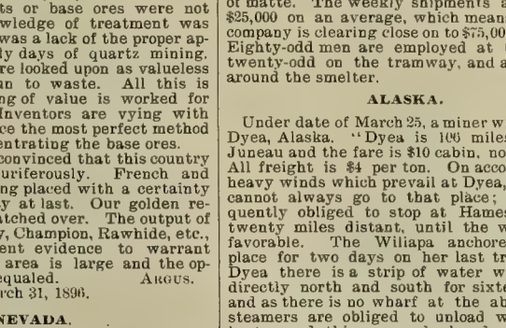
It is further ordered that as to the other defendants the action is dismissed.

"There is nothing in this judgment," says F. L. Clark to the Spokane *Review*. "It is substantially the judgment which was rendered several months ago by Judge Beatty, and reported at the time in the Spokane *Review*. It appears to me that this is a more explicit statement of the relation which the Tyler bears to the Republican Fraction. I suppose it is a step taken by Judge McBride to advance this case. The Republican Fraction claim is owned by the Last Chance Company. It is of comparatively small value and has no relation to the main ore bodies. The point to be litigated is whether the Tyler has any extra lateral rights whatsoever, which point the Supreme Court says was a very interesting one, but not necessarily before it at the time the court rendered the decision in favor of the Last Chance Company.

"This is a very interesting legal point, the question of extra lateral rights, but it is now, so far as we are concerned, a legal battle, as everything that is of substantial value we have won.

"The decision is a victory for the Tyler, so far as it covers the ground owned by the Republican Mining Company and the Idaho Mining Company," said Mr. McBride, attorney for the Tyler company. "I still think the Tyler is entitled to recover the vein in the Last Chance ground, but this is a question for the future."

A study of the following diagram is essential to an understanding of the fine legal points involved in this most interesting case:




The decision turned on the question of priority of location. It having been decided that the Last Chance had priority, the Tyler people are estopped from following the vein into the Last Chance ground. But the Tyler having priority over the Republican Fraction and the claims of the Idaho Mining Company, is allowed to follow the vein into their ground. There still remains to be determined, it appears, the question of ownership of the vein after it has passed through and out of the ground of the Last Chance.

The insurance adjusters are through fixing the amount to be paid the Tiger & Poorman Consolidated Mining Co. on account of the recent fire. The total insurance on the property actually in the fire was $112,000. It is estimated by parties conversant with the matter that the company will receive about $80,000 from the insurance companies. H. L. Frank says the consolidated company will start in at once to replace both concentrators, and nothing but the latest improved machinery will be used. The mines are flooded up to the 600-foot level, but no trouble is experienced in handling the water above that level.

The Standard is daily shipping 12 cars of crude ore to the mill at Wallace, which make about one-fourth of that amount after concentration. The Campbell tunnel is in about 1460 feet.

### UTAH.

*Tribune*: The Bennett amalgamator, that three weeks ago began to convert the sands of Green river into gold bullion, has met with an accident and is temporarily idle. The ponderous machine with which its daring inventor has started out to revolutionize the handling of placer ground was earning, it is said, $5,000 a day when the old engineer had occasion to make way for a new one, who succeeded a few days ago in burning out the dynamos. The result was the hasty shutting down of the amalgamator that the damage might be repaired. It is expected that it will soon resume.

Twelve and a half tons of silver bullion, valued approximately at $375,000, will shortly be shipped from the Eureka Hill. No shipment has been made from the mine since January 1st, the bullion product accumulating all the time until the immense amount mentioned is on hand. The bullion contains a small percentage of gold that will bring it up nearly to coin value. The shipment, while not large enough to fill a car, is as extensive as would be permitted. This, it is said, will be the largest and most valuable single car shipment ever made from a mine in Utah, and, the *Tribune* believes, in the world.

The *Tribune* hears that the propositions for the reduction of the Golden Gate ores have been favorably passed upon by Capt. De Lamar, after the ores had been submitted to Chicago and New York chemists, and that upon the return of H. A. Cohen the big 500-ton mill that has been talked of will be erected on the Golden Gate.

### WYOMING.

At Sheridan, a force of six miners is being worked on the tin claims by the owners, Messrs. Cosslett & Holgate. Three shafts are being sunk and in all the ore looks richer as depth is attained. One hundred pounds of the ore from the bottom of the shafts has been brought in and will be sent to Carraway, the Government assayer at Omaha, and Ledoux, of New York, fifty pounds going to each. Upon the reports from this ore will depend the future working of the claims.

### MONTANA.

The stockholders of the Comanche Mining Co. hold a meeting in Butte to-day to ratify the sale of the company's property to the Boston & Montana for $200,000.

Twelve men have been put to work at the Silver Bow shaft No. 1, one of the Butte & Boston Co.'s properties.

Men also began work on the old chutes at the Tunnel, mine one of the Boston & Montana properties, and the *Inter-Mountain* is reliably informed that the Butte & Boston smelter will hereafter be kept running on Boston & Montana ore.

A judgment by default for $364,451.07 principal and $16,398.29 interest has been obtained by J. C. Perkins of Boston against the Butte & Boston Mining Company. The amount represented the company's floating debt.

The Anaconda Company has expended many millions in the purchase and development of mines and the erection and operation of its smelters and refinery; it numbers on the payroll 5,000 employes. Ninety-nine mines have been acquired during a period of fifteen years. Those most extensively developed are the Anaconda, St. Lawrence, Mountain Con., Green Mountain, High Ore, Poulin, Pacific and Neversweat. The deepest of these is the Anaconda—1,500 feet; on the others the shafts are from 600 to 1,200 feet deep. Upon the Green Mountain and Neversweat, hoisting plants, capable of sinking 3,000 feet, are being erected at a cost of a quarter of a million dollars. On all the principal mines of the company hoists are in operation, daily lifting to the surface from 3,000 to 4,000 tons of copper ore. The ore bodies vary in width from 20 to 100 feet, and are considered inexhaustible. The Anaconda properties combined are now producing 105,000 tons of copper ore a month, from which it is estimated 110,000,000 lbs. of copper will be extracted, which, at an average of ten cents a pound, foots up $11,000,000. The ores are shipped for reduction from Butte to Anaconda, where two large smelters and the newly erected refinery, are located. They treat 200 carloads of ore per day, hauled over the company's road, 28 miles long, built in 1894. They consume 450 tons of coal and 500 cords of wood per day, and 1,000 tons of coke per month. They use 2,000,000 feet of lumber per month for improvements and repairs, and 100,000 fire brick. The ore is crushed by direct-acting steam stamps, dressed in the concentrators, roasted in revolving calciners, and reduced in matting furnaces to the form of pigs containing 65 per cent copper and varying amounts of silver and gold. The electrolytic refinery does the rest. It cost $1,000,000. The total capacity of the two smelters is 4,500 tons. J. B. Haggin of San Francisco, the

Hearst estate and Marcus Daly own the Anaconda mines and plant. Mr. Daly is general manager.

The *Northwest* says the force on the Drum Lummon mine at Marysville has been very greatly reduced, at least 200 men having been laid off in the last few weeks.

### SOUTH DAKOTA.

(Special Correspondence).—The Deadwood and Delaware Smelter Co. has notified the contractors at their limestone quarries near Englewood that in the future they will require just double the amount of rock they have been having. This rock is mixed with ore before the charge is put into the stacks and the additional amount required has been necessitated by the recent increase in the capacity of the smelters.

Deadwood, Black Hills, April 10, '96.

(Special Correspondence).—The owners of the Egyptian mine have closed a contract with the Ingram custom mill for an extended run on their ore. The development crosscut in the mine has opened up a large vein of ore, running $6.50 free milling and $6 per ton in concentrates. The cost of mining and milling being but about $2.25 per ton, the ore will pay a handsome profit.

Keystone, Black Hills, April 10, '96.

(Special Correspondence).—About a week ago the drift on the 600-foot level of the Highland mine broke into a body of ore assaying $600 per ton. They have now crosscut the vein 20 feet and a sample taken from the face of the ore yesterday assayed $1100 per ton. This is undoubtedly the richest ore ever encountered in this mine. The mine is owned by the Highland Mining Co., a very close corporation, and is under the same management as the Homestake Co.

Lead, Black Hills, April 10, '96.

(Special Correspondence).—Returns on the car of ore shipped from the Sunnyside mine to the Kansas City smelters gave the owners $49.80 per ton. The expense of shipment, treatment, etc., being but $11 per ton, the owners made a nice profit. Work has been commenced on ore bins and a pump and hoist will be put up at once, preparatory to extending the development shaft on down.

Hill City, Black Hills, April 10, '96.

### COLORADO.

Telluride *Journal:* The recent strike on the Commercial is the latest sensation, in the Saw Pit district, and as development work progresses and the chute is more extensively opened up, the mineral improves both in quality and quantity. The ore lying on top of the lime contact is now five feet in thickness, and the whole assays from average samples 20 ounces gold, 78 ounces silver and 30 per cent lead per ton. There is said to be enough of this character of ore blocked out to last eighteen months, shipping one carload per day.

Pueblo *Chieftain:* Mining in the Ouray region is going ahead actively. The tunnel of the United States Depository mine is now 1300 feet long and about to tap the vein, which will yield ore of 700 ounces silver. The recent strike of 13 inches of 174 ounces silver and 2 ounces gold ore in the Nevada has proved to be continuous as development goes on.

Colorado Springs *Gazette:* It would appear that the recent strike made in the Mollie Gibson was as unexpected to the management of the company as it was to the general public. The work of drifting for a known ore-chute at the eleventh level was going on when the find was made, which consisted of some valuable but not very large quantity of ore. The known ore body which was being drifted for is supposed to be some 120 feet distant from where the recent strike was made. From this chute some $250,000 or $300,000 worth of ore was taken in the workings above, and the eleventh level will cut it at a depth of 100 feet below the point where the last ore was taken from. It is, of course, the intention to cut the chute at greater depths. The eleventh level is about 900 feet from the surface. The ore chute in question is the one that was first opened up on the Smuggler, but which faulted into Mollie Gibson ground.

The *News* says that leading miners of the State, D. H. Moffat, W. S. Stratton and the owners of Leadville's Little Johnny, have taken hold of the low grade problem. The Moffat cyanide-chlorination plant at Florence is to reduce 450 tons per day. Mr. Stratton is building on the Independence a 200-ton-per day chemical plant. The Little Johnny owners have ordered machinery for a 100-ton mill. These plants are to be under the control of educated experts.

Cripple Creek *Mail:* One hundred and twenty men are now employed at the Victor mine. The mine is working a larger force and shipping more ore than at any time in its history.

The highest system of water works in the world is to be constructed this spring in Altman. The altitude is about 11,000 feet. The main pumping station will be located at Grassy, a mile and a half below and 1,000 feet lower than Altman. A second station will be placed 750 feet higher than the first and will throw the water into tanks above the town. The water is for domestic use and for fire purposes. It is the purpose of the company to furnish light and power for the mines on Bull hill. Superintendent M. S. Walker has charge of the construction.

The north half of the Colorado City, located in the saddle between Bull hill and Battle mountain, was sold Monday for $65,000 cash to the Golden Fleece Mining and Milling Company of Hinsdale county. The mine was being operated by Charles M. MacNeil and E. Lyman White, who secured it by purchase last summer for $45,000.

### NEW MEXICO.

Silver City *Sentinel:* At Mogollon, the Maud S. Company is working mostly on the 300 and 375 foot levels. The mill is running full time; ten stamps being employed on the free milling ore and five stamps on the base ore; the base ore is being concentrated. Over twenty men are employed on the Maud S. mine, and in the mill two shifts of twelve men each are being worked. Work on the Grey Hawk mine, which is under the control of this company, is also being pushed ahead.

### ARIZONA.

The Arizona and New Mexico company's smelter at Ivanhoe is running full blast again, upon the copper ores of the district. A large part of the ore reduced comes from leased mines of the Santa Rita Company.

E. Hilty is working the bars of the Colorado river by the Barnhart amalgamator process, and the Prescott *Courier* says he is making a success at saving the flour gold which fills the bed and bank of that stream. A great deal of money and labor have been expended in years gone by to save this gold.

At a recent meeting of the board of directors of the Prescott Mining Exchange Col. Brodie was elected president and S. Hill secretary.

*Gazette:* A check arrived on Saturday from El Paso in payment for a carload of ore from the Eclipse or Luke mine, in the Bradshaw mountains, seventy miles north of Phœnix. The car of ore weighed 21,756 pounds, and after expenses of reduction were taken out, the owners received $4,294 31. This is $394.77 per ton at 68¾ cents per ounce, the price received.

### LOWER CALIFORNIA.

*Lower Californian:* Goldbaum and Pegot have contracted with Canas to work the old Castillo mine in the Real. It was this mine that made the town of Real del Castillo, and Canas was one of the men who originally worked it. The old works are down 250 feet, but for the past eight years it has been idle.

## Coast Industrial Notes.

—Boring for oil at Coalinga, Fresno Co., has so far resulted in developing two 40-barrel wells.

—The first freight shipment over the Corral Hollow road was made last Monday. At present two and a half miles of track are laid daily.

—The directors and stock trustees of the San Francisco and San Joaquin Valley railroad have determined to float $6,000,000 worth of bonds.

—Three vessels are here loading redwood for Europe, where our "California cedar," as they call it there, is in demand in the manufacture of fine cabinet work, lead pencils, etc.

—Lincoln, Placer Co., will put $20,000 in water works. The water will be supplied by the South Yuba Water Company and piped two and a half miles from their main into the town.

—C. P. Huntington is now credited with intention to buy the Atlantic and Pacific Railway at foreclosure sale, extend it to Sapulpa, Indian Territory, and there connect with the St. Louis and San Francisco railway.

—The McCloud Valley Railroad Company has incorporated in Siskiyou county, to start at Mott and extend into Squaw valley, tapping the timber belt in the eastern part of the county; capital stock, $1,000,000; stockholders, J. Palmer, J. A. Davis, D. E. Miles, W. J. Branstetter.

—Three of the largest olive orchards in the world are being planted in southern California. The largest grove is that of A. McNally, who has men at work laying out a 400-acre olive grove near Fullerton, Orange county. He will plant 40,000 trees. In the vicinity of Colton, B. Stevenson has 340 acres now being prepared. D. E. Emery, recently of Oakland, is having 240 acres of olives planted near Whittier.

—Since 1863 there have been built at the railroad shops in Sacramento 73 locomotives, 8 officers' cars, 174 baggage, mail and express cars, 2,321 flat cars, 105 passenger cars, 53 tourist and emigrant cars, 3,066 box cars, 245 refrigerator and fruit cars, 265 cabooses, 133 combination cars, 103 furniture cars, 283 coal cars, 10 snowplows, 10 ice flanges and 275 other cars, unclassified, making a total of 7,131 cars built. During that time there has been paid for labor $31,100,000 and for material $50,500,000.

## Personal.

W. A. CLARK has returned to Montana from Europe.

J. V. KEELEY has returned to his mines in Vanderbilt, Cal.

PROF. LANDES of Seattle has been appointed State Geologist of Washington.

JNO. W. GRAY, the Oakland mining engineer, has returned from a ninety days' business sojourn in New York.

MAJ. DAVIS AND CAPT. GILLETTE of the U. S. Debris Commission are now making personal inspection of the Feather and Yuba rivers.

## Recent Mining Dividends.

THE War Eagle paid a 5c dividend, $25,000, last Saturday.

THE Montana Ore Purchasing Co. paid a regular dividend of $1 per share, payable April 15th. This dividend is at the rate of 48 per cent per annum.

THE Cariboo Gold Mining Co. paid its ninth dividend of $7000 on the 6th—1 per cent on its capital stock—which makes $63,000 paid by this company in thirteen months.

THE Boston & Montana Co. has declared a dividend of $2 per share, payable May 20th, making a total of dividends declared and paid by the company to date of $4,025,000. The stockholders' annual meeting will be held April 30th.

## Recent California Mining Incorporations.

El Progreso Gold Mining Company, San Francisco; capital stock, $100,000, $25,000 subscribed. H. B. Sharps, Berkeley; J. Francis, P. H. Coward, C. Bovone and A. H. St. Marie, San Francisco.

Rosedale Gold Mining Company, San Francisco; capital stock, $1,000,000, $2500 subscribed. J. M. Fletcher, J. N. Wells, J. H. Sivers, T. P. Ross and A. A. Hobe, San Francisco.

American Gold Mining Company, San Francisco; capital stock, $750,000, $260 subscribed. J. M. Taylor, T. T. Greaves, C. B. Taylor, Oakland; T. E. Boeskenvogan, Gonzales; P. C. Dow, San Jose.

Henshaw Gold Mining Company, San Francisco; capital stock, $10,000,000, $2500 subscribed. E. M. Adams, J. M. Downer, M. R. Phillips, M. B. Kellogg, San Francisco; C. Brier, Oakland.

Etna Development Company, Etna, Siskiyou county; capital stock, $30.000, $15,350 subscribed. J. Parker, C. W. Nutting, J. Stephens, G. L. Hungerford, E. Miller, A. S. MacLellan, Etna.

Hilda Gravel Mining Company, San Francisco; capital stock, $100,000, $25 subscribed. S. Bigelow, Sierra City; L. Bocqueneraz, J. Phelan, P. Bellemans, R. Phelan, San Francisco.

Baker Gold Mining Company, San Francisco; capital stock, $10,000,000, $2500 subscribed. Same parties as Henshaw G. M. Co.

Webb Gold Mining Company, San Francisco; capital stock, $10,000,000, $2500 subscribed. Same parties.

Cascade Mining Company, Chico; capital stock, $2000, all subscribed, with B. Cusick, J. H. Mansfield, H. B. Reed, J. D. Sproul, H. Greenland, Chico.

Lockwood Consolidated Gold Mining Company, San Francisco; capital stock, $2,000,000, paid up $500; W. W. Barrett, J. E. Warren, C. M. Broadbent, B. J. Wise, San Francisco, J. M. Haven, Oakland.

## Commercial Paragraphs.

The Consolidated Kansas City Smelting and Refining Company has just completed very extensive copper refining works at their general refineries in Argentine, Kansas, and are now putting on the market 1,000,000 pounds monthly of the highest grade ingot copper. The addition of these copper refineries now makes the whole system of refineries at Argentine one of the largest, if not the largest, in the world for the extraction and separation of the precious metals from lead and copper. Their total for 1895 will be in the neighborhood of 15,000,000 ounces of silver, $5,000,000 in gold, 120,000,000 pounds of lead and 12,000,000 pounds of copper. The magnitude of this company's business is indicated by its dealings with railroad companies. During the year 1895 they paid out in freight charges to railroad companies the sum total of $1,769,000. The total number of cars of freight handled was 26,000.

Their refineries at Argentine are drawing the bullion product from their own reduction works at Leadville, Colorado, and El Paso, Texas, and are refining the bullion for smelters in Magdalena, New Mexico, Salt Lake City, Utah, Tacoma, Washington, and the Union Works at Leadville. They are drawing products of cyanide, chlorination and other mills located in all the western mining districts. The ores smelted by their reduction works are drawn from all the western States, from the Province of British Columbia and from all the mining districts of Mexico. The business of this company has grown rapidly in the last five years, and its interests and influence are rapidly increasing throughout the western mining world.


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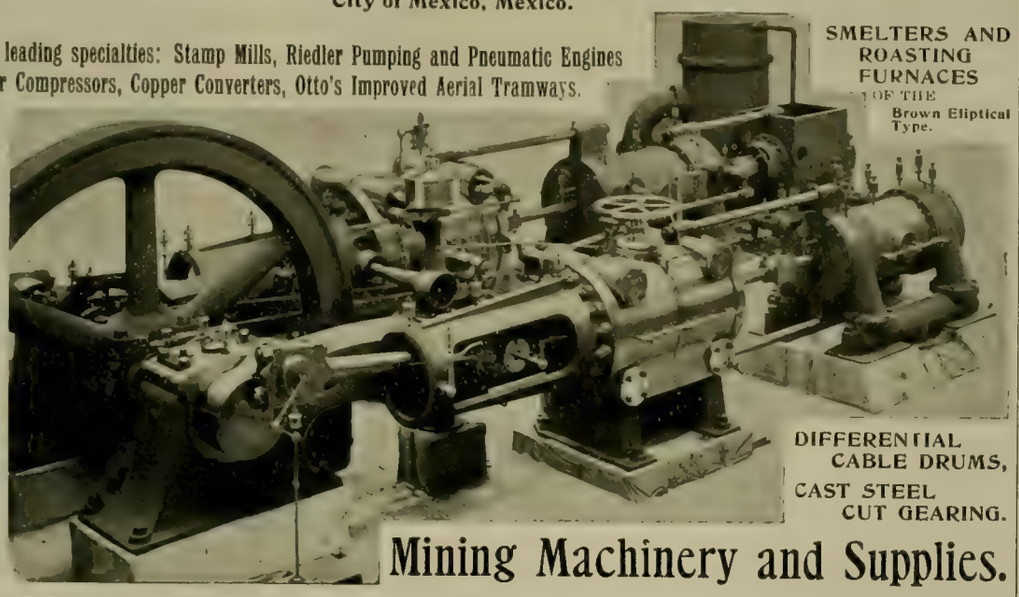
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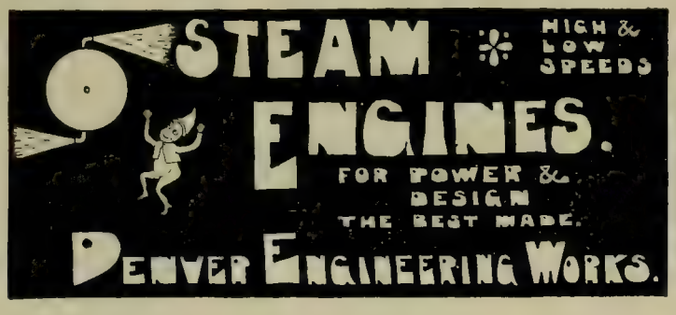


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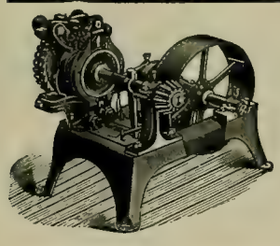

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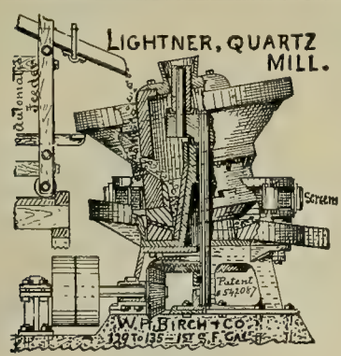


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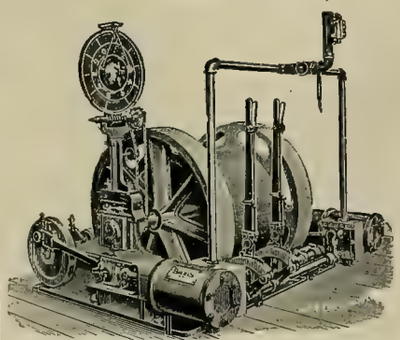
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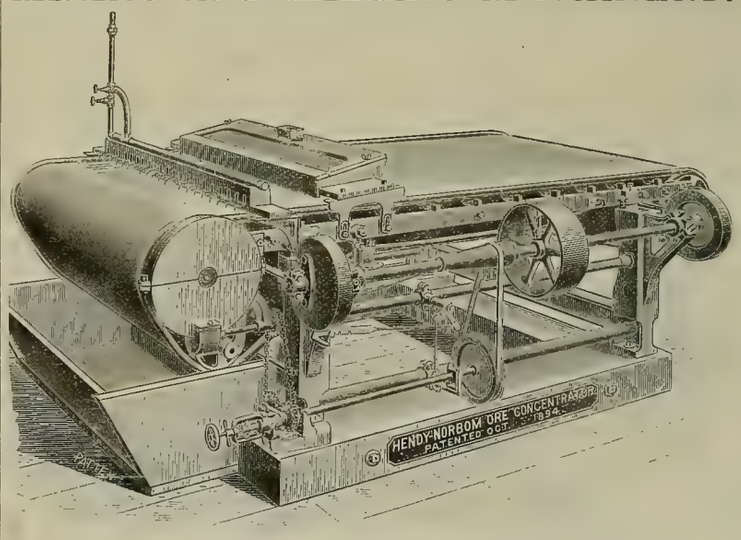
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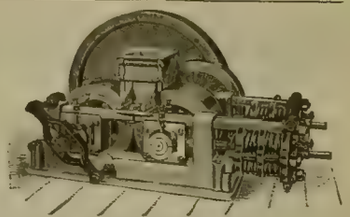
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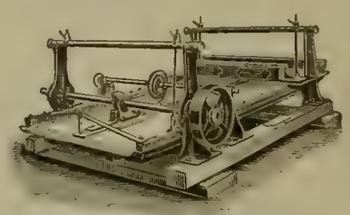
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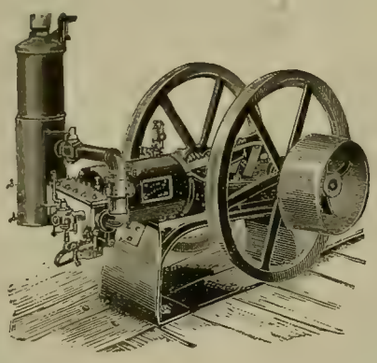


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| | |
|---|---|
| Coal Gas, ten hours' run, 1000 feet | $2 00 |
| Gasoline (74 deg.), ten hours' run, 8¾ gallons @ 14c. | 1 25 |
| Coal Oil, ten hours' run, 7½ gallons @ 10c | 75 |
| Crude Petroleum, asphaltum base, 16 gallons @ 3c | 48 |
| Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c | 65 |

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon—21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1½c per horse power per hour; and on gasoline, 2½c per horse power per hour.

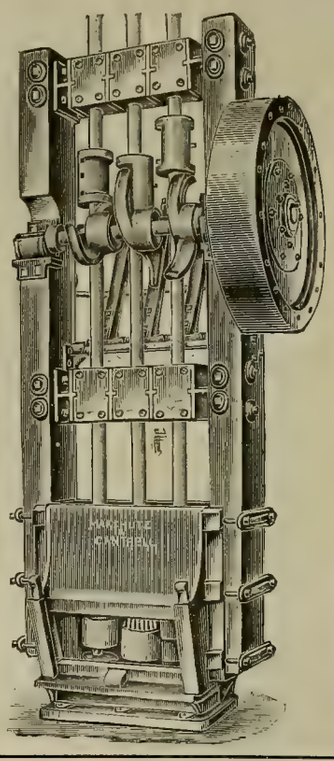
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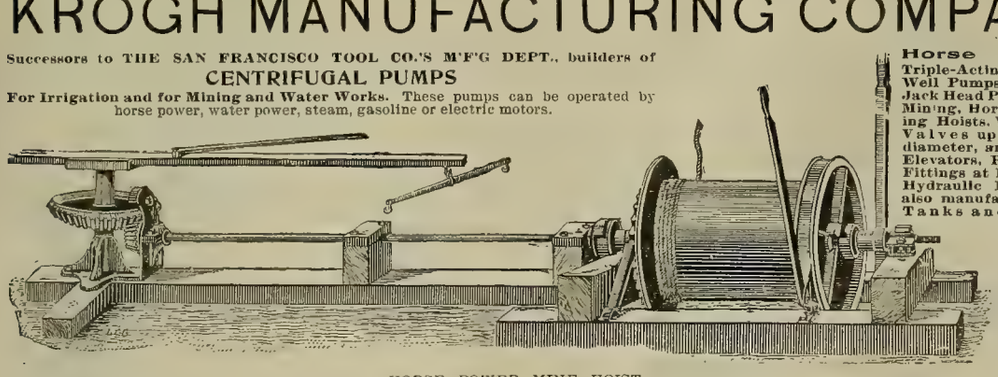
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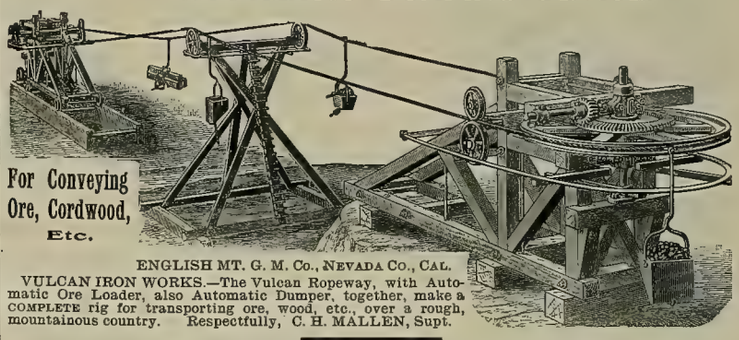
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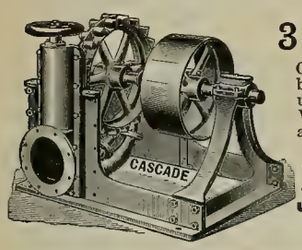
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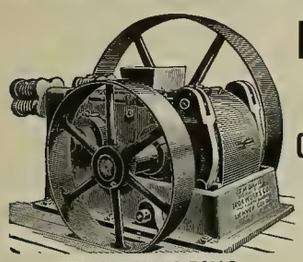
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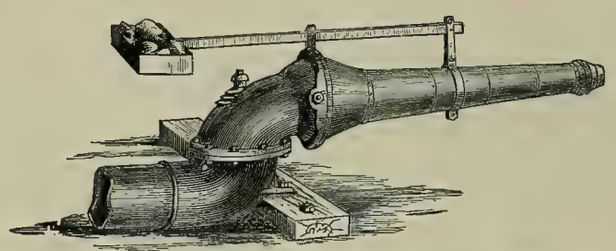
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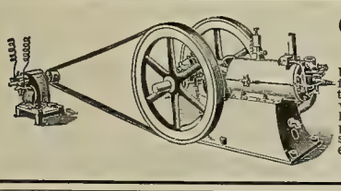
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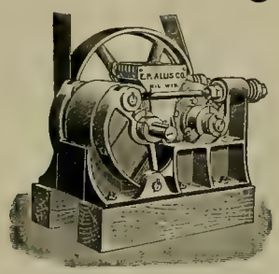
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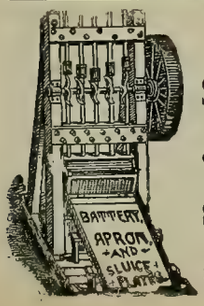
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# Market Reports.

## The Markets.

SAN FRANCISCO, April 16, 1896.

The improvement reported last week in trade circles seems to be more pronounced, but in the agricultural districts it is of a hand-to-mouth character. From the gold mining districts the call for goods is not only large but seems to be enlarging in scope. Traveling salesmen returning from Amador, Calaveras and Tuolumne counties say that there are more miners at work than for many years past, while the mining sections are being overrun by prospectors. As the snow disappears in the other mining counties a similar state of affairs is looked for. Many mines are being experted by mining engineers in the interest of expected buyers. Hardly a day passes but one or more transfers are made. These transactions inspire the belief that this State has entered on a large mining boom. Iron workers in this city state that they are working on more orders than for years, while bids are being asked on considerable new work. The work is largely for structural purposes, but considerable is being done in turning out machinery and material for railroads.

In the local money market there seems to be a general easing down, due to fair to good crop prospects, active mining, more money offering, a steady improvement in business and more activity in manufacturing circles. From the East authentic advices state that general business is improving and that a more hopeful and confidential feeling is beginning to set in. Foreign money is still offering fairly free. Speculation at the East also seems to be increasing and enlarging. Our leading exchanges appear to take a more roseate view of the situation and that a new era of prosperity is being entered on.

**New York Silver Prices.**

NEW YORK, April 16.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. |
|---|---|---|
| Friday | 31 3-16 | 68¼ |
| Saturday | 31½ | 68⅜ |
| Monday | 31⅛ | 68 |
| Tuesday | 30 13-16 | 67⅞ |
| Wednesday | 30⅞ | 67½ |
| Thursday | 30 15-16 | 67⅝ |

| | Copper. | Lead. | Iron. | Tin. |
|---|---|---|---|---|
| Friday | 10 75 | 3 05 | 11 00@13 50 | 13 30 |
| Saturday | 10 75 | 3 05 | 11 00@13 50 | 13 30 |
| Monday | 10 60 | 3 05 | 11 00@13 50 | 13 25 |
| Tuesday | 10 60 | 3 05 | 11 00@13 50 | 13 25 |
| Wednesday | 11 00 | 3 05 | 11 00@13 50 | 13 25 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.88 |
| London Merchants | $4.86 |
| London Sight Bankers | $4.89½ |
| Refined Silver, per oz., 1000 fine | 67½c |
| Mexican Dollars | 54½@55½c |

SILVER.—On Tuesday there was quite a slump in the London market. It is stated this was in sympathy with a rapid decline in India exchanges. The latter is said to have dropped by reason of the rains having set in there, which invariably causes a lessened movement in cereals, but the latter is reported in small stock. The expected new-season tea demand for silver has not materialized as yet. There are those in trade who think that the call for silver from this source will be less this year than it was last year owing to so much money being disbursed by both Japan and China in foreign countries which may give more exchanges. Judging from the quantity of quicksilver taken by Mexico there must be increased silver mining in that country. Since Tuesday the markets at the east and abroad have gradually strengthened. In this city a light inquiry is reported by sellers.

MEXICAN DOLLARS.—The market, in sympathy with silver, was sold lower. The demand is said to rule moderate for the season. The market is quoted at from 54¾ to 55½ cents.

COPPER.—At the close the markets at the East are reported firm at an advance. This is due to foreign buyers being compelled to pay more so as to have their orders accepted. Speculators at New York are said to have placed considerable at 10¾ to 10⅞ cents for May and June delivery, but at the close they demand more money. If these sales are from short sellers the market may do still better before they are able to secure enough to cover their over-sales. The consumption at the East and abroad continues heavy.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ½ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

LEAD.—Eastern advices report weak and dull markets. A New York exchange just to hand reports that "3.05c apparently the best price obtainable for common domestic in single carload lots, and few if any buyers for large quantities at over 3c for delivery this month or next."

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—There is nothing new to report.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | | | $1 40 |
| Drop, B and larger sizes, | " | " | 1 65 |
| Buck, Balls and Chilled, do. | " | " | 1 65 |

TIN.—The local market is slow for about all kinds. At the East pig is reported in fair movement, but foreign offerings keep the markets more or less easy. The production of tinplate in this country has grown to remarkable proportions. Several new plants have been added to the list, which brings the estimated output of American plate up to over 5,000,000 boxes. This large output is stopping the importation of foreign, owing to our manufacturing being able to get pig at the same price foreign manufacturers do, while steel and iron can be had for less money.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

ANTIMONY.—The market is steady at 9 cents as an outside figure. New York mail advices quote 7⅞@8c for Cookson's, 6⅞ for Hallett's and 6¾c for Japanese, from store.

QUICKSILVER.—We are informed that the export movement has been quite free so far this year.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| Distant points up north | 38 00 |
| West coast of Mexico, for export | 34 00 |

POWDER.—So far this year the demand shows an increase over that during the corresponding time in 1895.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " | 8½c |

BORAX.—The market is firm, and quoted as follows:

| | |
|---|---|
| Refined, in car lots | 6⅛ |
| Refined, in sacks | 5⅞ |
| Powdered, in car lots | 6⅛ |
| Concentrated, " | 5⅝ |

COAL.—Unseasonable weather has caused a large consumption for household purposes. The demand for steam coals also shows an increase. The market, while reported fairly active, is no higher. Some attention is being attracted to the coal fields in Alaska, which are reported by experts to be large and can be mined at a very small cost. This coal is used for both household and steam purposes.

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 8 50 |
| " in sacks | — — | @ | 9 50 |
| Cumberland | — — | @ | — — |

LUMBER.—There is a continued free export movement reported from all lumbering camps. The demand in this State is said to be increasing.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 16 00 | @ | — — |
| Pine | 13 00 | @ | 18 00 |
| Spruce | 25 00 | @ | 30 00 |

NAILS.—The market is reported strong, with good demand ruling.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Wire, carloads, basis per keg | | | $3 07½ |
| " jobbing, " " | | | 3 20 |
| Cut, carloads, " " | | | 2 82½ |
| " jobbing, " " | | | 2 95 |

IRON.—The consumption of pig in this city is the largest on record, owing to about all iron workers running fuller than for years past. The Eastern markets seem to be firming up. As reported by an Eastern exchange, this "is attributed to the props put under the market, first by coke manufacturers, later by the iron-ore men, and finally by the soft-steel men. That production is considerably in excess of requirements is evidenced by an increase in stocks of something over 50,000 tons last month. Stocks are now 718,244 tons, which are larger than at any time since March, 1894. One of the encouraging signs is moderately large railroad orders at the advanced price. The latest example of this was 12,500 tons of steel rails booked by Colorado Fuel & Iron from the Union Pacific.

Our market is quoted as follows:

| AMERICAN. | To Arrive. | Spot. |
|---|---|---|
| Sloso | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |
| **ENGLISH.** | | |
| Barrow | $21 00 | $23 50 |
| Gartsherrie | 21 50 | 23 50 |

## Mining Share Market.

SAN FRANCISCO, April 16, 1896.

The depression reported in last week's issue was continued throughout the past week. While prices did not go off so very much, yet the market was made to look sick, but not near so much as were dealers financially sick on the long side. The latter, who were on a margin, were either forced to sell all or else a part of their holdings, while many with cash shares sold. Where these shares drifted is an open question, but it is quite evident that few outside dealers have had the temerity to buy much in the face of assessments being collected and more to be levied. If they have gone into the hands of small pools it ought not to create surprise if the latter should "patch" up their differences temporarily for the purpose of promoting a small bull movement, so as to unload the bulk of, if not all, their long holdings. This can be done by bull points sedulously circulated, and also through interested write-ups in the press. While saying this, it must be admitted that the work which has been done, as well as that being done, justifies better prices for shares in several of the mines than they are selling at now. Taking the Comstock list as a whole, and it averages less in price than for fully three years, it is the history of the Comstock that when there is a low range of values it is only a question of time when the market receives support, and under stronger manipulations is made higher and more active. Even if a change for the better does set in, it is not at all unreasonable to affirm that the market will "run away." This opinion is grounded on the belief that large moneyed men are not operating, and until they come in openly and above board no pronounced bull movement can be brought about in the absence of two or more dividend paying mines, for moneyed outside men can not be drawn in as buyers without some assurance of getting part, if not all, of their investments back. Sentimental or large speculative trading seems to have seen its best day. It has been killed in the house of its friends, largely through the management of some of the mines, and also that after each small bull movement prices recede before the year passes to a lower range of values than that which ruled at when it was started upwards.

From the Comstock mines our advices, taken as a whole, are of more encouraging character, yet they do not justify investment buying, only trading for small turns, unless a large body of ore is developed in two or more mines. In the Alta group the only work reported continues in Alta, where they seem to be playing hide and seek with the Keystone ledge. The last official letter states they are saving a little ore, which will do to mill if a sufficient quantity is found and extracted. In the Gold Hill group Belcher has milled 336 tons of ore, returning gross over $7000; Seg. Belcher milled 114 tons, gross yield over $3100, while Confidence milled 107 tons and Overman 100 tons, but the returns have not as yet been reported. In the above mines a few tons continue to be raised, but the quantity is small and the grade only fair. The work in these mines is about the same as heretofore made public. In Crown Point the most active work is under way. In working to the east on the 800-foot level a two-foot vein was cut assaying from $15 to $25 a ton. These are the highest assays reported by this company for many a long month. On the 700-foot level a west drift has been started. A report is current that there is to be a contest for the control of this mine at the next annual election. On the 200-foot level in Confidence some exploiting work is being done. The joint west drift of Confidence, Challenge and Con. Imperial is being extended at the rate of a little over one foot a day. The material encountered seems to be slightly more favorable. The work in Alpha is still of a procrastinating character. The long west drift in Bullion and that in Gould & Curry are being extended as fast as possible, considering their length and the ground through which they are being run. In Potosi, Chollar and Savage active work is still the order. Judging from the official letters, every promising vein or indication is followed up in the hope of finding something of value. In prosecuting the work some ore is extracted and raised, but which is not enough to meet current expenses. In Hale & Norcross active work seems to have been inaugurated, but the better informed do not expect that a large body of ore will be developed, and, unless this is done, assessments will be in order, for, so far as we can learn, there has been no material reduction in expenses. Some ore, now said to be a little over 200 tons, is being milled. This was extracted by the former management. Best & Belcher advices state that the work is on the same levels heretofore reported. The work in Con. Virginia is being carried on on several levels, but that being done on the 1000-foot level attracts the most attention. The better-informed miners say that the work is not very far from the point where they expect to strike ore. These persons are quite hopeful that it will be found, but as to the quantity and grade they will not commit themselves. In Ophir and Mexican there is no essential change in the work. In the former they are working westward on the 1000-foot, probably to take advantage of any improvement that might be found in Con. Virginia on that level. The work in both Union and Sierra Nevada continues to attract attention. As yet the ore found is of no value for extracting; still better things are expected as the work is pushed forward. In Utah they have found one-dollar ore. Even this must be some comfort to shareholders, for it shows that something besides assessments can be run into. In Andes fair work is being done, but no change in material is reported in official letters.

On the Brunswick lode attention continues to be centered on the work in Occidental. Quite a body of $7-ore has been found on the 650-foot, but this will not pay until the Comstock tunnel can be utilized. If this ore is found to be of higher grade on the 750-foot level, it will cause work to be prosecuted still lower down. The work by the other companies on this lode is now largely of an exploitive character.

From the Bodie district there is nothing new reported officially. In Bodie active exploiting is still the order. The controversy over the control of Bulwer is, at this writing, still in court, but a decision is expected any day as to which contending party gained control at the last election. This decision is expected to rule on the relative value of proxies and certificates of stocks for voting purposes.

The following illustrates the changes of the week:

| MINES. | Apr. 9. | Apr. 16. |
|---|---|---|
| Alpha | $ 06 | $ 06 |
| Alta Consolidated | 09 | ..... |
| Andes | 27 | 26 |
| Belcher | 43 | 41 |
| Best & Belcher | 52 | 47 |
| Bodie | ..... | 40 |
| Bullion | ..... | 02 |
| Challenge | 24 | ..... |
| Chollar | 44 | 36 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 1 70 | 1 60 |
| Consolidated New York | ..... | ..... |
| Crown Point | 35 | 32 |
| Exchequer | ..... | ..... |
| Gould & Curry | 23 | ..... |
| Hale & Norcross | 1 30 | 1 25 |
| Justice | ..... | ..... |
| Mexican | ..... | 31 |
| Ophir | 1 10 | 85 |
| Overman | 11 | ..... |
| Potosi | 36 | 21 |
| Savage | ..... | ..... |
| Sierra Nevada | 60 | 56 |
| Union | 55 | 48 |
| Utah | 05 | ..... |
| Yellow Jacket | 34 | ..... |

## San Francisco Stock Board Sales.

SAN FRANCISCO, April 16, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 200 Alpha | 06 | 600 Ophir | 84 |
| 600 Best & Belcher | 46 | 550 Potosi | 21 |
| 700 Bodie | 40 | 100 Sierra Nevada | 55 |
| 60 C. C. & Va | 1 55 | 400 Union Con | 48 |
| 650 Occidental | 92 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 200 Ophir | 85 | 500 Sierra Nevada | 56 |
| 300 Mexican | 31 | 100 Bullion | 02 |
| 200 Best & Belcher | 47 | 50 Caledonia | 05 |
| 880 Con Cal & Va | 1 60 | 300 Occidental | 94 |
| 30 | 1 55 | 100 Andes | 26 |
| 100 Chollar | 36 | 50 Bulwer | 35 |
| 200 Hale & Norcross | 1 25 | 150 | 36 |
| 100 Crown Point | 32 | 400 | 37 |
| 600 Belcher | 41 | | |

## Rainfall and Temperature.

The following data for the week ending 5 A. M., April 15, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS:

| CALIFORNIA STATIONS. | Total Rainfall for the Week. | Total Seasonal Rainfall to Date. | Total Seasonal Rainfall Last Year to Same Date. | Average Seasonal Rainfall to Date. | Maximum Temperature for the Week. | Minimum Temperature for the Week. |
|---|---|---|---|---|---|---|
| Eureka | 5.06 | 42.13 | 39.61 | 28.48 | 58 | 34 |
| Red Bluff | .28 | 17.19 | 27.87 | 22.58 | 68 | 38 |
| Sacramento | .52 | * | 23.98 | 14.60 | * | 36 |
| San Franc'co | .42 | 17.14 | 23.97 | 21.62 | 60 | 40 |
| Fresno | .60 | 5.99 | 15.45 | 8.31 | 72 | 38 |
| S. L. Obispo | .39 | 15.83 | 24.96 | * | 68 | 36 |
| Los Angeles | T | 8.88 | 15.56 | 16.48 | 72 | 40 |
| San Diego | 1.36 | 5.80 | 11.90 | 5.92 | 68 | 44 |
| Yuma | .... | .88 | 3.01 | 3.00 | 90 | 42 |

* Indicates no record.

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alpha Con M & M Co, Nev | 16 | 5c | Apr 7. | May 13. June 2. | C E Elliot, 309 Montgomery |
| Belcher S M Co, Nev | 52 | 25c | Mar 3. | Apr 7. Apr 28. | C L Perkins, Mills Building |
| Bodie Con M Co, Cal | 19 | 15c | Mar 7. | Apr 10. May 4. | M E Willis, 309 Montgomery |
| Bullion M Co, Nev | 47 | 10c | Mar 18. | Apr 22. May 14. | R R Grayson, 331 Pine |
| Caledonia S M Co, Nev | 46 | 5c | Apr 1. | May 6. May 27. | A S Croth, 414 California |
| Challenge Con M Co, Nev | 21 | 5c | Mar 27. | Apr 29. May 20 | C L McCoy, Mills Building |
| Con Cal & Va M Co, Nev | 6 | 30c | Mar 4. | Apr 8. Apr 28. | A W Havens, 309 Montgomery |
| Crown Point G & S M Co, Nv | 67 | 20c | Apr 2. | May 6. May 26. | J Newlands, Mills Building |
| Gould & Curry S M Co, Nev | 78 | 15c | Mar 25. | Apr 28. May 20. | A K Durbrow, 309 Montgomery |
| Inyo Marble Co, Cal | 28 | 10c | Mar 30. | May 4. June 4. | M A Cahn, Phelan Bldg |
| Lady Emma M Co, Cal | 1 | 15c | Feb 26. | Apr 6. Apr 27. | W W Boughton, Mills Building |
| Occidental Con M Co, Nev | 22 | 10c | Apr 2. | May 6. May 28. | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 2 | 3c | Apr 3. | May 10. May 26. | F L Olmstead, 315 Montgomery |
| Ophir S M Co, Nev | 68 | 25c | Mar 17. | Apr 20. May 11. | E B Holmes, 309 Montgomery |
| Potosi M Co, Nev | 45 | 30c | Apr 9. | May 14. June 4. | C E Elliot, 309 Montgomery |
| Summit G M Co, Cal | 14 | 5c | Mar 17. | Apr 20. May 12. | J E Jacobus, 309 Montgomery |
| Utah Con M Co, Nev | 22 | 5c | Apr 3. | May 6 May 27. | A W Havens, 309 Montgomery |

## ANNUAL MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Jamison M Co, Cal | Sam W Cheyney, 120 Sutter St | May 4 |

## ANNUAL MEETING.

The regular annual meeting of the stockholders of the Jamison Mining Company will be held at the office of the company, Rooms 50 and 54, No. 120 Sutter street, San Francisco, California, on MONDAY, the 4th day of May, 1896, at the hour of 2 P. M., for the purpose of electing a Board of Directors to serve for the ensuing year and the transaction of such other business as may come before the meeting. SAM W. CHEYNEY, Secretary.

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# Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, Virginia Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Trustees held on the twenty-fifth day of March, 1896, an assessment (No. 78) of Fifteen cents (15c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary at the office of the company, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-eighth (28th) day of April, 1896, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on, WEDNESDAY, the 20th day of May, 1896, to pay the delinquent assessment, together with the cost of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DURROW, Secretary.

Office, Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California.

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OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 2d day of April, 1896, an assessment (No. 22) of ten cents (10c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of May, 1896, will be delinquent and advertised for sale at public auction, and unless payment is made before will be sold on THURSDAY the 28th day of May, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURROW, Secretary.

Office, Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

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CHALLENGE CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Gold Hill, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 27th day of March, 1896, an assessment (No. 21) of Five Cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 35, third floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 29th day of April, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on WEDNESDAY, the 20th day of May, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. McCOY, Secretary.

Office, Room 35, third floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

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INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business, San Francisco, California. Location of Works, Inyo, Inyo county, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 30th day of March, 1896, an assessment (No. 28) of ten (10c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 323, Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 4th day of May, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before will be sold on THURSDAY, the 4th day of June, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

M. A. CAHN, Secretary.

Office, Room 323, 5th Floor, Phelan Building, San Francisco, California.

# DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice. There are delinquent upon the following described stock on account of assessment (No. 3) levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| Chas. A. Moore | 102 | 7,222 | $361 10 |
| Chas. A. Moore Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6,000 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore Trustee | 150 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 109 | 6,665 | 333 25 |
| N. L. Bell Trustee | 128 | 250 | 12 50 |
| A. U. Rugg | 116 | 1,000 | 50 00 |
| A. U. Rugg | 117 | 1,000 | 50 00 |
| Louise V. Rugg Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg Trustee | 153 | 1,000 | 50 00 |
| Louise V. Rugg Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 109 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 141 | 1,665 | 83 25 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 133 | 3,195 | 159 75 |
| E. C. Godfrey | 134 | 4,000 | 200 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Nos. 37 and 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

## POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until SATURDAY, May 9, 1896, at the hour of 2 P. M., at the office of the Company, Room 38 Crocker Building, San Francisco, Cal.

E. C. GODFREY, Secretary.

# TRUSTEE'S SALE

## IN SIERRA COUNTY.

On TUESDAY, APRIL 21st, 1896, at one o'clock P. M., at the front door of the Court House in Downieville, Sierra county, California, I will sell at public auction, to the highest bidder, for cash, all of that certain mining property, mills, machinery, boarding houses, tools, water rights, dams, etc., of the well known Young America mine, which consists of four contiguous patented claims and other locations; and also about 150,000 tons of tailings stored near the mine, and rich in free gold.

This sale is made by me as Trustee, and to make the sum of about $12,000.

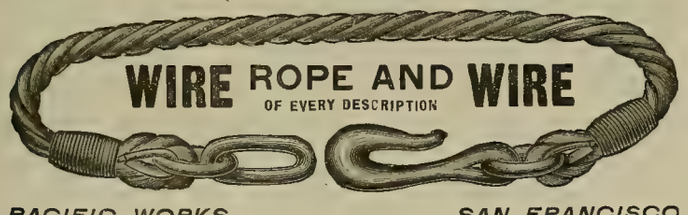
Full information concerning the property and a full description thereof will be furnished on application by letter, or otherwise, to me at 230 California street, San Francisco, or to my Attorney in said matter, Frank R. Wehe, whose address is Downieville, Cal.

JOHN BERMINGHAM, Trustee.

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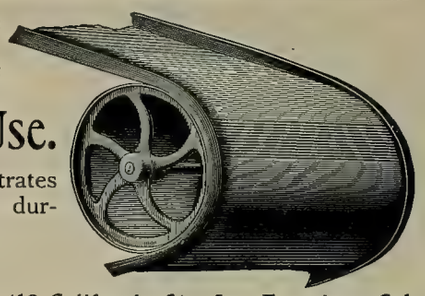
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SAN FRANCISCO, SATURDAY, APRIL 25, 1896.

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## River Reclamation in California.

The 150,000 square miles of California would seem to make unnecessary the reclamation of any part of it, but gold miners who can afford to buy fruit if allowed to work their mines create such a demand in territory contiguous to their claims that great tracts of fertile bottoms in the Sacramento river are being put in condition for profitable horticulture. At Grand Island, as elsewhere, this work is being done on a large scale.

There has been also in recent years an improvement in pumping machinery. It is two-thirds cheaper than it was. All the pumping plants are now placed on concrete foundations, so as to prevent that oscillation which is so destructive to the life of machinery.

The pumping plant at Ryde Landing on Grand Island, and several other pumping plants in the various reclamation districts along the Sacramento river, have been put in by the Byron Jackson Machine Works of San Francisco. The test of the pumping plant at Ryde Landing shows the coal consumption to be 2.14 pounds per indicated horse power per hour. Ratio of actual work performed to one horse power of engine, 59 per cent. This is equal to pumping one acre foot of water for a ten-foot lift (that is, water enough to cover one acre one foot deep) with 37 pounds of average Green River coal, which, at $6.50 per ton, makes the cost for fuel per acre 11 cents.

This firm has manufactured some very large irrigating pumps all over the State. There are 17,000 acres in Sacramento county on Grand Island, and these were being reclaimed in 1894 according to the modern method. Some very extensive works were put in at Ryde's Landing in the same year, and a dredge and a ditcher were employed in cutting a drainage ditch extending all around the island, half a mile from the levee. This ditch is eighteen miles long, twenty-five feet wide and six feet deep. The pumping plant placed in concrete in 1894 at Ryde's Landing, by the Byron Jackson Machine Works of San Francisco, has a guaranteed capacity of 30,000 gallons, with a maximum of from 40,000 to 50,000 gallons per minute. The seepage water is conveyed to the river in 44-inch pipes. The engine used in working the pumps is a cross-compound condensing engine, guaranteed to run on two and a half pounds of coal per horse power per hour. It maintains a steady vacuum of twenty-six inches.



INTERIOR VIEW, BYRON JACKSON 200 H. P. PUMPING WORKS, GRAND ISLAND.



40,000 GALLON PUMPING PLANT, RYDE'S LANDING, GRAND ISLAND, SACRAMENTO RIVER.

The thorough reclamation of land is an expensive undertaking, but the cost is nothing when compared to the value added to the land by reclamation. Thus, it cost $25 per acre to reclaim the land on the Tyler Island; but after reclamation it is valued (with an eye to the county assessor) at $100 per acre for bare land and $500 per acre for land planted to fruit. But none of the orchards are for sale, and this suggestive fact is the best criterion of its value. The cost of reclaiming land on the river generally, taking in the good and bad places, ranges from $25 to $50 per acre.

The pumping plant on Randall Island is of 10,000 gallons capacity per minute; that on Merritt's Island, 30,000 gallons; Senator Johnston's, 15,000 gallons; and the district two and one-half miles below Isleton has a pumping plant of 20,000 gallons capacity. The pumping plant on Tyler Island is of a capacity equal to that of the largest.

In the Brannan Island reclamation district an assessment of $5 an acre was levied for five years to maintain the levees. The work in the spring of 1894 was nearly complete at a cost of $3 per acre, and the result is a strong levee four feet higher than the flood-water mark of 1890, the highest high-water mark ever noted on the river at that point. The seepage on this island is so slight that no pumping works are required.

The system of building high levees, extensive drainage ditches and constructing plants to pump away the seepage water to reclaim the rich bottoms along the Sacramento river subject to overflow, has proved to be eminently successful, and it is, therefore, expected that by the year 1900, at the furthest, there will not remain an acre of unreclaimed land in Sacramento county. There were in the year 1894 about 80,000 acres of such rich unreclaimed lands.

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The U. S. Circuit Court of Appeals has overruled the State Supreme Court in the litigation between the Waterloo M. Co. and the Doe estate. The former located a claim in Calico district, San Bernardino Co., but did not immediately stake it out. The latter simultaneously filed on the same location and began monumenting. The Waterloo representative did likewise and finished his monuments twenty days after his location. The Doe estate claimed that the Waterloo people had failed to perfect title; the latter claimed that they were entitled to a reasonable time. The Doe estate held the ground; the Waterloo Company brought suit to dispossess. They were beaten and appealed to the Supreme Court, which confirmed the lower court's decision. The U. S. Court now decides in their favor, holding that twenty days was "a reasonable time."

# MINING AND SCIENTIFIC PRESS.

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J. F. HALLORAN.....General Manager

**San Francisco, April 25, 1896.**


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## A Revival of River Mining.

One of the noticeable effects of the growing interest in gold mining is the renewal of mining on a large scale in the beds and bars of the rivers in the mining counties. For over twenty-five years past these deposits have been an insignificant source of gold yield. It has been considered that they were worked out in the early mining days, and since then they have been abandoned to the Chinese. The more thorough search now being made for gold is disproving this supposition, and operations by white men are increasing in number and extent. Considerable sections of river bed were never mined at all by the old miners, having been buried beneath the tailings from hydraulic and drift mines.

These places are now available by reason of the disappearance of the tailings down stream, exposing the original stream bed gravels. At other points improved mining methods and facilities are making it possible to mine ground successfully that could not be profitably exploited in the early mining days. The tailings from hydraulic and drift mines have restored a portion at least of the gold contents in sections of the rivers that were thoroughly worked out in early days. These can now be remined at a profit.

New operations by white men are particularly noticeable on the American and Bear rivers. On the latter stream, where it leaves the foothills above Wheatland, a very extensive deposit of rich channel gravel has been developed buried beneath the tailing deposits. It covers several hundred acres and is mined by drifting from shafts about 100 feet in depth. The water to be pumped is easily handled, and so rich has the gravel prospected in the preliminary exploration that it will be mined on a large scale this summer. On the American river the new activity is even more marked.

Below Michigan Bluff and Forest Hill, in the Middle Fork, several claims will be worked this year that have been untouched for years. Between Auburn and Folsom several new operations and reopenings of old claims are being made. The North Fork ditch, built in the '50s for the mines of Rattlesnake Bar, has been cleaned and restored to its original capacity during the past winter; and coincident with its restoration, the old mining activity is being developed. The increased water supply under pressure has made it possible to use power machinery, and several hydraulic elevators are to be put in to work claims that could not otherwise be mined. One of these new enterprises at Horseshoe Bar will use 800 inches of water for pumping by elevators, and the mining ground of proved value in the claim, it is estimated, will require ten years to mine out. Several other claims will use power and be mined on a large scale. Some idea of the significance of these operations can be realized from their probable annual output, which will be over $150,000—all of this from a section of river that has not yielded that amount as the aggregate of the last twenty years of mining. Some of the owners of fruit farms bordering on the river have successfully mined the tailings in the river by sluicing. The yield per hand employed has averaged $1.50 a day—a return considerably above that of the wages of farm labor.

These operations are especially desirable from a mining standpoint in that they are in a new field. It has been considered that there were small or no possibilities of profit in the reopening of the supposed worked-out shallow placers. The success of these enterprises will prove an incentive to a more careful examination of this class of deposits than they have yet received from the new blood and money coming into gold mining.

## A Final Decision.

This week the U. S. Supreme Court denied the petition of the Providence Mining Co., of Nevada Co., Cal., praying for a writ of certiorari in the case on appeal between that company and the Champion Mining Co. The case has attracted considerable attention by reason of the general application of the issues involved.

On August 13, 1894, in this city, in the U. S. Circuit Court, Judge Hawley made a decision limiting the Providence rights on the contact ledge to a bounding plane drawn through the original end lines of the Providence patent, being the line marked on the several diagrams fixed by the court. This decision, together with explanatory illustrations was published in full in this paper in its issue of Aug. 25, 1894. From this decision the Providence Company perfected an appeal to the U. S. Circuit Court of Appeals, which latter tribunal on Feb. 4, 1896, practically affirmed Judge Hawley's decision, Judge Ross delivering the opinion of the Appellate Court. The Providence Company then applied to the Supreme Court of the United States for a writ of certiorari to have that tribunal review the decision of the U. S. Circuit Court of Appeals, which the Supreme Court has refused to do. The denial of this application results in a practical affirmance of Judge Hawley's original decision, and fixes permanently the end line plane bounding the rights of the two companies on the contact lode approximately as contended for by the Champion.

The main principle decided by this case, of general interest to the mining world, may be epitomized by a quotation from Judge Hawley's decision, which stands as the law of the case:

"When the end lines of a mining location are once fixed, they bound the extra lateral rights to all the lodes that are thereafter found within the surface lines of the location.

"It necessarily follows that the end lines of the Providence survey must be considered by the court as the end lines of any and all other lodes or veins which lie 'inside of such surface lines.' Otherwise endless confusion would arise in the construction of the statute. End lines would have to be constructed in different directions if the separate lodes or veins found within the surface lines did not run parallel with each other, and the result would be that these lines extended might give to the owners of the claims a greater length along the lode as it extended downward than they had upon the surface.

"If the same end lines which bound the extra lateral rights of the Providence surface survey apply to the contact vein and to all other veins, if any are hereafter found, then no such difficulty can arise. This is the rule that applies to all locations made after the act of 1872, and it ought not to be presumed that Congress—by its grant to prior locators—intended to give greater rights to them than were given and granted to subsequent locators under the same act."

In a former decision of the U. S. Supreme Court in the case of the Iron S. M. Co. vs. Elgin M. Co., it was decided that the same end lines bound all extra lateral rights as to all veins or lodes within the surface boundaries of the claim. In delivering that opinion Justice Field, speaking of the rights of locators of mining ground to follow the lode in its depth, said: "It often happens that the top or apex of more than one vein lies within surface lines, and the veins may have different courses and dips, yet his right to follow them outside of the side lines of the location must be bound by planes drawn vertically through the same end lines. The planes of the end lines cannot be drawn at right angle to the courses of all the veins if they are not identical."

## A Gratifying Communication.

The following is published verbatim. It is from one of the best known miners in California and is suggestive. Apart from the gratifying nature of his remarks as applied to this paper, the letter shows that earnest personal effort will overcome the most adverse conditions. The writer of the following prepared himself, so that when the opportunity offered he was able to go ahead:

TO THE EDITOR:—Noticing an article a short time ago in the MINING AND SCIENTIFIC PRESS in regard to the usefulness of the California State Mining Bureau, etc., I wish to add my experience in relation to it and also to state that there is another very important factor of usefulness and value to the California miner. Quite a number of years ago I was glad to get a job in the mines at "pushing car," breaking rock or any work such as a common laborer could do. Accidentally I ran across a copy of the MINING AND SCIENTIFIC PRESS containing an editorial describing the great possibilities of young men who would enter the field of mining, even as common miners. I became interested; saw miners all around me, mostly foreigners, who had good positions, receiving good wages and salaries, and some of whom could hardly write their names; but they were excellent miners.

I determined to see if I could not get out of the rut I was then in and do better. I had had considerable experience, but thought opportunities was what I needed most; so I subscribed for the MINING AND SCIENTIFIC PRESS and watched for the opportunities. Through the PRESS I learned of the State Mining Bureau, and, obtaining a copy of its eighth annual report, eagerly devoured its contents.

The opportunity soon came along in the shape of an offer to take charge of a certain department of mining, in which I never had had a day's experience. However, I accepted the offer, and, with the aid of the eighth annual report, carried it through successfully. From that day on I have advanced step by step, until to-day I am superintendent of one of the largest mines in the State.

In all of my experience, which has been varied, I have realized that there is always something to learn, and for one to learn up-to-date mines he must study and read up on the subject continually, and by taking the MINING AND SCIENTIFIC PRESS and following its advice he can get there.

AN AMERICAN MINER.

A good many such letters are weekly received and are gratefully appreciated. Occasionally criticisms are made on acts of commission or omission, the course of the paper, etc., which are also gladly noted and are of value. A paper usually gets praise or blame, just as it merits either, and the judicious use of both is always acceptable.

The reference "American Miner" makes to the State Mining Bureau is a just individual tribute to a State institution that, rightly managed, is of considerable value to the commonwealth.

A BILL which provides for the establishment of a Department of Commerce and Manufactures was introduced in the United States Senate on March 9th by Senator Frye and was referred to the Committee on Commerce, in whose hands it now rests. This measure is one of great importance to the manufacturing and commercial interests of this country, and there is need for vigorous and immediate support of the bill by those whose interests it directly affects. To secure any action by the committee or to obtain even a hearing upon the bill, it must be demonstrated to the members of the committee that the business men of the country are in favor of such legislation. Efforts have been made on several occasions during the past ten years to secure the enactment of laws providing for the establishment of a department in the Federal Government especially devoted to the commercial and industrial interests of the country. Lack of general appreciation of the necessity for such a department and the absence of organized support have caused the failure of such movements. With the extraordinary rapid growth in the manufacturing interests of the country there has come a broader understanding of the importance of the suggested new Government department and a wider recognition of the necessity for its establishment. The crowding of additional functions upon the existing departments from time to time has also served to emphasize the need for measures of relief for the established executive branches of the Government. At no time, however, has public interest in the creation of a Department of Manufactures and Commerce been so strongly marked and so emphatically expressed as at present. This is due to the active support which is being given to the present move-

ment by several of the most influential organizations in the United States, which have taken the matter up simultaneously and with the determination to urge upon the public and upon Congress the importance of the proposed new department. There are three, and only three, creators of wealth in this State—the miners, the farmers and the manufacturers. The farmers have a Cabinet department; the miners and manufacturers should each have a similar representation in the councils of the nation. Every dictate of wise national policy favors such extension of Cabinet representation. California is directly interested in this measure, and if our prominent miners and manufacturers will communicate with Senator Frye in this matter they can aid in securing such requisite recognition.

## Concentrates.

THE week's rains have been just what the hydraulic miner wanted.

TRINITY COUNTY has recently made up nearly $200 for the California State Miners' Association.

THE Comstock is one of the very few mining towns where a miner's day's wages buys a barrel of flour.

OVER 2500 mining claims have been recorded in Camp Floyd district, Utah, in the past eighteen months.

THE Salt Lake *Tribune* is twenty-five years old: it is one of the newspapers essential to thinking men.

THE Los Angeles Mining Exchange has started with one hundred charter members and flattering prospects.

THE February output of gold in the Transvaal, S. A., is officially declared by the Chamber of Mines there to be 167,018 ounces.

BUYERS of mining stocks would always do well to first find out if the title to the mine is legally vested in the corporation issuing it.

IN '95 California and Colorado produced over $30,000,000 in gold, about as much as the entire United States yielded five years before.

TWENTY years ago to-day, April 25, 1876, Ophir sold for $58.25, Gould & Curry $17.50, California $79, Con. Virginia $76.50, Chollar $101 and Bullion $50.25 per share.

ANOTHER dreadful explosion of giant powder occurred in Montana last Saturday, this time in the Broadwater mine at Neihart, thirty sticks exploding, killing seven miners and wounding six others.

THE miners of Florence district, Idaho, have decided unanimously upon the location of a new town a quarter of a mile south of the old town of Florence on Summit Flat. The new town is to be called "New Florence."

A YEAR ago the statement was made herein that when the value of the gold yield of the world for '95 was made up, the United States, as in the past, would have first place. It is now evident that it will hold that pre-eminence in '96.

THE Redstone quartz mine, Blue Canyon, Placer county, has been sold to a Philadelphia company who will add five stamps and two concentrators to the mill, and talk about putting in twenty more stamps about a quarter of a mile lower down the river.

NEWS of grave import comes from Bulwayo, South Africa, of the advancing Matabeles on the English and American miners there. Several Shasta county men are in that region: among others, W. St. Auburn, J. D. Cassely, Jno. Shehe and Thos. Burke.

LINA is the name of the new town which has just been organized on the Nevada side of State Line district in Lincoln county. It is but a few hundred feet on the Nevada side, but affords the best location for a townsite to be found thereabouts.

COL. CALEB DORSEY was shot and instantly killed by his mining partner, John T. Newcomer, at Italian Bar, twelve miles from Columbia, Tuolumne Co., last Tuesday. It was a personal quarrel between two fiery old friends, with the usual tragic result.

CONTRARY to supposition, the old Mayflower, one of Placer's great producers, is far from being exhausted. Felix Chappellet says that recent developments from an upraise on the south side of the main tunnel ensures 8,000 feet of new ground for the company.

DISMAL tales come from the icy north of misery and destitution among unprovided men who went to search for gold in Alaska. This paper has repeatedly pointed out the folly of entering that country unless fully prepared to meet hardship, privation and probable disappointment.

THE mining clause of the British Columbia Assessment Bill as now amended reads 1 per cent on assessed value. This to be assessed on ore or mineral bearing substances at the mine as determined in case of dispute by a smelter reduction or refinery returns. No ore is to be taxed unless removed.

G. W. WILLIAMS of Boise, Idaho, proposes to utilize superheated steam in hydraulic mining on the Snake river, and expects, by passing the earth and sand through the steam, to save the fine gold without stamps, grinding or mercury. Efforts in that direction have hitherto been unsuccessful.

AUSTRALASIA shows a gold yield for '95 aggregating $42,647,271, an increase of $2,874,635 over '94. Since the discovery of gold in New South Wales that country has yielded an aggregate value in gold of $205,947,326. Since the discovery of gold in California, this State to January 1st, '96, has yielded a value in gold of $1,269,115,604.

A LEADING mining engineer who modestly requests that his name be withheld, in renewing his subscription takes occasion to say that "every mining man is proud of the appearance of the MINING AND SCIENTIFIC PRESS and the valuable place it fills." Commendation from those whose good opinion is worth having is one of the strongest incentives to deserve and retain it.

RECENTLY W. S. Stratton, the Colorado millionaire mine owner, bought 100,000 shares of stock in a Cripple Creek company with a $2,000,000 capitalization—the Little Puck G. M. Co.—with this agreed stipulation: "You promise me never to sell mining stock to any person who is not amply able to lose the money he invests, in case the mining adventure should turn out adversely, without distressing him." The stipulation does him credit, but, it is possible, possessed of such sentiments he at times feels lonesome.

SPOKANE, WASH., calls for a reconsideration of the ruling which requires the payment of duty on the gross weight of ore shipments in which the value of the lead exceeds the value of the silver, claiming that the effect of this ruling will not be to keep foreign lead out of the country, but will compel the mine owners of the Kootenay country to build smelters on the British side of the boundary.

THE amount of pure silver in the American silver dollar has not changed. It remains at 371.25 grains, but the number of grains of pure gold have fluctuated. From 1792 to 1837 there were 24.75 grains of pure gold in a dollar. From 1834 to 1837 the number of grains were cut down to 23.20. From 1837 to the present time the mint puts 23.32 grains of pure gold in a dollar. In every $2,000 of silver coined there is added one pound of copper.

IN these days of new ten-million-dollar mining incorporations, with "fully paid" stock, that term "fully paid" is most of the time a fiction that has its only justification for existence in a legal technicality of sufficient elasticity to conveniently cover what is ofttimes a manifest fraud. The merit of a mining proposition is evidently in inverse ratio to the bombast of the prospectus, and under present circumstances the "fully paid stock" announcement requires scrutiny on the part of possible investors.

A WASHINGTON DISPATCH says Senator White is inquiring into the speedy patenting to the railroads of 260,000 acres of land in the Redding district, and, if the facts are as claimed, it may cause trouble for the Land Office. The charge is made that at once, upon the expiration of its sixty days' notice, the agricultural claimant telegraphed to Washington for a patent, and one was issued without waiting for the proper papers by mail. The haste made, it is believed, was to frustrate the possible passage of the Mineral Land bill.

ACCORDING to recent statistics the aggregate mineral and metal production of the United States for 1895 was $628,689,505, an increase over 1894 of $84,226,503, or 15½ per cent. The gold yield was 2,205,612 fine ounces, with a total value of $46,830,200; the increase over 1894 was $7,068,995, and keeps the United States in the front rank as a producer. Silver was 46,331,235 ounces, with a value at present figures of $30,254,296, a decrease of 3,515,640 ounces from 1894. Pig-iron production amounted to 9,446,308 long tons, giving the United States first position as a producer.

MEMBERS of the U. S. Debris Commission, have been making recent extended observations through northern and central California. At last Monday's meeting the Liberty Hill Mining Co. of Nevada county, and the Polar Star Mining Co. of Placer county, were authorized to raise the dam in the Bear river, in the vicinity of Dutch Flat, twenty-five feet. The original appropriation for the maintenance of the commission is exhausted, but the appropriation bill now going through Congress had, last Monday, an addition made to it of $15,000 for current expenses of the commission, which will be available after July 1st.

A TELEGRAM from Tirey L. Ford says that the outlook is good for favorable action on the Mineral Land bill, which still awaits the pleasure of the Senate. U. S. Senator Stewart of Nevada and U. S. Senator Mitchell of Oregon, for personal and powerful reasons are opposed to it, and, being from neighboring States, their opposition has more influence than if the reasons were as well understood in Washington as they are here. Since the Sacramento *Record-Union* in its issue of the 2nd. inst., made its adroit argument in favor of the bill as a corporation measure, the true friends of the bill have been more anxious than ever as to its final fate.

THE Pelatan-Clerici process of extracting gold and silver is the invention of Louis Peletan and Fabeizio Clerici. It is the property of the General Gold Extracting Company, limited, of London. The treatment consists of a single operation. A vat, the bottom of which is composed of amalgamated copper plates, and in which is a metallic stirrer, is filled with crushed ore, tailings or slimes, mixed with a solution of cyanide of potassium, common salt and other reagents. The stirrer is then set in operation, thoroughly mixing the sludge, through which an electric current is passed. The particles of metal are consequently kept in constant connection with the cyanide and the gold and silver dissolved and afterward electro-deposited on the amalgamated plates.

A SUMMARY of the mineral production of Canada during 1895 has been issued by the dominion geological survey. The returns, several of which are estimated, show a total of $22,500,000, the largest previous return being $20,900,000 in 1894. Coal has still the leading position, the output being $7,774,178, gold ranking second with an output of $1,910,921. Following the lead of gold the metals are: Nickel, $1,360,984; silver, $1,158,633; copper, $949,229; lead, $749,966; iron ore, $238,070; and mercury, $2,343. Petroleum ranks next to coal in the non-metallic products, the output being $1,201,184. In the same class the other leading products are: Natural gas, $423,032; asbestos, $368,175; gypsum, $202,608; salt, $180,417; coke, $143,047; mineral water, $111,048; and pyrites, $102,594.

IT may not surprise old miners, says the *Review*, to learn that gold has been found in paying quantities in the Peace river country far north tributaries of that stream produce every year large sums of placer gold. John Cameron, a merchant at Edmonton, Saskatchewan, says every year the old miners start out with a supply of provisions and come back in the fall with evidence of good placers. Gold has been found on the McKenzie river under the Arctic circle. In fact, gold seems to have been distributed all over the northwest from Rainy lake to Alaska, and now when it is said that discoveries have been made in the Birch hills, near Prince Albert, Saskatchewan, it occasions no surprise. For many years gold has been taken from the bars of the Saskatchewan and its tributaries. But no quartz has been found in the Rocky mountains from whence this stream takes its course.

AT A special meeting of the Executive Committee of the California Miners' Association in the rooms of the Union League Club in this city last Wednesday evening, Mr. Chas. G. Yale was the deserving recipent of a series of resolutions engrossed and mounted, expressive of the just appreciation in which his work for the association is held by that organization. The resolutions were unanimously voted by the association at its annual meeting in Pioneer Hall, last November, and were last Wednesday presented to Mr. Yale by Jno. M. Wright, who in his presentation speech, paid due tribute to Mr. Yale's zeal and efficiency in forwarding the principles and purposes of the organization, and in giving his services at all times for the advancement of its interests. Mr. Yale's modest response disclaiming having done more than what he felt was his duty in the matter was fittingly supplemented by the remarks of President Neff and others who bore witness to the value of his services from the incipiency of the organization.

THOS. MEIN, general manager of the Robinson Gold Mining Co., Johannesburg, South Africa, furnishes a voluminous and detailed report of the workings and condition of that mine, the expenses, etc., for the year ending Dec. 31, '95. Fifty new stamps were added during the year, which cost $205,000. During the year there were mined and milled 140,655 tons of ore, yielding a value from mill of £431,666, from concentrates by chlorination £61,723, and from tailings by cyanide process (75,825 tons) £72,553, a total yield of 157,208 ounces, worth £565,942. Compared with the figures for '94, there was a falling off of 4 dwts. 14 grs. per ton in yield and 16s 11d in value. Milling expenses were 3s 10¼d per ton; mining and milling, 19s 1½d per ton in '95; £1 1s 8½d in '94. During the year 247 Europeans were employed and 1332 Kaffirs, the average weekly wage being 14s 6d, exclusive of food. The output for February, '96, is also given as follows: Stamps at work, 120; running time, 25½ days; tons crushed, 14,075 tons; tons per stamp per diem, 4.6; gold produced, 8866 ounces; gold from concentrates by chlorination, 1038 ounces; bullion from tailings, cyanide process, 1714 ounces; bullion from slimes, 1317 ounces; total, 12,935 ounces. Capt. Mein is about to return and is expected at his home in Oakland next month.

A BOSTON concern is advertising "The Old Glory Gold Mining & Smelting Company," and claims to own property in Idaho. It is quite a scheme: "Authorized capital $5,000,000; controls six great proved ore deposits; sample ore assayed up to $36,000 in gold per ton, 4,000 ounces in silver and 20 per cent copper; the company is formed to do a great mining and smelting business—not simply sell stock; stock is all held in trust for the benefit of the treasury; one of the mines produced ore assaying $36,000 per ton in gold, and tons of ore from it have been sold at $3000 per ton. A Boston banker visited this mine, studied it with all a business man's sagacity for six months, saw its wonderful wealth, talked with men who worked in it. He says: 'I believe it is worth $10,000,000 right now.' A near neighbor on the same belt (ten miles from there) has produced $10,000,000 and we never heard of a mining man who was familiar with both properties that did not claim our property to be much superior. The Alpine group shows a great ore body sixty feet thick, rich in gold, silver and copper. The ore assays from $15 to $600 per ton, specimens run into the thousands." These people seem to have a good thing—too good to touch. Still such games must find players or they wouldn't run.

DISCOURSING of Mercur, Utah's mineral-bearing zones, G. H. Robinson says that the rock may be characterized as limestone, stratified and more or less impure, interstratified with clay slates, as the Oquirrh mountains are only a range of high hills in the midst of a desert country. This range was formerly sea-bottom; subsequent upheavals caused the rock to form a great curve or arch, with its major access north and south, and the subsequent readjustment of rock masses has caused many faults and folds in the strata. In the vicinity of the Mercur mine the rock strata now lie nearly flat, with a general strike of north 45 degrees west, magnetic, dipping toward the northeast and having an inclination of 17 to 30 degrees under the horizon. The great longitudinal faults of the country are formed in lines approximately north and south, which is evidenced by the escarpment exposure and precipitous slopes on the west faces of the hills, with long, easy slopes leading to the east. Such a fault appears to the east of Mercur and the Golden Gate properties, and is marked upon the surface by a general depression. The gold-bearing strata will in all probability terminate abruptly on the dip in this fault, and if found farther east will be at some different elevation, probably at a higher altitude. The strata themselves before reaching the fault will be found upon a constantly increasing dip until it will terminate in a vertical fissure or faulting plane.

AS HERETOFORE EXPLAINED in detail, the pending River and Harbor bill in Congress makes appropriation of $250,000 jointly with similar amount already appropriated for the same purpose by the State of California. After considerable telegraphing this week and last week between San Francisco and the national Capitol and congressional committee discussion, the following paragraph has been inserted in the House bill in place of the original one: "For the construction of restraining barriers for the protection of the Sacramento and Feather rivers in California, $250,000; such restraining barriers to be constructed under the direction of the Secretary of War in accordance with the recommendation of the California Debris Commission, as contained in executive document No. 16 (H. R.), Fifty-third Congress, second session, pursuant to the provisions of and for the purpose set forth in section 25 of the Act of Congress of the United States, entitled 'An Act to create the California Debris Commission and regulate hydraulic mining in the State of California,' approved March 1, 1893: Provided, That the Treasurer of the United States be and he is hereby authorized to receive from the State of California, through the Debris Commissioners of that State, or other officer thereunto duly authorized, any and all sums that have been or may hereafter be appropriated by said State for the purpose set forth, and said sums, when so received, are hereby appropriated for the purposes above named, to be expended in the manner above provided." Tirey L. Ford, who has had charge of the interests of the miners in the matter, says that the changes from the wording of the appropriation as it passed the House were made that there might be no question as to what use was to be made of the contemplated restraining barriers, specific reference being made to the recommendation of engineers composing the California Debris Commission, as contained in their report for the year 1893. All reference to Sections 23 and 24 of the Caminetti Act is stricken out, and a reference to Section 25 only left, that section being based upon the proposition of protection of the Sacramento and San Joaquin rivers' systems. All reference to hydraulic mining is thus eliminated and the rights of the hydraulic miner with reference to the proposed works left for future consideration and determination. Another change relates to the proviso contained in the item and is intended to make the Federal Act more in harmony with the State Act. It is believed that the changes made in the Senate Committee in the item will be agreed to by the House and become law.

# CALIFORNIA MINES AND MINERS.

## Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

"I want a list of the going mines of the State." "Can you send me the names of the mine superintendents in the State?" "I would give $20 for the address of some of the mine owners." These are a sample of letters and verbal requests daily received in this office. For some time the MINING AND SCIENTIFIC PRESS has been trying to get something like an accurate list—an approximate answer to the multitude of requests therefor. The difficulty of such a task is probably best understood by those who have tried it. Finally, after many months, the following has been prepared. It is by no means perfect, and accuracy is not claimed for it; names are probably in the list that are incorrect; other names which should appear do not; yet, on the whole, it is believed that it has sufficient merit and value to warrant publication herein.

The manner of preparation was as follows: Every local mention of a mine, its owner, superintendent or agent, was clipped from the local paper containing it, lists were prepared of the various counties and those names placed therein, personal knowledge of mines and miners was utilized, recent official records in the office of the State Mining Bureau were carefully copied, and from these and other sources lists of the several counties were written out. Attempts have been intelligently made to verify the list thus prepared, with the result that several hundred names have been erased, so that so far as possible the list is freed from errors, and is believed to be of great value. Any mine owner or superintendent whose mine or address is not on this list can, if desired, have the mistake corrected by notifying this office.

The above is intended to be explanatory of the time, effort and expense given to this work. Several who have known of its progress have urged that the list be published in book form, and advertised for sale at $4 or $5 per copy. But the request from old patrons of the paper have been so general that it was deemed best to adhere to the original idea and publish it in these columns.

The mines, names, etc., in the State will appear by counties, alphabetically.

### AMADOR COUNTY.

| NAME OF MINE | Character of Mine | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| Anita | Gold quartz. | 10 | Jackson | P. Reichling, Supt. | Jackson |
| Amador Con | " | | Amador City | Hayward & Co., Owner | |
| Alma | " | 16 | Jackson | J. B. Francis, Supt. | Jackson |
| American Flat | " | 12 | Near Oleta | Geo. Beard, Supt. | Oleta |
| Argonaut | " | 17 | Near Jackson | W. F. Deteret, Mgr. | Jackson |
| Alpine | " | | Plymouth | Bank of Cal., Own | S. F. |
| Arroyo | " | 4 | 3 m N W from Ione | Frates, Numan, Knights & Co. | Ione |
| Amador Red. W. | " | 6 | Sutter Creek | E. C. Voorhies | Sutter Creek |
| Amador G. Mine | " | Idle. | 1¼ m S from Jackson | Jas. E. Dyer, Gen Mgr. | Jackson |
| Amador Queen | " | 8 | 2 m S from Jackson | Jas. E. Dyer, Gen Mgr. | Jackson |
| Astoria | " | Idle. | 4 m S from Jackson | Martin Jones | 330 Pine, S. F. |
| Albany | " | " | 3½ m S from Jackson | Martin Jones | 330 Pine, S. F. |
| Altoona | " | " | Quartz Valley | Chas. Roberts | Etna, Siskiyou Co. |
| Burner Cyanide W. | " | " | ½ m E from Sutter Creek | E. M. Burner | Sutter Creek |
| Bernardis Mine | " | 5 | ½ m E from Sutter Creek | J. Bernardis, Lessee | Sutter Creek |
| Bellwether Mine | " | Idle. | ½ m N E from Jackson | S. W. Bright, Own | |
| Belmont Mine | " | " | Sutter Creek | J. H. Tibbitts | Jackson |
| Bay State Mine | " | 19 | 4 m N W from Plymouth | W. T. Jones | Plymouth; T. E. Luty, Sec., 330 Pine, S. F. |
| Blue Lake Canal Co. | " | | | W. E. Proctor | Sutter Creek |
| Clinton Con | Gold. | Idle. | 7 m E from Jackson | Weiland Bros., Own | S. F. |
| Central Eureka | " | " | Sutter Creek | W. R. Thomas, Supt.; C. W. Randall, Own | Sutter Creek |
| Carbondale | Pot'ery | 3 | 1 m N from Carbondale | Fred Hammer, Own | May P. O. |
| Clark, N. & Sons | Clay pits. | 10 | 2½ m S W from Ione | Francis Stevens | Ione |
| Coal Mine No. 3 | Coal & iron. | 38 | 3 m N W from Ione | Francis Stevens | Ione |
| Colorado | Gold. | Idle. | 3½ m E from Volcano | W. Q. Mason | Volcano |
| Contention Mine | " | " | 2½ m S E from Pioneer | Thos. J. Stevens | |
| Crown Point | " | " | 3 m N W from West Point | Crown Point M. Co. | Oakland |
| Dry Creek | Placer. | 3 | 5 m N from Volcano | Geo. Hadley, Supt. | Volcano |
| Downs | Gold. | Idle. | 2 m E from Volcano | R. C. Downs, Own | Sutter Creek |
| Doyle | " | " | 1½ m E from Jackson | Wm. Doyle | Jackson |
| Eureka (Amador Con) | " | " | Amador City | Hayward & Co., Own | S. F. |
| Easton | " | 2 | Near Plymouth | Geo. Easton, Own. (Bonded) | Plymouth |
| Evans | " | Idle. | Near Jackson | Ellis Evans, Own | Jackson |
| Elephantine | " | " | 3½ m S from Jackson | Malvina Jones | 330 Pine, S. F. |
| Forty-nine Flat Mine | " | 6 | 4 m N from Volcano | John Bell, Supt. | Volcano |
| Focus | " | 10 | 2 m W from Volcano | H. M. Wolf | Volcano |
| Fremont | " | Idle. | Near Amador City | Grover Gold M'g. | Amador City |
| Fifty-four Flat | " | " | 5 m N W from Volcano | Dr. Nichols, Pres't. | Sutter Creek |
| Gover | " | " | Near Amador City | Gover Mining Co. | Amador City |
| Gold Mountain | " | " | Near Amador City | Gold Mountain M. Co. | 325 Mont'g'y, S. F. |
| Good Hope | " | " | Near Jackson | C. Peters | Jackson |
| Hardenburg | " | " | Near Jackson | Hayward & Lane | Angels Camp |
| Heath & Smith | Clay. | 10 | Near May Station | Heath & Smith, (A. E. Smith) | May P. O. |
| Holly Wood | " | Idle. | 3½ m S from Jackson | Martin Jones | 330 Pine, S. F. |
| Hardenburg | " | " | 3½ m S from Jackson | Hayward & Lane | S. F. |
| Ivanhoe | Gold. | 7 | Near Plymouth | S. C. Wheeler, Own | Plymouth |
| Jackson Gold Fields (L't'd.) | | | 2 m S from Jackson | Jackson Gold Fields Co., Own.; Jas. E. Dye, Supt. | Jackson |
| Kennedy | Gold. | 110 | Near Jackson | J. F. Parks, Supt. | Jackson |
| Kelley | " | 2 | 5 m E from Volcano | Loser & Laughery, Supts.: (Frank Kelley, Own.) | Volcano |
| Kate Gray | " | Idle. | Near Volcano | W. Q. Mason, Own. (Prospect) | Volcano |
| Keystone Con | " | 94 | Amador City | E. T. Hale, Supt.; C. E. Anderson, Sec. | S. F. |
| Kelly Mine | " | Idle. | 4 m S from Jackson | Henry Emerson | Jackson |
| Lucille | " | " | Plymouth | A. Harpending | Nashville |
| Loyal | " | " | Near Plymouth | A. L. McWayne | Drytown |
| Lincoln | " | " | Sutter Creek | T. J. Clavering | S. F. |
| Little Amador | " | " | Amador City | S. H. Emmons, Supt. | Amador City |
| Littlefield | " | " | 4 m S from Jackson | Martin Jones; E. Luty, Sec. | Jackson |
| Mahoney & South | " | 29 | Sutter Creek | John Ross (Wildman G. M. Co.) | Sutter Creek |
| Mechanics | " | Idle. | Sutter Creek | Bandel, Valentine & Co., Own. | S. F. (P. Fagan) |
| Modoc | " | 4 | Pioneer | F. Mace, Own | Volcano |
| Medean | " | 5 | Smith Spring G M Co, Amador. | John R. Tregloan, Spt | Amador City |
| Mayflower | " | Idle. | Near Amador City | S. H. Emmons, Supt. | Amador City |
| Massa | " | 4 | Near Jackson | Meads, Massa & Co., Own. | Amador City, (Bonded to D. Gutman, S. F.) |
| Mammoth | " | Idle. | 4 m S W from Jackson | W. A. Neville & Co. | Jamestown |
| Middle Bar | " | " | 4 m S W from Jackson | T. E. Luty, Sec. | Jackson |
| Moore | " | " | 1 m S from Jackson | W. A. Neville & Co. | Jamestown |

### AMADOR COUNTY—Continued.

| NAME OF MINE | Character of Mine | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| Mammoth | Gold. | Idle. | 1½ m N from Plymouth | Theo. Etling and M. Leach. | Plymouth |
| McIntyre | " | 6 | Amador City | John McIntyre | Sutter Creek |
| North Grover | " | Idle. | 2 m N from Amador City | Reub. Ford & Co., Own | Amador City |
| North Star | " | " | Amador City | E. C Voorhees, Own | Amador City |
| New York | " | " | 3 m W from Jackson | G. W. Anderson | Jackson |
| New Albany | " | " | 3½ m N from Jackson | E. F. Luty, Sec. | Jackson |
| Oneida | " | " | Jackson | Anglo-Cal. Bank, Own | S. F. |
| Philadelphia (Richmond) | " | " | Near Plymouth | J. J. Crawford | S. F. |
| Pioneer | " | " | Near Plymouth | Dr. T. Boysen, Own.; A. Robinson, Supt. | Plymouth |
| Phœnix Red. Works | " | 5 | Drytown | E. S. Barney | Drytown |
| Plymouth Con | " | Idle. | Plymouth | A. Hayward & Co. | S. F. |
| Posey Hill | " | 2 | 5 m N E from Volcano | Geo. Hadley | Volcano |
| Red Cloud | " | 8 | Near Plymouth | W. J. Hussey; C. M. Jackson, Stock'n, Sec. | Plymouth |
| Reward G. M. Co. (Clough) | " | 8 | Pine Grove | W. C. Smith | Pine Grove |
| Robinson | " | 9 | Oleta | — Robinson | Oleta |
| Rancheria | " | 4 | 5 m N W from Volcano | Geo. Evans | Volcano |
| Ritter Ditch (Amador and Sac'to Cos) | " | | Michigan Bar, Sac'to Co. | D. R. Thomas | Michigan Bar |
| South Eureka | " | 20 | Sutter Creek | J. F. Parks | Sutter Creek |
| Seaton | " | Idle. | Drytown | A. Hayward & Co. | S. F. |
| Strong | " | " | Amador City | S. H. Emmons | Amador City |
| South Spring Hill | " | " | Amador City | J. R. Tregloan | Amador City |
| South Mayflower | " | " | Amador City | S. H. Emmons | Amador City |
| St. Julian | " | " | 4 m S from Jackson | A. Caminetti | Jackson |
| St. George | " | " | 1½ m N from Plymouth | Thos. George and M. Leach, Own. | Plymouth |
| Tripp | " | " | 1 m S E from Jackson | Peters & Tripp | Jackson |
| Telegraph Hill | " | 4 | Volcano | Geo. Evans | Volcano |
| Treadwell | " | 9 | Sutter Creek | Wm. Castle | Sutter Creek |
| Treasure (formerly Hazard) | " | Idle. | Amador City | A. Hayward & Co. | S. F. |
| Telurium | " | " | Pine Grove | N. G. Young | Volcano |
| Terakoff | " | " | 3 m N W from West Point | Crown Point M. Co. | Oakland |
| Volcano Ditch | | | | Clarence Bradshaw | Volcano |
| Valparaiso | Gold. | Idle. | 1½ S from Jackson | Jos. Poggi & Co. | Jackson |
| Wheeler | " | " | Pine Grove | J. S. Wheeler | Pine Grove |
| Wildman | " | 57 | Sutter Creek | John Ross, Jr. | Sutter Creek |
| Zumeralt | " | Idle. | | D. D. Wicks | Volcano |
| Zeilie | " | 110 | Jackson | W. F. Deteret | Jackson |

### BUTTE COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Banner | Gold. | 24 | 5 m N E from Oroville | W. Coleman, Supt. | Oroville |
| Chico Flume | | | Chico; Sierra Lumber Co. | C. E. Tinkham, Supt. | Chico |
| City Garden | Gold. | | Oroville | O. Becker, Supt. | Oroville |
| Cattskill | " | 23 | ¾ m N from Bangor | C. S. Barefoot, Own. | Bangor |
| Golden Butte | " | 17 | 4 m N from Oroville | S. P. Moody, Supt. | Oroville |
| Golden Feather | " | 50 | ½ m N from Oroville | — Sanburn, Supt. | Oroville |
| Golden Summit | " | 26 | 18 m E from Powellton | C. G. Kane, Supt. | Powellton |
| Grove Mine | " | 2 | ¾ m N W from Bangor | Ed Bloom, Supt. | Bangor |
| Magalia | " | 25 | 3 m N E from Magalia | J. T. Mortkill, Supt. | Magalia |
| Rock River | " | 10 | 9 m N from Oroville | — Fugua, Supt. | Oroville |
| Standard | " | 20 | Oregon City | C. W. Spangler, Supt. | Oregon City |

### CALAVERAS COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Alpine | Gold quartz. | Idle. | 8 m E of San Andreas | W. B. Swauk | Mountain Rancho |
| Augustini Mine | " | " | 4½ m N W of San Andreas | J. J. Augustini, Own. | San Andreas |
| Ant Hill | " | " | 2½ m N W of Copperopolis | Royal Con. M. Co., D. Jutton, Supt. | Copperopolis |
| Adelaide | " | " | Robinson's Ferry | Wood Bros. | Robinson's Ferry |
| Allison Mine | " | | 4 m S of Angels Camp | Robt. Allison, Own. | Angels Camp |
| Angels Camp Mine | " | 9 | 1½ m W of Angels Camp | J. H. Roberts, Supt. | Angels Camp |
| Angels Mine | " | | ¼ m N of Angels Camp | Jas. V. Coleman, Own | S. F. |
| Altaville | " | | 1 m N of Altaville | B. R. Prince, Own | Altaville |
| Alameda | " | | 10 m E of San Andreas | Jos. Framantin, Own | Esmeralda |
| Banner Blue Gravel | Gravel. | 3 | 16 m N E of San Andreas | Lindsey, Rigby & Co., Lessees. | Mountain Rancho (formerly Sheppard) |
| Binnon | Gold quartz | | 7½ m N E of San Andreas | F. Floyd | Binnon |
| Blue Bell | " | Idle. | 1½ m N of Glencoe | Scott & McIntyre, Own | Toledo, Ohio |
| Blazing Star | " | 10 | 1 m E of West Point | W. C. Nixon | West Point |
| Black Wonder | " | 1 | 8½ m S E of West Point | Ford Grive, Own | West Point |
| Banner | " | Idle. | Glencoe | Phelps & Miller, Own | 120 Sutter St., S. F. |
| Benson | " | 4 | 4 m N W of San Andreas | Benson Bros., Own | North Branch |
| Bailey | " | 4 | ¾ m N W of Comanche | D. Bailey & Co., Own. | Comanche |
| Boston | " | 12 | 4 m N of Milton | J. H. Southwick, Supt | Milton |
| Bannmaker | " | | ¼ m N of Altaville | H. W. Bannmaker, Own | Angels Camp |
| Belcher | " | | Parrotts Ferry | T. Smith, Own. | Angels Camp |
| Belle | " | | ½ m E of Robinson's Ferry | E. W. Roberts, Own. | Oakland |
| Big Spring (Graham) | " | | 1 m S of Angels Camp | L. C. Graham, Own. | |
| Birney | " | | 1¼ m E of Angels Camp | T. L. Birney et al, Own | Angels Camp |
| Bisbee | " | 10 | 1½ m W of Angels Camp | W. A. Bisbee, Own | Angels Camp |
| Blair Consolidated | " | | 1½ m W of Angels Camp | Jas. Schmeidake, Own | Angels Camp and 120 Mission, S. F. |
| Bolytho (Hardy) | " | 8 | 1 m S of Angels Camp | A. N. Butts, Own | Angels Camp and Occidental Hotel, S. F. |
| Brown, Smyth & Ryland | " | | 1 m N W of Angels Camp | Brown, Smyth & Ryland, Own. | Angels Camp |
| Buckhorn | " | 2 | 1½ m W of Murphys | Buckhorn Con. M. Co., Own. | Napa |
| Big Horn | " | | 2½ m N of Murphys | J. W. Taylor, Own | Murphys |
| Brazza | " | 2 | 10 m E of San Andreas | Antonio Leach et al, Own | Esmeralda |
| Bonanza | " | | 1 m N of Murphys | E. C. Loftus et al, Own | Sonora |
| Bence | " | 2 | 10 m E of San Andreas | Adam Bence et al, Own | Esmeralda |
| Beatrice | " | | 1 m W of Murphys | W. S. Edwards, Own | Calico |
| California (formerly Hicks) | " | 2 | 9 m E of San Andreas | Frank Cunes & Co, Own | Esmeralda |
| Champion | " | Idle. | 2 m W of West Point | F. Rufino, Own | West Point |
| Coffee Mill | " | 26 | 4 m S of Mokelumne Hill | Jas. L. Gleason, Supt. | Mokelumne Hill |
| Carlton | " | 8 | 4 m W of West Point | C. Carlton | West Point |
| Culbertson | " | 1 | ½ m N of San Andreas | Culbertson & Strough, Own. | San Andreas |
| Comet | " | Idle. | 2 m N of San Andreas | Irah H. Reed, Own | San Andreas |
| Casnelli | " | 2 | 4½ m N W of San Andreas | D. Casnelli, Own | San Andreas |
| Canape | " | | 1 m W of Carson | Jas. Canape, Own | Carson |
| Calaveras Con | " | | Carson Hill | T. F. Wood, Agt. | Robinson's Ferry |
| Carson Creek | " | 17 | Near Stanislaus River | M. D. Howells, Supt. | Angels Camp |
| Chapparal | " | | 3 m S W of Angels Camp | C. R. Stevenot, Own. | Sonoma |
| Cloud | " | 2 | 2½ m S W of Angels Camp | Otto Dalling | Angels Camp |
| Con. Gold Reserve | " | | 2 m S of Angels Camp | N. S. Wright, Supt. | Angels Camp |
| Cosgrove | " | | Angels Camp | Chas. Cosgrove, Own. | Angels Camp |
| Cook | " | | 1¼ m N E of Angels Camp | Saml Cook, Own | Angels Camp |
| Costa | " | | 2 m S of Angels Camp | | |
| Cushing | " | | ¼ m N of Angels Camp | — Cushing, Own | St. Johns, N. B. |
| Central Hill | " | 12 | ¼ m S E of Murphys | Wm. Thomas, Supt. | Douglass Flat |
| Crystal | " | | Angels Camp | Est Jas. G. Fair, Own | S. F. |
| Caldwell | Marble quarry | | 4 m S W of North Branch | Edw. Caldwell, Own. | Valley Springs |
| Dormelan | Gold. | Idle. | 2 m N of San Andreas | John Dormelan, Own. | San Andreas |
| Deane Mine | " | 3 | Salt Spring Valley | Mrs. V. M. Deane, Own | Milton |
| Dunlop | " | 3 | 7 m E of Milton | E. Kuhn, Own | Milton |
| Dublin | " | 4 | 4 m N W of Copperopolis | Jas. Adams, Own | Copperopolis |
| Dora | " | | 3 m N of Murphys | Dora G. M. Co., Own. | S. F. |
| Dalmazia | " | 2 | 10 m E of San Andreas | Jos. Framantin Own. | Esmeralda |
| Excelsior | Gold quartz. | Idle. | Near Mokelumne Hill | Bondel & N. S. Wight | Mokelumne Hill |
| Esperanza | " | 22 | Near Mokelumne Hill | W. T. Rohnson | Mokelumne Hill |
| Everlasting | " | Idle. | ½ m S W of San Andreas | N. Seiffort | San Andreas (Bonded to P. Deidshelmer) |
| Eureka | " | " | 1 m N of West Point | Joel Rowe, Own | West Point |
| El Encino | " | 3 | 4 m S E of Mokelumne Hill | Jas. A. Regan, Own. | Mokelumne Hill |
| Edna | " | Idle. | 3 m N of San Andreas | J. S. White, Own | San Andreas |
| Empire Group | " | 11 | 3½ m N W of Copperopolis | Hunt & Livingston; F. B. Livingston, Supt | 718 Sansome, S. F. |
| Emma | " | | 2½ m N W of Copperopolis | D. Jutton | Copperopolis |

(To Be Continued.)

# Scientific Progress.

## The Microscope as Used in Mining.

(Specially Reported for the MINING AND SCIENTIFIC PRESS.)

On the 15th inst., at the rooms of the Microscopical Society, 432 Montgomery street, San Francisco, Cal., J. A. Edman of Plumas delivered an address on "The Microscope as Used in Mining." He said:

It is not necessary to look backward many years to remember the time when the microscope as an instrument of research and scientific investigation was confined to a few of the learned professions, to a limited number of the most advanced thinkers and workers in natural science, to physicists, physiologists, botanists and a few chemists. To most of us here present it was once seldom seen, and still less appreciated, as an instrument of precision. Later, with the advance of optical science and improved mechanical methods, it became the familiar and constantly efficient instrument not only in the schools and halls of science, but in many departments of manufacturing industry, to which it gave a precision and certainty never before attained. To-day we find it in every civilized country, the aid of the teacher, the guide of the philosopher, the scientist and the practitioner, the counsellor of the manufacturer, the aid of the engineer and constructor, the beneficent adviser of the farmer, and last, but not least, the guiding light among the hitherto empirical practices of the metallurgist and the miner.

And not only this. But the cares and worries of the business man have been lightened when he made it the companion of his leisure hours, and its kindly light brought him near to Nature's heart and opened to his vision the power, wisdom and perfection of the Creator.

Not long ago an eminent member of this society gave you the history of the origin and development of your favorite instrument to its present high state of perfection, and showed its application in solving the problems of geology, dealing with the upbuilding of the earth and the constantly recurring cycles of decay, reconstruction and change in our plains, valleys and mountains. Although but a comparative novice in the use of your favorite instrument, perhaps I may be entitled to continue the story and tell you tonight some of the truths it has taught me in one of the oldest, and even today one of the most important, industries of California, that of gold mining. In this I use the term in its broadest sense as applied in the Pacific States, where mining also includes the metallurgical processes for the reduction of our ore, usually called milling, and the separation of the gold from the enclosing gravels and sediments. For convenience I will divide the subject into two parts, the first concerning the physical conditions of our gold-bearing ores, including the various mill products; the second referring to the studies of the golden sands derived from our gravel deposits. It is true that the placers were first discovered and worked in this State, and from them the most of our wealth of gold was derived, but they have to this day remained the least observed and studied by our miners, as the sequel will show.

From the earliest days of quartz mining and milling in 1850, when scarcely any previous experience pointed the way and only the mill practice of Germany was available, if they had been known to our miners, all advance was based upon constant experimenting, which generally resulted in improved mechanical appliances, which finally developed into our present practices of milling, which yet in no sense can be said to be a system. All milling operations were, and yet remain, based upon the delusive belief that gold, being one of the heaviest metals, must always and under all conditions descend to the lowest level and become arrested by its affinity for mercury without any special effort of the operator to so modify the obstructions to the general law of gravity and chemical affinity as to permit of its full operation in the quartz mill and connected apparatus. This might have led to results had gold ores been uniform in character, had comparatively coarse grains of gold been enclosed in a simple rock or mineral, impervious to and not exerting a mechanical or chemical action on the mercury in use in amalgamation, could it be what the millman and miner dream of, so-called free-milling ore, a condition practically as impossible as for the physician to meet in his practice with a perfect man. In fact, our gold ores occur in all conditions and combinations, from the hard, white and crystalline quartz to the crumbling, brown-black sand of manganiferous ores; from the tough carbonaceous hornstone of the mother lode to the soft and yielding talcose slates from the altered diabase; from the hard quartz brought from the deepest mines, sparkling with crystals of pyrites and galena, and in spite of its richness scarcely exhibiting to the unaided vision a trace of metallic gold, to the crumbling and dusty limonites of our decomposed surface ores, where the gold may range from visible grains and crystals to the microscopic dust that almost floats in the air.

No classification of mill processes in accordance with physical conditions has yet been evolved, and cannot be attained without calling the microscope to our aid. What, then, does it teach and will prove to any earnest investigator? That in nearly all its ores the gold generally occurs in infinitely small particles, diffused unevenly both in the rock matrix and in the sulphides and other combinations and elements; that in most instances this diffusion is to the ordinary observer almost incomprehensible, although familiar to the student of micro-organisms. In the few slides I have brought here to-night you will find the diffusion of gold in quartz beautifully exemplified in a sample from the Diadem mine, where the size of the gold particles frequently reaches one twelve-thousandth of an inch diameter, and generally averages below one two-thousandth inch; and another from the San Jose de Gracias mine, in Mexico, where the diffusion of both gold and silver reaches one thirty-thousandth inch. These are not extreme cases, although in many gold ores of California the size of grain only goes somewhat below one two-thousandth diameter.

The same condition is observed in the sulphides, and principally in the iron pyrite, the arsenical pyrite, and in galena, although here the diffusion does not reach the extreme sizes noted in silica. But here occurs another condition, as hostile to free-milling as that already cited, the chemical union of gold with sulphur, arsenic, selenium and tellurium, which my work has conclusively proven, although the fact has been disputed by many chemists and metallurgists. It is especially noticeable in arsenical sulphides and their decomposition products, in which latter the gold is precipitated in crystalline and arborescent forms, built up atom by atom from a precipitation of the soluble gold compound.

The greatest loss in milling may be stated as due to the diffusion of infinite gold particles in the quartz, not set free by the usual processes. Noting that the common practice of gold milling has fixed upon forty-mesh screen in batteries as a limit, or an average size of one-fortieth inch diameter of grain, to which the ore is reduced, it is readily perceived that much gold still remains enclosed in the sands in a condition not available for amalgamation, and, by reason of its low specific gravity, not amenable to amalgamation.

A close study of amalgams and related products proves that amalgamation of both gold and silver is essentially a chemical union, and not a simple solution of gold in mercury, as the resulting products always combine to an amalgam in equivalent proportions and form crystals that are modifications of the cubical system. The three forms I have met with—the acicular, the prismatic and the octahedral—are exhibited by slides I shall place before you, in each of which the percentages of gold and mercury differ, containing the most mercury in the order given. In each case the mercury has been eliminated from the sample by solution in dilute acid, as the original amalgams are generally too fragile and deliquescent to be made into mounts.

My work has illustrated that time is an element in all amalgamation, graduated according to size of gold particles, and that the general law holds good, that the best condition for amalgamation obtains when proper proportions of gold and mercury are present to form the two last named varieties of gold amalgam.

Amalgamation is also seriously affected by the form of the rock particles in the pulp, and by capillary attraction, which fully explains the causes of flouring of mercury and the impossibility of successfully amalgamating talcose ores without previous preparation. Here the microscope reveals the curious condition that the smooth scales of talc, microscopic in size, become firmly attached to the cleanest mercury and rapidly form a semi-transparent crust, preventing the contact of gold with the amalgamated surface of the plate.

Of this scum I have here available only a working mount, but the fact has been fully investigated. A very instructive mount of rich waste sands is also at your service, taken below the plate table of a quartz mill.

The foregoing facts explain the main causes of the great loss of gold yet occurring in milling operations, and also suggest the remedy, namely, a full investigation of the physical conditions of the ore before a plant and mill process are decided upon, instead of the ruinous practice of discarding an expensive plant or abandoning a mine, virtually made a failure by lack of skill and judgment.

Time forbids me to enter into the details of the amalgamation and cyanide processes, of which the latter especially most speedily demonstrates its effectiveness or its shortcomings under the microscope in conjunction with chemical analysis.

The most interesting study of the genesis of ore deposits will receive its solution through the patient and intelligent use of the microscope, in which direction my own very desultory and incomplete labors can only be presented to you by a few slides and ore samples.

When we enter the division of the gold-bearing gravels as found in California's surface and deep deposits, the results of erosion during several geological periods, it presents another wide field for microscopical research, and this chiefly in the auriferous heavy sands, which represent not a little of the values and the most interesting objects of study for the microscopist, as they contain virtually the heaviest and most imperishable minerals of the adjacent rock formations. In the black sands of the Pacific coast we meet not only the heavy metals generally obtained in mining operations, such as gold, gold amalgam, platinum and iridium, but also metallic copper, nickel and iron; next, many of the sulphides and arsenides of our lodes, such as pyrites, mispickel, bornite, galena, and finally a great variety of oxides and silicates, such as magnetite, chromite, limonite, ilmenite, cassiterite, zircons, garnets, tourmalines, epidote, corundum, beryl and diamond, the last generally in very minute grains. In size of grain these sands generally run below one-fortieth inch diameter, and a large portion are of microscopic sizes, the gold particles often averaging below the one-thousandth inch in diameter, and consequently not at all amenable to the usual processes of placer and hydraulic mining.

Of the gold, a portion of it is clean and bright; much of it is coated with the oxides of iron and manganese, with silica and lime sulphates, and also with sulphides and selenides, frequently so much so that the gold color does not become perceptible without previous preparation. The sulphide grains, generally very minute, are often rich in gold, chemically combined or mechanically enclosed, and, what is still more important, the magnetites, hemetites and chiefly the ilmenites contain metallic gold enclosed within the hard and lustrous grains of these minerals, as will be shown to you in some of the mounts submitted. Everywhere the constant progress of chemical action is present in the gravels in the leaching out, transposition and subsequent precipitation of both gold and other elements and minerals, in the presence of secondary deposits of silica, alumina and hydrated silicates, in sulphides and arsenides, and in the many and beautiful forms of precipitated gold in crystals, and in acicular and arborescent forms of wonderful variety, some of which can be shown you.

While these evidences of beauty, order and constant activity in Nature's great laboratory will ever delight the student of natural laws, they offer no small rewards to the miner and investor who may view them solely from a commercial standpoint. After extracting all of the visible values by ordinary mining operations, the black sand and the waste gravels from which they result always contain gold varying from a few dollars per ton up to and exceeding $5000 per ton for the richest black sands, with probably an average of $40 per ton for concentrated heavy sands. As the cost of concentration and extraction of the valuable contents will seldom exceed, and generally go below, $20 per ton, they promise great rewards to men of skill, energy and capital, and intelligently handled will add much to the wealth and progress of our State.

Looking back to the period when the geological survey of California was in progress under the able guidance of Prof. J. D. Whitney, some of the members present may recollect his prophetic words as to the future of our waste gravel deposit, and his suggestions as to necessary legislation on the subject, and taking up the two volumes of the "Auriferous Gravels of California" and noting therein the discussions on the physical features of the gravel deposits, you can readily recognize that my work is only a continuation of that by Whitney, Pettie and Goodyear, and that part of the problems confronting them have now been happily solved.

At the period referred to when the geological survey was discontinued, when our Legislature then, as frequently of late years, was controlled by lobbyists and pothouse politicians, all the great material laboriously collected by the survey was consigned to oblivion, and remains yet unused and inaccessible somewhere among the classic halls of Berkeley. Had the volume on economic geology as projected by Whitney been published, the doors of a vast treasure house would thirty years ago have been opened to the citizens of California, and the State would have been richer by at least three hundreds of millions of dollars.

I here take occasion to render on behalf of the miners of California a cheerful and well-merited tribute to Prof. Whitney, whose powers of perception, lucid reasoning, indefatigable energy and unerring judgment in regard to the economic geology of California have done more to make our placer mines known and appreciated than all the men of science that have but followed where he blazed out the trail.

To those of your society who, like Melville Atwood and Henry G. Hanks, have studied our ores and minerals, and also left honorable records and valuable aids to the miners of California, I tender their well-merited meed of honor, and will venture to hope that your society, while adding luster to California's record in the paths of science, will not forget the needs of our miners, the beauties, the uses and the silent teachings of Nature, as revealed in our rich and useful ores and gravel deposits, in our marbles and building stones, our borax, soda and salt deposits, our asphaltum and mineral oils, which form the substratum on which Nature has placed our plains and smiling valleys, our pure and ever-flowing streams, our grand forests and our heaven-reaching and snow-covered Sierras.

# Electrical Progress.

## Electric Rock Drills.

Electricity has been applied to mining in many forms: the MINING AND SCIENTIFIC PRESS has discussed and portrayed numerous practical electrical devices in metal mining, and this week depicts apparatus designed to successfully overcome existing obstacles in the application of electricity to mining drills. The rotary drill and the percussion drill have been brought per se to a high degree of efficiency. Steam, water power and compressed air have been successfully applied as motors, but hitherto some difficulty has been experienced in adapting electricity to this function. The Siemens & Halske Co., represented by A. Brooke-Ridley, 10 Front street, this city, claim to have solved the problem of satisfactorily connecting a rotary or percussion drill with any electrical system of power distribution. In soft rock the rotary drill does very well, and it is believed that the electric motor is ordinarily best adapted to the rotary drill. The reciprocating motion required for a percussion drill has tended to dissipate applied electric power in heat and lost energy.

After continuous experiment the firm of Siemens & Halske have constructed a machine which they claim meets the requirements of practice and which for the same amount of work uses only 25 to 30 per cent of the energy heretofore used in percussion drills. In practical operation, using 1 H. P., for instance, they claim that their machine has bored in hard granite in one minute a hole 1.4 inches in diameter and from 3.2 to 3.6 inches deep.

To do this they have employed the Stow flexible shaft, which consists of two main parts, the inner, power-transmitting part, which consists of a number of steel wire spirals, called the core, and the outer protecting casing. The core is provided at each end with solid terminals, which are supported in bearings provided in the casing, which consists of a steel spiral covered with leather and provided with terminals on the ends, which carry the necessary couplings. Under the expectation that the flexible shaft would be applicable to the percussion drill, the latter has been reconstructed and modified to make the method of driving both types of drills identical. The firm now assert that it is only necessary to attach the flexible shaft to either of the two types of drills in order to operate either.

The theoretical difficulties of the task having been solved by the construction of both drill types in connection with the flexible shaft, for practical use of the whole system the electrical part needed considerable attention. The truck used in factories for the conveyance of the electric motor did not meet with the conditions found in a mine; the motor was placed in a solid wooden box, armored with angle irons and provided with a steel cover and two handles. This box contained the motor, gear, starting rheostat, etc.

Figs. 1 and 2, which represent complete drilling outfits of the two types, also illustrate the motor box. It will be seen that the motor box has one opening for the connection with the flexible shaft and another on its rear end for the electric plug. After plug connection is made the current is turned on or off by means of a handle, which is operated in accordance with two sign plates, "On" and "Off." The bottom of the motor box is covered with galvanized sheet iron, which protects it against water. During the operation the cover of the box is always closed; this cover is so strong that it cannot be injured by men stepping or jumping on it. The iron cover, moreover, on account of its good heat-conducting qualities, permits the warm air below to cool off. In the beginning the motor box was constructed only for direct current. As in rock drill installations, electric energy has to be transmitted usually over longer distances, the practical demand was for higher voltages, and a motor of 1 H. P., 330 volts, with cumulative winding, was built. The series winding was added to the shunt for the purpose of quicker starting. Motors of 110 and 220 volts were also built. The result of many experiments and measurements gave 1 H. P. exact 75 per cent commercial, or 84.8 per cent electrical, efficiency. Grease is used for lubrication; it is impossible to use self-oiling bearings, as the motor box must very often stand in inclined positions.

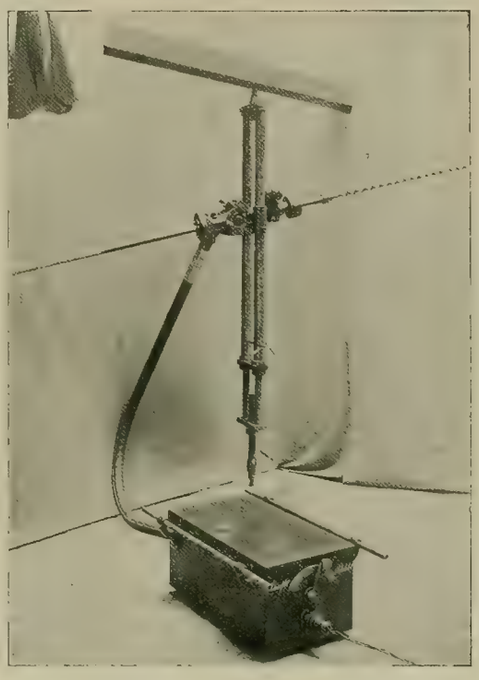


FIG. 1.—SIEMENS & HALSKE ROTARY DRILL.

The method of connecting the motor box with the electric service wires has been carefully worked out. The device permits connections to be made without having the workmen touch any non-insulated part of the conductors, and do not require the use of any screwdrivers or similar tools; they are also adapted for use in driving entries and other necessary mining operations. The conductors are usually fastened on the walls of the drift, near the roof, and are carried near the face of the drift, where the connections between main conductors and motor box are made by means of flexible conductors, which latter have to be reeled back before a blast. In order to reduce the drop of potential, the copper conductors are made of a large cross section, usually No. 9 to No. 5, B. W. G., while the flexible conductor for the sake of light weight and flexibility is usually made of conductors No. 15 to No. 13, B. W. G., cross section. There are, of course, two conductors in a direct current system and three conductors in a multiphase system. The connection between the main and the flexible conductors is made by means of a wall connection box; this contains a safety fuse for each pole. To this connection box is permanently attached a short piece of rubber cable, terminating on its free end in a plug. A small cap protects the plug when out of use. This cap is usually hanging alongside of the connecting box; when out of use the plug is put into the cap, and in this manner suspended from the wall.

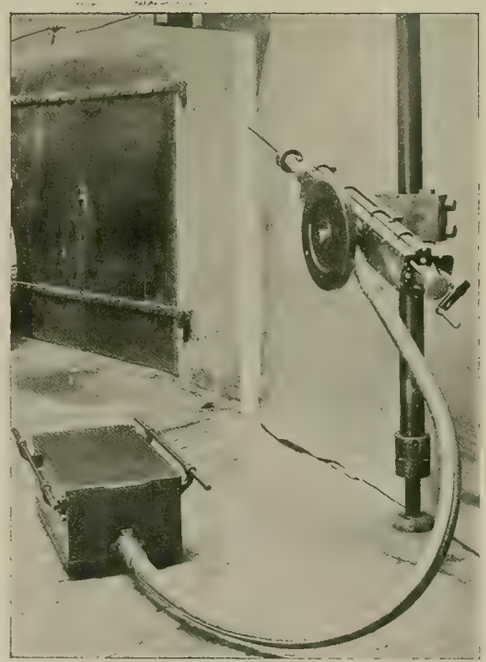


FIG. 2.—SIEMENS & HALSKE PERCUSSION DRILL.

In practice the rotary drill is supplied with exchangeable gears, which may be selected for each hardness of rock, so that the motor does not use more than from 700 to 800 watts at maximum feed; the pressure on the friction coupling is so adjusted that this maximum feed only occurs at normal hardness of rock. In case the drill meets harder strata the feed is automatically decreased, in which case the electrical energy is somewhat increased. Without exchanging the bit, the drill will bore a hole one meter (3.3 feet) deep.

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AT the Provo, Utah, power plant the flume will be about 1000 feet, with a fall at the terminus of 125 feet. It will be semi-circular, 6 feet 6 inches in diameter, and capable of carrying 5½ feet of water. The power will be 2000 H. P. The company will use the high potential alternating current, generated by the Westinghouse Company's two-phase system. Mr. Cramer, the engineer in charge, says the power, it has been proven by the company's plant at Telluride, Colo., can easily be carried thirty or forty miles. That plant runs four large mines, two smelters, and furnishes light for Telluride and Pandora.

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CONCERNING the "invisibility" of the new light, Prof. Lodge's theory of retinal action is that the visual mechanism of the eye is sensitive to it, but investigators will grope so far as immediately seeing "the new light" is concerned. One explanation is that the dioptric media of the eye are very opaque to cathode rays. Still, a cathodal image can be thrown upon the retina from behind.

# Mechanical Progress.

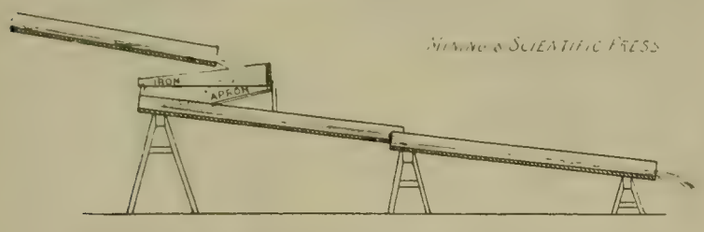
## The Banta and Wink Process.

The following is published without present comment. A drawing has been prepared and a cut made of the machine according to description:

TO THE EDITOR:—The following is a complete description of the Banta and Wink chemical process for saving fine and floured gold, which I hope you will accord space in your columns for the benefit of every one interested in mining in this west half of America. The wood and iron work of a system consists of two boxes 12 feet long, 2 feet wide and 4 inches deep, and a tom or screen, which rests on top of the upper box. To make the tom, take two pieces of lumber 4 inches wide at one end and 8 inches wide at the other and 6 feet long; cut an end piece 18 inches long and 8 inches wide and nail together so it will be 20 inches wide outside. Then take a piece of No. 18 sheet iron punched with one-fourth inch punch one hole to every three-fourths inch surface same as rocker screens are punched. Cut the iron 20 inches wide by 6 feet long and nail it on the edge of the frame as nailed together, leaving the end open at the narrow end of sides; then make two more side pieces 4 inches wide at one end and 11 inches wide at the other. Nail them on to the outside of edge where iron is nailed on, giving them one inch lap, so as to get good nailing; let narrow end point the same way as those above them. Cut an end piece 28 inches long and 11 inches wide and nail it on wide end of sides so it will rest on the sides of the box to take the weight of the tom, and keep it from dropping down on the bottom; also take a strip 3 inches wide, 28 inches long, and nail it across at narrow end of sides, and just under end of sheet iron for the same purpose. Now cut a strip of wood 1 inch square and 20 inches long, and nail it next the iron at the wide end of sides and make an apron of wood 20 inches wide and 3½ feet long. Lay one end on to the narrow one-inch strip, and let the other end be just even with the edge of the two sides, so that when it sets on top of the box, and the sand and water drops on to the perforated iron, it will run through on to the apron, which will have a pitch of one inch to one foot, and will also change the direction of the current toward the upper end of the boxes and drop the sand and the water on to the bottom of the box, two feet from the end of the upper box, where the direction of the current is again changed in the boxes, thus forcing every particle of gold or sand to the bottom of the 24-inch boxes,

which are prepared in the following manner:

Take 1x4 inch vertical grained Puget Sound fir, or Northwest lumber, such as is used for the best floors, tongued and grooved; nail them on to 2x3 inch strips every two feet, and nail well with 6d nails so as to hold solid in place. Set the nails well down into the wood. Put sides of 1x6 inches; let the box be 4 inches deep inside. Close up the end of upper box with 1x6 inches same as




MACHINE FOR WORKING THE BANTA & WINK PROCESS.

sides. Narrow the end of upper box so that it will fit into the lower box; and, after completed, prepare the bottom as follows.

First close up the ends in a temporary manner, and soak them with water so they will not leak; then take our chemical solution, prepared in the following proportions: One gallon of water; one pound of pure potash; one-quarter pound of proto carbonate of iron; one-half ounce of alum; one-half ounce of sal ammoniac. Always mix in the above proportion; but in first preparing a system use four times the above quantity. Put it into an iron kettle and boil it thirty minutes; then pour it hot on to the bottom and let it stand one hour. Then if it has not all soaked into the wood, draw it off into the kettle and take a sharp pointed knife or other sharp pointed tool and scratch the entire surface of the bottoms of the boxes, straight across and diagonally, both ways, until the entire surface is rough. Keep the tool point sharp and at right angles with the bottoms while scratching and bear down hard. Keep the wood wet while scratching it; and when thoroughly done, sweep out the fiber that has been loosened. Boil more of the solution mixed as above, and pour it boiling hot into the boxes and let it stand and soak into the wood; then keep wet; put them full of water or let the water run over them. The potash and iron forms ferricyanide, and the alum and sal ammoniac helps it to crystallize on the fiber of the wood, forming a crystal which water will not dissolve. Ferricyanide of potassium has an affinity for gold, and attracts the fine particles and causes them to settle and gather in clusters on the bottoms of the boxes, and boxes prepared as above will handle thirty tons of sand per day and save 95% of all gold in the sand, no matter how rusty or greasy or how fine. Set the boxes on a grade of one inch to one foot and run the water one inch deep over the bottom. Never crowd enough sand through, so as to cause it to pack on the bottom of the boxes; put through just what the water will carry and keep in motion. When using regularly, scratch the bottoms every two weeks, and brush the fiber out clean and boil two gallons of the mixture. Pour it hot into the boxes and let it stand two hours; and if it has not all soaked in, draw it off, and keep it until wanted for the next charging of the boxes. To clean up the boxes, stop putting in sand, and push the tom back until the apron nearly touches the end of the box, so as to clear out all the sand in the upper end of box. Let just enough water run to keep the bottom covered; then take the tom entirely away, and take a stiff bristle or grass brush and begin at the upper end and brush down. Brush several times over the bottoms and take the gold up in a scoop or blower. If the gold is rusty or greasy when you wish to amalgamate it, put it in a pot and boil it in a strong solution of potash—one pound to one gallon of water. Put in enough quicksilver to amalgamate it and boil it thirty minutes; stir it continually while boiling; then pan it out and strain it through chamois skin. At the upper end of the second box put in a piece of astrachan cloth or Brussels carpet three feet long. After dipping it in a weaker solution of the chemicals, and letting it dry, wash the cloth every two days and run the concentrates back into the system, just before cleaning up next time. Brush the gold out of the boxes every evening; do not let the boxes go dry with gold in them, for it will float away when you turn the water in again. Any of the solution that is drawn off can be bottled up and used to renew the system the next time. The above system of mining, especially in black sand, is very successful, and you will find it much better than any other system now in use. It is not patented, and can be put up by any miner.

THE BANTA AND WINK CO. of CAL.
San Francisco, Cal., April 17, 1896.

## Assays of Copper and Copper Matte.

NUMBER II.

Discussion of the Results presented at the Florida Meeting of the American Institute of Mining Engineers.

The matte was first ground to pass a 120-mesh sieve; the material as received being entirely too coarse for accurate analysis or assaying.

The method employed for the determination of the copper in the matte was the cyanide titration method, essentially as described by "K," aluminum being used as a precipitant. The copper in the drillings was determined as follows: 1 gramme of drillings was dissolved in a flask with 10 c. c. of nitric acid (32° B), and the contents were heated until the red fumes had been expelled. The solution was then transferred to a 500 c. c. graduated flask and diluted with distilled water to exactly 500 c. c., and thoroughly mixed. 4 portions of exactly 100 c. c. (0.2 gramme) each were drawn off with a pipette, run into a 200 c.c. flask and 15 c. c. of strong ammonia was added to each portion. The solution was then titrated with a standard solution of potassium cyanide, each c. c. of which was equivalent to 0.005 gramme of copper. With each set of assays a blank assay should be run, using pure copper foil and the same amount of nitric acid, ammonia and water as in the regular assay. This is important, as the standard solution is liable to change in strength. The proof assay also presents the advantage that it is run side by side with the regular assays, and the same conditions are introduced in all.

A comparison of these results with those obtained by the electrolytic method would lead to the conclusion that the titration method is quite as accurate as the latter, if not more so. Thus, in the case of the copper borings, the difference between the highest and lowest of the four volumetic determinations is much less than in the case of the average electrolytic determinations, whilst the average of the four (97.65 per cent) is very close to the average of the electrolytic results (97.67 per cent). In the case of the matte, while the volumetric determinations are somewhat lower than the average of the electrolytic determinations, the writer believes that they more truly represent the amount of copper present. This matte contains some antimony and zinc, and doubtless other elements, which are liable to be precipitated with the electrolytic copper, and thus give too high results. I quite agree with assayer "N," who remarks "For such material (the matte) I do not believe electrolysis to be as good a method for determining copper as some others."

The assays for gold and silver were made as follows, the method being the same for both matte and borings. One A. T. of material is introduced into a No. 5 beaker and 100 c. c. of distilled water is added. The mass is stirred with a glass rod and 50 c. c. of nitric acid (sp. gr. 1.42) is added. As soon as the action of the acid has ceased 50 c. c. more of nitric acid is added and the solution is gradually heated until the red fumes have been expelled. The solution is now diluted with distilled water to 500 c. c. and allowed to stand several hours. After thorough settling, the solution is filtere off through a rather heavy 4½-inch filter paper; the water used in transferring the precipitate to the filter being generally sufficient to wash out the silver and copper salts.

To the filtrate, which should be perfectly clear, normal salt-solution (1 c. c. representing 10 milligrammes of silver) is added in slight excess. (To the matte 14 c. c. and to the borings 18 c. c. was added.) The solution is stirred, 10 c. c. of a saturated solution of lead acetate is added, and the solution is stirred again. Now, 2 c. c. of sulphuric acid (1 part concentrated acid and 1 part of water) is added, and the solution is stirred. After allowing to stand several hours, the precipitate is filtered off and thoroughly washed with distilled water. The filtrate should be perfectly clear. The filters are removed from the funnels, wrapped around the precipitates and placed in 2½-inch scorifiers, the paper containing the first residue being placed in the same scorifier with its corresponding silver-lead precipitate. The filters and precipitates are now dried by placing the scorifiers on a hot plate, and when dry the paper is burned by placing the scorifiers in front of the muffle. The scorifiers are finally pushed back into the muffle to destroy all the carbon and sulphur. To each scorifier is now added 5 grammes of litharge, 15 of test lead and one of borax glass. The charges are then scorified and poured, the resulting lead buttons weighing about 6 grammes. The buttons are cupelled so as to show feather litharge and are pushed back into a hot part of the muffle just before the "blick." After weighing, the buttons are parted for gold by flattening them, introducing each button into a small procelain crucible and adding nitric acid (15° B.). After all action of the acid has apparently ceased (it should be at boiling temperature) it is poured off and fresh acid of 32° B. is added. The gold is boiled in this acid 4 minutes, when the acid is poured off and the gold is washed twice with distilled water. After drying, the gold is annealed and weighed.

The writer quite agrees with assayer "D" that the combination silver assay is more accurate, and it certainly requires no more time or work than the scorification method, especially when, in the practice of the latter, the slags and cupels are saved and assayed for the absorbed silver.

J. N. Walker, Everett, Wash.: After reading the report of the various assays of samples of copper and copper matte presented at the Florida meeting, I wish to offer some further statements bearing upon the use of a proof assay. After determining by the scorification method upon the sample of matte received from the secretary, the commercial results, such as would be reported in the course of ordinary business, I extracted the silver from the scorifier slags of four sets of assays. No. 1 (slags from one scorification) gave me 0.3 ounce silver per ton. No. 2 (two scorifications), 0.6 ounce; No. 3 (three scorifications), 1 ounce; No. 4 (two scorifications, very cold), 0.8 ounce. This seemed to indicate clearly that with this grade of matte, the silver loss in successive scorifications was practically uniform.

The loss by absorption in the cupel appeared to me most serious of all; and I was led to believe also that this loss was the greater, the greater the porportion of copper in the buttons to be cupelled. Thus, the results from 3 buttons were as follows:

| No. | No. of Scorifications. | Copper in Buttons. Ounces Per Ton. | Silver in Cupel Ounces Per Ton. |
|---|---|---|---|
| 1 | 1 | 3 03 | 3 7 |
| 2 | 2 | 2 95 | 3 53 |
| 3 | 3 | 2 23 | 3 20 |

These cupellations were made at the same time and at the same heat, but the buttons were the product of one, two and three scorifications respectively; and the reduction in copper by successive scorifications is attended with a corresponding reduction in cupel absorption of silver. The elimination of copper by scorification, however, is not proportioned to the number of scorifications made. In my experience the second scorification is the most effective in this respect, though in the instance here given, the third has produced the greater diminution.

But the chief conclusion to which I have been brought is that the heat of cupellation has more to do with the loss of silver in the cupel than anything else. I give herewith some results of experiment in this direction, which, however, I regret to say were not checked by duplicates:

| No. | Scorifications. | Cupellation. | Silver. Ounces Per Ton. |
|---|---|---|---|
| 1. | Hot. | Hot. | 118.6 |
| 2. | " | Cold. | 128.2 |
| 3. | Cold. | " | 130 6 |
| 4. | " | Hot. | 120 4 |

The indication is clear that excessive heat in cupellation causes excessive loss of silver by cupel absorption.

After weighing my beads and also the silver obtained from the cupels and from the scorifier slag, I decided to cupel them again with a small amount of lead, and to run at the same time for comparison a pure silver button of about the same weight. The results was as follows:

A set of three buttons, resulting from two scorifications each, the first with 40 grammes of lead, and the second with 20 grammes of lead plus the button, weighed 39.5 milligrammes. The proof-button weighed 39.12 milligrammes. After cupellation of both at medium heat (the main point being to get rid of the lead and copper), the weight of the assay-button was 37.6, and that of the proof 38.1 milligrammes. The normal cupel absorption of silver, under the circumstances, was, therefore, as 39.12: 38.1 or 1.027: 1. Multiplying 37.6, the new weight of the assay-button after cupellation with 2 grammes of lead, by 1.027, we have 38.615 as the probable weight of the three buttons before this cupellation, if they had been pure silver. The difference between this and their actual weight, 39.5, is 0.885, a loss which cannot be fairly ascribed either to cupel absorption or to volatilization. Dividing it by 3, we have 0.295 milligrammes (or 2.95 ounces per ton for each button of original assay), as the loss of weight, due, in my judgment, to copper in the silver-buttons; and I therefore determined the actual amount of silver in the assay as follows:

| | | Ounces Per Ton. |
|---|---|---|
| In original average weight of button | | 131.6 |
| In scorifier slag | | 0.6 |
| Silver absorbed by cupel | | 3.53 |
| | | 135 73 |
| Less—Copper in button | 2 95 | |
| Gold in button | 2.34 | |
| | | 5 29 |
| Silver contents | | 130 44 |

In ordinary commercial practice, the copper in the button and the silver in slag and cupel would have been neglected, and the total weight of the silver-button, less the gold determined by parting, would have been reported as the result in silver.

Albert R. Ledoux, New York City: The variations among different assayers in report of these comparative determinations is what I expected, and emphasizes, more than any words of mine could do, the importance of our "getting together." In my opinion the differences exhibited are due to the choice of methods, and do not reflect upon the skill and care of the participants in this joint inquiry or "symposium." I trust that the discussion will be continued with the fullness and freedom which the subject deserves.

*(To Be Continued.)*

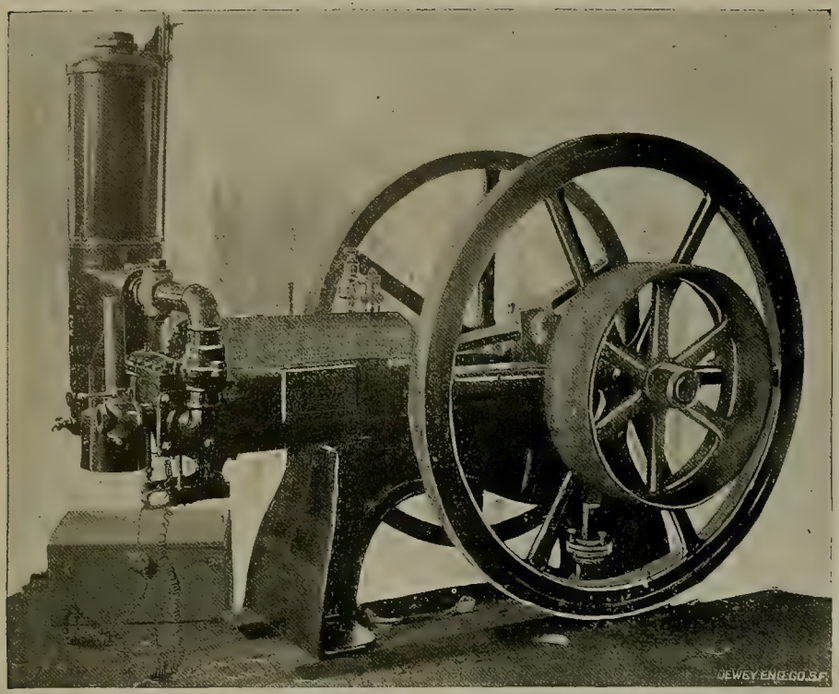
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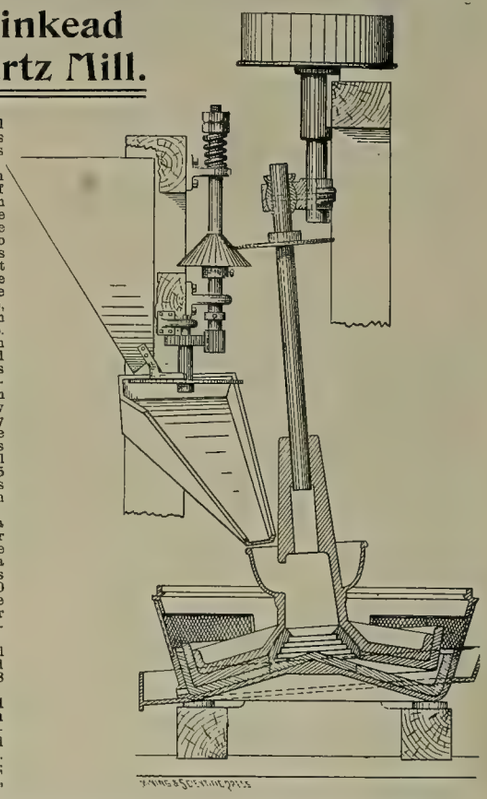



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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR WEEK ENDING APRIL 14, 1896

558,122.—SACK FOR FRUIT.—W. Aspden, Riverside, Cal.

558,141.—LETTER STAMPING MACHINE.—C. W. Ayers, S. F.

558,111.—ROTARY ENGINE.—A. W. R. Beer, San Jose, Cal.

558,253.—PRESERVING EGGS.—Helen Bierer, S. F.

558,148.—POISON DISTRIBUTOR.—G. A. Brown, Hardman, Or.

558,156.—SEWER FLUSHER.—F. Cavallaro, San Jose, Cal.

558,304.—PIPE COUPLING.—I. P. Doolittle, Redlands, Cal.

558,302.—GAS ENGINE.—J. W. Eisenhuth, S. F.

558,452.—EXCAVATOR.—W. H. Fulcher, Stockton, Cal.

558,061.—BOTTLE LABELING MACHINE.—Grace & Reynolds, S. F.

558,381.—CASTINGS.—W. Hainsworth, Seattle, Wash.

558,172.—BLACKING BRUSH.—W. Hayball, Portland, Or.

558,200.—BLACKING BRUSH.—A. M. Ingargiola, S. F.

558,203.—HOOK.—H. E. Newton, Los Angeles, Cal.

558,308.—DISPLAY STAND.—R. L. Peyton, Stockton, Cal.

558,107.—POWER TRANSMITTER.—D. S. Regan, S. F.

558,108.—HOISTING MECHANISM.—D. S. Regan, S. F.

558,420.—GAS ENGINE GEARING.—D. S. Regan, S. F.

558,422.—TUBE CUTTER.—J. Richard, Bisbee, A. T.

558,112.—CAR FENDER.—G. Rischmuller, S. F.

558,216.—HAY PRESS.—Shirley & Merrill, El Modena, Cal.

558,219.—PLUMB LEVEL.—E. J. Simmons, Eugene, Or.

558,224.—HOT-CORN HOLDER.—J. D. Stanley, Honcut, Cal.

25,306.—DESIGN FOR LAMP STOVE.—F. E. Browne, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ROTARY ENGINE.—W. R. Beer, San Jose, Cal. No. 558,144. Dated April 14, 1896. This invention relates to an improvement in that class of mechanical contrivances in which any medium under pressure is employed to propel pistons attached to, varied by and rotating around a central shaft or axis. The device being also applicable to those machines in which power is applied to drive the shaft and piston so that they may be used as pumps and water meters and for similar purposes. It consists of an exterior case having eccentric chambers fixed therein side by side, with their eccentricities diametrically opposite; a shaft extending through the heads of the case, disks fixed to the shaft intermediate between the eccentric chambers and exterior thereto, with spring actuated packing rings to form joints between the disks and chambers, piston carrying drums fixed to the shaft within the eccentric chambers, pistons sliding in radical channels in said drums and transverse bars fulcrumed in the intermediate disk between the chambers, the ends of said bars engaging with the oppositely placed pistons whereby the inward movement of one piston is transmitted to produce an outward movement of the corresponding one in the other chamber. The arms connecting the pistons are so formed as to tilt upon fulcrum blocks intermediate between the two chambers, these blocks being made adjustable to compensate for wear.

FLUSHING DEVICE FOR SEWERS.—Francesco Cavallaro, San Jose, Cal. No. 558,156. Dated April 14, 1896. This invention relates to a convenient means for flushing sewers and cleansing them from time to time. The sewer extending along in the usual manner has a man-hole with an open connection with the sewer, a cap-plate is permanently cemented around the opening and itself has a central opening into the sewer. A cover is hinged to one side of the cap-plate with swivelling locking bolts so that its opposite edge is confined, and a projecting flange is adapted to engage a corresponding groove or channel to form a joint between the cover and the cap-plate. A conical valve seat is formed in the central portion of the cover and vertical guide rods upon each side, upon which a correspondingly shaped valve with slotted guiding arms is slidable. From this valve is an upwardly extending rod or handle by which it may be opened and closed. A transverse slot is made in the cover plate with guding wings upon the upper side, and a gate is slidable in this slot having an upwardly extending rod and handle so that communication with the sewer pipe may be cut off or established. Through a suitable supply pipe the water is delivered into the man-hole and the gate in the sewer being closed, the man-hole will be filled and that portion of the sewer above the gate will also fill up. By opening the gate and the valve in the man-hole the water will rush down the sewer pipe and flush out the lower portion of it.

VENTILATOR CARS.—Louis Weinberger, New Orleans, La. No. 538,330. Dated April 14, 1896. The object of this invention is to provide a certain improvement in the ventilation of cars which are employed in the transportation of fruit and perishable products. It consists of a car having double floors and roof sections, with longitudinal passages extending there through openings in the ends of the car communicating with the passages between the floors and passages through the inner floor by which the air is admitted into the interior of the car. Gates or doors are arranged to be vertically slidable upon guiding rods, with means by which the doors are closed into the openings or raised and suspended to allow the air to enter, and valves cover the passages by which the air is admitted into the spaces between the floors, these valves being so constructed as to be opened by the pressure of the air from the outside and closed by a pressure from the interior so that air is admitted from one end of the car and prevented from escaping at the other. In conjunction with this are supplemental pipes or passages extending vertically down in the corners of the car and connected with adjustable wind funnels at the top and openings from the bottom of these pipes are made into the passages between the floors with diverging directing plates extending into the passages from the openings.

AUTOMATIC LETTER STAMPING MACHINE.—Clarence W. Ayers, San Francisco, Cal. No. 558,141. Dated April 14, 1896. This invention relates to a device for stamping letters and packages. It consists of a guide table over which the strips of stamps are adapted to pass, a slotted opening in the front of the casing through which the stamps are projected, a cutter blade fixed at the lower edge of the opening, feed rollers situated between the guide table and the opening and adapted to receive and advance the stamps, a gear and pinion by which one of the rollers is rotated, a pawl and ratchet mechanism engaging the gear so as to advance it, a vertically moving plunger having a fixed cutting blade corresponding with the one upon the side of the opening through which the stamps pass, a spindle connected with the plunger, a sleeve slidable upon the spindle having a lug which engages the lever, to first actuate the pawl and ratchet and feed mechanism so as to advance a stamp and afterwards engage the plunger and move that downward to sever the stamp and apply it to the letter or surface beneath. The letters or papers are placed upon a table by which they are advanced beneath the point where the stamps are to be applied. This table is mounted upon springs so as to be adjustable, and allow any thickness of letter or paper to pass. In conjunction with this device is a moistening roll with a means for supplying moisture thereto, and means for moving the surplus moisture.

HOT CORN HOLDER.—John D. Stanley, Honcut, Cal., assignor of one-half to Austin P. Merrill of same place. No. 558,224. Dated April 14, 1896. The object of this invention is to provide a simple, serviceable and convenient device for holding hot corn while eating the same. The device is composed of two opposing normally closed jaws, the shanks of which are parallel, with one guided and slidable on the other, a spring acting on the shank of the unmovable jaw and exerting a constant pressure against the article held between the jaws, and means, like a finger piece, whereby the movable jaw is slidably retracted in opposition to the normal closing action of its spring.

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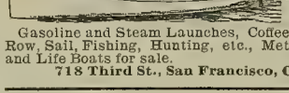


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# Mining Summary.

## An Appeal in the Imported Ore Cases.

Collectors of customs have received instructions from the Treasury Department to appeal the decisions of the Board of General Appraisers in the cases of the Guggenheim Smelting Company and the Balbach Smelting Company to the U. S. Circuit Court. The cases are of importance, as upon the ultimate decision of the court will, the smelters claim, depend whether foreign ores can be separated in bond in this country. The cases were test ones and have attracted much attention. Both concerns imported from Mexico base bullion, composed of gold, silver and lead, the lead being the vehicle for the precious metals, predominating largely in quantity, while the gold and silver were the components of chief value. The collector assessed duty upon the gross weight of the product as pig lead. The importers claim that, under section 21, paragraph 66, of the tariff, duty could only be assessed on the amount of lead found by assay. The Board of General Appraisers sustained the claim of the importers. If this ruling of the board should be reversed, it is claimed by the importers that it will drive the smelting of foreign bullion from this country, as bullion smelted in England and all the products imported into this country would be dutiable at only 1 cent per pound for the lead, while the gold and the silver would be free. The opinion of the Board of General Appraisers on this matter is in part as follows:

"The counsel for the Government takes exception to the jurisdiction of the board under instructions from the department contained in a letter dated Feb. 15 last, which he submits as part of the record. The department states in this letter: "I invite your special attention to the fact that these protests are not against the assessments of duties, but against the collection of the duties assessed and liquidated without protest, and, consequently, that the board has no jurisdiction. You are doubtless aware that the regulations prescribed under section 21 of the Act of Aug. 28, 1894, deal with the abatement or collection of the duties accruing on the warehousing entry of imported impure metals or ores, and not with the assessment of such duties, still less with any assessment of duties on the products, which were not imported as such."

It appears that the merchandise was imported Dec. 11, 1895, at Newark, N. J., from Tampico, Mexico. It was entered on rewarehouse withdrawal for consumption on Feb. 3, 1896. The entry was stamped "liquidated," Feb. 3, 1896, and the same day, after liquidation, the importers filed their notice of dissatisfaction, setting forth distinctly and specifically the reasons for their objection to the Collector's decision as to the rate and amount of duties chargeable upon the imported merchandise.

The protest is made under the exact circumstances and in the form described in section 14, Act of June 10, 1890, and fulfills all the requirements of that provision. In accordance with said section, the Collector transmitted it to the Board of General Appraisers, on duty at the port of New York, which board, the law goes on to say, "shall examine and decide the case thus submitted."

Section 21, Act of August, 1894, in its bearing on the present case, may be plainly construed as follows:

"Metals imported in any crude form, requiring smelting or refining, shall be removed from the vessel to the bonded smelter or refinery without payment of duties thereon. Each day a quantity of refined metal equal to the amount of imported metal smelted or refined that day shall be set aside for exportation, or it may be removed upon entry and payment of duties for domestic consumption, all to be under regulations prescribed by the Secretary of the Treasury."

Section 21 is substantially a reproduction of Section 24, Act of 1890. It is presumed, therefore, that the Treasury regulations on the subject dated Jan. 8, 1891, ss. 10,585, are still in force. It is provided in these regulations (paragraph 4): "The appraisers will ascertain by proper assays the quantity of dutiable refined metal or metals contained in the crude metals or ores, as entered, and the quantity so ascertained will be noted in the warehouse entry and bond. Upon a withdrawal for consumption in the United States of any refined dutiable metals set aside and stored as the equivalent for the metals contained in the crude metals or ores smelted in such warehouse, duty will be collected on the corresponding quantity as shown by the original assay of such imported crude metals or ores, without any allowance for wastage."

If the gross weight of the bullion was dutiable, why assess duty by assay instead of by weight? Or why should the importer incur all the expense of maintaining a bonded warehouse and the required inspectors and bookkeepers, if in the end he had to pay duty on the gross weight landed?

It is a contention on the part of the Government that the bullion should pay duty by gross weight as landed, although merchandise deposited in bond is dutiable only at the weight ascertained upon withdrawal.

Were this contention correct, how should the article be classified? Certainly not directly as pig lead, when it is neither pig lead nor any one of the lead products enumerated in paragraph 165-7 and when lead is as far from being the component material of chief value. An experimental rate might be levied under paragraph 177 and section 3, or exemption might be claimed under paragraphs 423, 556 or section 4. But why consider the problem when section 21 and ss. 10,585 afford a simple solution?

The department regulation provides that upon the withdrawal of dutiable refined metals duty shall be collected upon certain corresponding quantities of dutiable refined metals as found by the Appraiser's original assay, or, briefly, that duty shall be assessed upon the dutiable metals as shown by the original assay.

We sustain the claim that the merchandise is dutiable only upon the lead contained in the bullion, which is withdrawn in the shape of pig lead, in accordance with section 21 and with the Treasury regulations on the subject."

### CALIFORNIA.

#### Amador.

Ten stamps are now running at the Gover mine; this number will soon be increased to the full capacity of the mill.

At Amador City the Keystone Company has over one hundred names on its payroll; the South Spring Hill consolidated mines are beginning to be operated again with a full crew of men.

Superintendent Burrington who introduced the use of petroleum as fuel at the Glover mine pronounces it a great success. His fuel is now costing him the same as wood at $4 per cord.

*Record*: The Argonaut shaft is now down 1220 feet, and they are still sinking, at present in gouge making 2½ feet daily. The Argonaut is the only mine that was ever sunk in the county nearly so deep as it is, without stations crosscuts or drifts.

The Median mine is paying well. With ten stamps of the South Spring Hill mill in operation they are paying up past indebtedness, sinking in another of their group of mines and reopening the South Spring Hill.

Recently the output of the Keystone has been better than for many years. They are catching up with their old indebtedness and intend soon to prospect the 1400-foot level.

*Republican*: Near Volcano, the Reward mill on the Clough place is closed down. The Fogus mine has also suspended operations. The Studhorse mine, formerly known as the old Tulloch, is now owned by Gillick and Lyle. They are sinking.

The Good Hope Mining Company proposes to increase the capital stock from 50,000 shares at $10 each, to 700,000 shares at $1 each.

The Oneida shaft is down 160 feet. Eighteen men are employed in sinking, in three shifts of eight hours each.

The first shipment of sulphurets from the tailing plant below the Zelia mill was made this week to the Selby Smelting Works at Port Costa. They are treated for $11 per ton, delivered at Ione, and it costs $3 per ton to haul to Ione, making the total cost of $14 per ton.

#### Butte.

It is now deemed probable that the gravel mine at Cherokee will soon be in operation again. This property has a record of producing $13,000,000 in gold. In the event of its immediate resumption, Butte's $700,000 gold yield in 1895 will be increased materially in 1896.

#### Calaveras.

Near West Point the Machu mine, which is operated by the Machu Gold Mining and Milling Company of Denver, Col., has men sinking the shaft and two shifts in the drifts taking out ore. The company has bought the Smith Ranch, the south extension of the Machu, at a reported price of $13,000.

At the Soap Root, near West Point, Capt. Somerville has in the bottom of the shaft, 100 feet deep, a four-foot vein, which assays well.

The Granite mine, which has not been worked in the past sixteen years, has recently been taken in hand by J. D. Morgan in the interest of the Granite Gold Mining & Milling Company. Eight men are at work repairing the mill and cleaning out the drifts. The ore is of the same nature as the Machu mine and will run from $3 to $25 per ton, which is all extracted through tunnels and run by cars into a ten-stamp mill run by water power.

Near Murphys the mine that J. S. Sublette located two years ago across the Stanislaus from "Colliers," and bonded to the present company, has a 3-stamp mill in operation upon it and is yielding good returns. The Iron Mountain Co. of Shasta is extensively interested in mining property, having bonded several mines of repute.

The Central Hill gravel mine is running day and night with a force of fourteen men, and with the use of powder to shatter the banks and with wheel and derrick great progress has been made. A partial cleanup of 50 feet of flume yielded $1600.

*Prospect*: At the South Paloma the shaft that was started from the surface has made connection with the one that was started in the tunnel, making the depth on the lead now 160 feet. Hoisting works and other necessary machinery are to be erected at once and then the work of sinking to the depth of 600 feet will be commenced.

The shaft at the Gwin mine is now down 1140 feet and is still being sunk at the rate of from 12 to 15 feet per week. The flow of water is about 14,000 gallons per day.

#### El Dorado.

(Special Correspondence.)—The Pine Hill, Company, composed of San Francisco people is progressing methodically in its work. The property is situated 15 miles west in the Jay Hawk district. The shaft is 208 feet, on a 20-foot ledge. The drifts to north, south, east and west are respectively 70, 50, 150 and 100 feet. The ledge between the walls is 90 feet and all mineralized.

Work on the Vulture, one mile north of town, owned by Deuch & Craddock, is progressing gradually. The tunnel is 100 feet, and the shaft, on the ledge, is 150 feet.

The disposition to give favorable terms to reliable parties for working bond and lease is gradually growing upon our people here who own mining grounds and lack capital for development.

A. S. Bosquit has bonded his interest in the Gardner mine near town to Fowler & Benson who will begin developement work with J. French, owner of half interest in the Gardner.

The incorporation of the Larkin mine, which took place last week, proves that the owners have succeeded in developing a promising property. They awaited incorporating until development work warranted this step.

A small cyanide plant for custom work, combined with an assay office, located in this town would be a paying investment.

Placerville, April 22, '96.

(Special Correspondence.)—The Baltic Mining and Milling Company has incorporated. Capital stock $30,000, fully paid. There are 30,000 shares at $1 each. Board of Directors: Goodwin George, L. M. Barnes, M. Hanahan, Placerville; L. M. Howard, San Francisco; W. B. Stuart, L. Thurwatcher, Aptos; W. H. Coover, Santa Cruz. The property consists of three claims 23 miles east of Placerville, one mile from the Blue Gouge now undergoing development work by Mackay & Head. It was worked twenty years ago with a cannon ball mill but abandoned for want of harmony. The present company after considerable prospecting and cleaning the tunnels are now drifting on the ledge, a 3 foot body of ten dollar ore. A ten-stamp mill is en route. There are 250 tons of ore on the dump. There is timber in abundance and 250 inches of free water the year round.

The Lady Emma Mining Company has levied an assessment of 20c per share, delinquent May 25th.

#### Kern.

Randsburg attracts attention. If one-half what is reported from there is one-half true it is a rich spot.

Garlock's eight-stamp mill at Cow Wells is running.

The owners of the Olympus have resumed development work. The Trilby claim adjoins it. The question of water has been a problem, but there are 1000 inches at Kane springs. Cudderback wells are an inexhaustible supply. There are 200 men in the camp.

#### Mariposa.

The Hites Cove people have suspended operations and discharged the force of men.

*Gazette*: The Merced Gold Mining Company are pushing work in all their mines. Drifting is being carried on quite extensively. Sinking at the Mary Harrison still continues in good ore. The mill is running steadily with good results.

In a few days a large force of men will be put to work in the Virginia mine. A new engine has been purchased for the hoist.

The Red Banks mine is being developed with a force of twelve men.

#### Nevada.

The Sebastopol gold mine of Grass Valley is listed on the Gold Mining Exchange; capital stock, $3,000,000, with 300,000 shares of $10 each; B. G. Lathrop, president; Walter Turnbull, vice-president; V. L. Turnbull, secretary and treasurer.

The Home Gold Mining Company has levied an assessment of 5 cents per share, delinquent May 18th.

The Peabody Gold Mining Company of Grass Vally has reorganized; president, J. J. O'Farrell; treasurer, Baron Von Schroeder; secretary, B. Natorp. Electric power will be used.

The *Union* learns the Electric Power Company proposes to work the river bottom of the South Yuba, between the dam and power house of the Electric Power Company —a distance of about three miles. When the Blomfield hydraulic mine was going the methods of saving gold were crude and gold undoubtedly washed down the river.

The Boyle gravel mine on Squirrel creek has been bonded to H. A. Moss and W. G. Scott of San Francisco.

The Allison Ranch Company have not yet decided what power will be used to work their mine.

*Union*: San Francisco and Eastern men have bought the Fortuna and Orleans mines. The Fortuna, or Live Yankee, as it is also called, is on the upper Grass Valley road. The Orleans is on Gold Flat. The owners will sink a new shaft on the Fortuna 1000 feet.

#### Plumas.

The Elizabeth Town Gravel Mining Company has incorporated in San Jose, to work a gravel mine; capital, $100,000; G. W. Hanson, F. H. Smith, G. H. Salisbury, P. Lanz and J. C. Hayes directors.

#### Riverside.

Dudley Porter and others of Haverhill, Mass., in a suit against J. M. Sigafus for $1,000,000 have secured a verdict in the United States circuit court for $330,375. The plaintiffs charged that the defendant sold them a gold mine in Riverside county, and misrepresented its character. The defendant claimed that the misunderstanding arose over the incompetency or the negligence of the experts employed by the plaintiffs to inspect the mine. They also claimed that the mine was mismanaged after the sale.

#### Sacramento.

The Golden Land Placer Mining Company has levied an assessment of 1 cent per share, delinquent May 20th.

#### San Bernardino.

E. J. Baldwin is credited with intention to reopen and develop his mine on Gold mountain, near Holcomb valley.

Thomas and Wood report a discovery of a deposit of borax, five acres in extent, sixteen miles north of Barstow, and show samples of the rock, which assays better than that taken from the mine of the Pacific Coast Borax Company at Calico.

#### San Diego.

The Chucawalla Mill and Mining Company has incorporated in San Diego: capital stock, $1,000,000; president, H. E. Crepen; secretary, A. Crepen; superintendent, H. Santee.

#### Shasta.

*Free Press:* Ellery brothers, on Kline gulch, recently ran through twenty-two and a half tons of ore, which gave a return of $6000. They have a tunnel 500 feet in length on the ledge at a depth of 100 feet. The ledge varies from 16 to 22 inches.

*Searchlight:* George Schmitt and Fred. L. Rahn, purchasers of the group of mines belonging to the Forbes estate, will put up mills and the necessary works to treat their ores. The mines are located near Newtown, about seven miles north of Redding, and the ledges are large and well-defined. There are eight claims in the group, including a good mill-site, with plenty of timber and water at hand.

#### Sierra.

R. B. Harper has bonded the Salinas and Mercer quartz mine ten miles east from Downieville from J. E. Freeman. There is a ten-stamp mill upon the property.

Near Sierra City, the Butte Extension quartz mine has a tunnel 370 feet long, which taps the ledge at a depth of 350 feet. At present a crosscut is being run to tap the foot-wall ledge which contains 25 per cent sulphurets, assaying well.

#### Siskiyou.

*Journal:* The weather during the past month could not have been more satisfactory to the hydraulic miners. The cold nights have prevented the snow in the high mountains from melting too rapidly, but it has been warm enough during the day to furnish a good supply of water, which has kept the giants in operation. The miners around Oro Fino and other localities are counting on having fully as long a season as usual. Some good work is being done in the hydraulic mines in this county.

The Espey, Hunter & Co. mine at Hawkinsville has been worked with greater success than ever during the past two months.

The Distlehorst Bros. will immediately begin work on their boats near Oak Bar for the new dredger which they intend putting in.

The Horse creek ditch has been completed and the mine is now in operation. They are running one giant with a 4-inch nozzle, having a 300-foot pressure. They have a 120-foot dump.

J. R. Garrett, at Hamburg Bar, a mile below the mouth of Scott river, is putting in a large wing dam.

#### Trinity.

Four teams are at Redding from the Altoona quicksilver mine at Cinnabar loaded with 150 flasks of quicksilver valued at $60,000. The present output of the mine is about six hundred flasks per month.

*Journal:* Ricard and McCue have sold the Bunker Hill quartz mine, in the vicinity of Lowden ranch, to Messrs. Harrison & Kolman of San Francisco, for $8,000, who will erect a stamp mill and put men to work in the mine at once. Work will also be commenced on the Grove quartz mine.

The Poker Bar Placer Co. will commence May 15th to rebuild the dam which was washed out last winter. The dam is to be 600 feet long, 9 feet high and will be substantially built in every particular. About forty men will be employed in its construction. The Poker Bar Placer Co. has been incorporated with a capital stock of $2,000,000.

The McKenney mines on Mooney gulch, above Lewiston, have been bought by the St. Helena Mining Co. Active work will commence as soon as the survey is completed, in digging a ditch six miles in length, from Papoose creek to the mine. A large force of men will be worked, and it is expected that the ditch will be finished and hydraulicking begun about the first of June. The Bank of St. Helena, Napa county, is one of the principal owners.

#### Tuolumne.

Supt. Geo. J. Smith of the Grant gold mine reports that the third tunnel has advanced over 4 feet the past week, being now nearly 150 feet in length. The quartz is darker, looking better and carries more sulphurets.

The Coast Development Company has levied an assessment of 3 cents per share, delinquent May 25th.

*Independent:* The output of the Rawhide is as great as ever. The Erin-go-Braugh is being developed by sinking a new shaft. Work is being pushed rapidly on the App mine, and the 20-stamp mill is running steadily. The New Era mine has been bought by P. G. Gow of San Francisco, agent for the MacArthur-Forest process. The Tarantula mine has been purchased by Hugh McDonald of the Alameda. It adjoins the Alameda on the north. At the Old Soulsby mine a 3-foot vein

has been uncovered in the new shaft, showing free gold.

Yuba.

The Hibbert and Burris mine at Browns Valley is to be known in future as the Faust Hill Claim.

## NEVADA.

ESMERALDA COUNTY.

J. M. McSwain is reported to have made a gold strike near Cambridge, on the East Walker river. He has a shaft twenty-six feet and a six-inch ledge of ore that assays $290 in gold. This ore is being hauled to the Gignoux mill which has started up. Prospectors are going in lively. McSwain discovered his prospect while riding through the canyon; his horse stumbled over a boulder which upon being pounded up gave a return of about $50 in gold. He then began to search for the vein and soon discovered it and sank the shaft. Gold has been known to exist in the hills of that section for years, but this is the first strike that has been made that has ever promised much.

HUMBOLDT COUNTY.

The Numa Mining Co., in Trinity district, has levied assessment No. 3, of one-half cent per share, delinquent May 23.

LANDER COUNTY.

The *Reveille* hears that the Austin Mining Company has located Kingston creek and Big creek, with the view of generating electricity with which to light up Austin, and that Supt. Stokes has gone over the survey of the N. C. R. R., south of Austin, with the idea of extending the road from Austin to the Colorado river. If these improvements are made, and the big tunnel into Lander Hill proves successful, that section of Nevada will experience considerable activity in the next few years.

LINCOLN COUNTY.

At De Lamar the new mill with a capacity of 200 tons a day, will be started May 1st.

M. Wilson, manager of the April Fool, has returns from ore sent to Salt Lake, which show a valuation of $100 per ton.

The Flagstaff, south of the town of De Lamar, has been developed during the season, and is expected to be the next contributor to De Lamar's output.

## OREGON.

BAKER COUNTY.

The Columbian Mining Company has incorporated, $1,000,000 capital; V. and L. H. McDowell and W. E. Grace; Baker City. The mining property is the Columbian mine in Virtue district.

JOSEPHINE COUNTY.

Blalock Bros. are piping with a good head of water at the head of Grave creek.

Twenty men are at work on the Hampton-Lewis placer. Three giants are at work.

JACKSON COUNTY.

Wells and Taylor have leased the Lucky Bart mine on Sardine creek, and have five men at work.

The Grants Pass *Courier* says: The Gold Basin Company expects to send a party of prospectors out to the works in May to determine whether the ground justifies any more expense. The work done out there last summer was mostly thrown away, as no proper survey has been made. Some $500 was expended in setting up a sawmill alone and at this writing the water for hydraulicking will have to be raised the enormous height of 2500 feet, which according to the last expert's report, needs ground that will prospect $1 to the cubic foot. No greater than 10 cents to the foot has thus far been discovered. The company is an honest one; has paid all bills and spent its money in good faith and it is to be hoped the ground will justify going ahead.

## WASHINGTON.

OKANOGAN COUNTY.

The Okanogan Gold Mining and Milling Company is incorporated, D. W. Henley, E. S. Williams, W. T. Stoll and C. E. Adams; capital stock $750,000; to develop the Small Hope, Grand, Triumvirate, Invincible, California, Tranquility, Virginia and Carson, which adjoin and surround Triune and Spokane claims at Golden.

## BRITISH COLUMBIA.

The *Review* hears that 12,000 tons of ore from the Slocan Star mine will go out over the Canadian Pacific to the Omaha & Grant smelter at Omaha. This ore is loaded on the cars at Sandon, taken to Nakusp, then loaded on the boat and carried to Arrowhead, and again loaded on the cars. This is a long way to take the ore, but the Canadian Pacific proposes to get their share of the tonnage from Kootenay. The contract is for the monthly delivery of 1500 tons.

In 1862, says the New Denver *Ledge*, the British Columbia Government offered a bonus of $5000 to anyone who would discover a gold quartz mine and prove that it would pay at a depth of twenty-five feet. S. T. Walker, now a resident of New Denver, while on his way from Cariboo to Yale in the fall of '61 found a quartz claim on Bald mountain between the forks of Keithley and Antler creeks, assays of which went $27 in gold. Thinking to obtain the bonus he returned with some men to where he had found the ledge in July, '62. Breaking through eight feet of snow they reached the ground on the 8th of July and commenced work. After paying $16 a day wages and sinking a shaft fifteen feet deep the pay streak disappeared, and Mr. Walker was out $3200. As it was the first attempt in the Province to develop a quartz mine Governor Douglas was in favor of paying the $5000, but the Government voted it down, and Walker received nothing except the satisfaction of being the first man to open a gold quartz lead in British Columbia.

## IDAHO.

The *Avalanche* hears that Gen. Manager Grothe, of the Poorman Gold Mines, Ltd., has sent in his resignation. Supt. Hutchinson, of the Trade Dollar, is now exporting the Poorman property for the London owners.

Kleinsmidt & Bro., of Helena, who are interested in Seven Devils copper mines, authorize their agent, Weiser, to contract for the hauling of 800 to 1600 tons of copper ore during the coming season from the mines to the railroad.

About two miles from Wallace a new mill of 100-ton capacity will be erected by Burke and Gies on the Formosa mine, southwest of the Gem mine. A nine-foot ledge of concentrating ore is uncovered a distance of 300 feet. The ore assays are said to give sixty per cent lead, fifty-three ounces silver and $5 gold, it being the first gold assay known on Canyon creek.

The Black Bear mine, above the Frisco, has been idle for many years. The sheriff will sell it on the 9th of May.

At Burke the insurance adjusters are still at work estimating the loss of the Consolidated Poorman and Tiger Company. It is considered certain that rebuilding of a large plant will commence next month.

The Standard is working eighty men, the Gem fifty or sixty and the Frisco 150 men. At present the Cœur d'Alene mines are employing about the same number of union men as non-union men; and while the union men complain considerably about the cut in wages, the hard feelings of a few years ago have cooled down.

At Murray the Arizona Hydraulic Mining Company is running full time. The face of the bank is now 90 feet.

At Thiard the Jenkins mill has been running on low grade ore without striking a pocket for some time. The management has had canvas tables put in to handle the tailings over again.

## UTAH.

Speaking of Mercur ore zones, Manager Robinson says the mineralized zone is a stratum of altered limestone, ranging from 6 to 85 feet in thickness, thoroughly impregnated with arsenic in the form of realgar and mercury or quicksilver in the form of cinnabar, carrying gold in varying quantities, ranging from a trace to several hundreds of dollars a ton. The apex, or vein, is generally rather flinty limestone, which is sometimes decomposed clayey material of yellow-ocher color, which usually assays from a trace to $3 a ton. In some places in the ore-bearing zone silica has been deposited as a replacement pseudo-morphic. The hanging wall is a black clay shale, the color being due to the carbon contained. This shale usually carries the coal fossils and sometimes carries a finely disseminated iron pyrites, which is not, however, arsenical. The shale is very fissile in character and contains enough lime so that when exposed to the atmosphere it quickly slakes away to clay. The foot wall of the zone is usually hard crystalline limestone, but it is not at all uniform. Holes and channels are formed where mineral solutions have replaced the lime, and in these channels the ore is generally of better quality than is the general average of the whole mass. In many places the workable zone has developed a thickness of twenty-four to thirty feet, and the average thickness of the ore bodies may be placed at fifteen to eighteen feet. The direction of the foot-wall channels may be stated as approximately parallel with the local dip of the strata. The appearance of the ore is yellow, brown, red brown, sometimes gray or black, and the limestone itself, when it is colored, usually carries good working values. The payable portion of the ore of the vein on the foot-wall side can only be determined by assay, while the hanging-wall side is distinctly marked.

The vein in the Mercur district is not a vein at all as the term is usually understood. A better name would be an inter-calate vein or mineralized zone of country rock. The Germans, recognizing this character of deposit, have given it the name of a "fahlband," meaning a rotten stratum. It is undoubtedly true that the silica occurs as a chemical replacement, and the only difference between the Mercur district and other localities farther south is that in the Mercur district the chemical intercharge is as yet incomplete. At the Mercur district the payable values do not always follow one stratum. There is evidence that there are at least three separate and distinct mineralized zones. It is also probably true that the whole area of the country will not be underlaid with gold-bearing rock in payable values, but that the shoots will assume definite boundaries with a trend lying between the walls in a definite and direct course. As to what this direction is at the present time has not been determined. There has been some discussion among mining men as to the probability of the ore-bearing zone at Mercur carrying with it extra lateral rights. From the general construction of the zone, and the fact that there is hardly an instance in the Mercur district where the letter of the mining law has been strictly complied with, it will be very difficult to enforce mining rights on the dip of the vein outside of the vertical boundaries projected.

The Park City *Record* severely condemns the Morgan mine at Hardscrabble; it has had tests made by five assayers. The analysis showed the rock to contain 63.822 silica; 32.68 specular iron (an oxide); 1.135 iron pyrites, making a total of 97.637 per cent. The balance, 2.363 per cent, was decided to be organic matter. These assays are all vouched for as being absolutely correct.

The *Tribune* has information that the Copper plant owners will resume by June 15th. Upon the smelter at the present time there has been expended between $300,000 and $400,000. To put the plant in condition that it may enter the market and compete for ores with a capacity for reducing them implies an expenditure of perhaps $30,000 on the plant itself; this, of course, not including the electrolytic feature for the refining of the product. At present the plant is provided with one furnace with two reverbatory furnaces which will enable it to handle over 100 tons of ore a day, while to increase this would involve an outlay of but about $25,000, which would then afford employment for over 100 persons.

## MONTANA.

The 100-ton concentrator plant of the Chicago & Montana Mining Company, near Libby, is finished. Supt. Lacoursier has a pressure of 205 pounds on the water gauge in the mill. The Snow Shoe mine, the principal one of the group, will supply 150 tons of ore daily.

THE ANACONDA DIVIDEND.—*Inter-Mountain:* The sensational event of the week in mining circles has been the declaration of the Anaconda dividend of $750,000.

It is the greatest amount ever declared by a Montana mining company.

We think it is the greatest dividend ever declared by an American copper company.

It is the greatest dividend ever declared on the Pacific coast since the Comstock days, if not since the discovery of the Comstock itself.

It is a wonderful thing for the city of Butte and the State of Montana.

It is a great credit to the management of the company and will probably not be objected to by the stockholders.

Beside, it will be repeated every four months.

In all respects the Anaconda is now the greatest mining enterprise in the world.

[The above is worthy of reproduction as illustrative of the importance of Pacific coast mining interests. Without detracting from the magnitude of the Montana dividend it is in order, however, to state that greater mining dividends have been paid and are now being paid. Twenty years ago, on the Comstock, one mining corporation alone, the Con. Cal. & Va., used to pay monthly dividends of $1,080,000. Greater dividends than $750,000 every four months are now being paid by one individual mine in this State.—ED. MINING AND SCIENTIFIC PRESS.]

## WYOMING.

Edholm & Aikin of Deadwood, S. D., are preparing to reopen and develop some old prospects made at Spring Hill in 1868. Three brothers were killed by the Indians and their mines have remained untouched until the present time. Work on the mines in the Copper Mountain district is progressing. The tunnel being driven on the Albion property is in 150 feet and in rich ore. On the Cœsus the tunnel is in 200 feet. The Gold Coin Mining and Milling Company is being formed, Messrs. Bracken, West and Morgan as incorporators, to work the Emma G., Clara B., King Solomon and Minneapolis prospects.

## COLORADO.

The Pike's Peak Tunnel Mining Railway is the name of a company registered at New York City that proposes to tunnel through the heart of Cripple Creek at the average depth of 2500 feet, and to pass under the Victor 4000, Portland 3500, Rebecca 3550, and Independence 3200 feet from the surface.

Work has begun on the chlorination works to be built at Colorado City by the Colorado Philadelphia Company. The *Prospector* says the daily capacity of the mill at the outset will be 200 tons, and the cost of the plant and site will be about $300,000.

At the Tomboy mine in San Miguel county a forty-stamp mill is ready to handle the ore of the company's purchase in the Gunnison gold belt. During the winter a force of men has been employed in sinking a shaft 250 feet and drifting 1000 feet on the ledge, a continuous ore body averaging about seven feet wide of $12 quartz.

AT IDAHO SPRINGS.—Because of the demand for milling facilities for the treatment of low grade ore, J. G. Roberts, manager of the Silver Age mill, has begun preparations for the erection of a 100-ton capacity mill, within the town limits at the point where Chicago creek empties into Clear creek. The water for power will be taken from Chicago creek.

*Mining Industry:* Platinum is reported to be found in the Annie C. C. mine, Swiftwater district, Chaffee county, at the rate of three ounces per ton. The ore of the Annie C. C. runs from $75 to $105 in gold, and the addition of platinum to the extent reported should add materially to the values. Just how the platinum occurs is not made clear. The chief ore of the Annie C. C. is a white sulphide of iron in white quartz.

*Mail:* The continued shipping of silicious ores to the smelters has created a demand for the dry ores of Cripple Creek that has made a heavy reduction in the smelting charges and will no doubt have a beneficial result in the production of the mines of the camp. Representatives of two leading smelters are now in camp making contracts with some of the larger mines for the treatment of their ores at $7 and $8 a ton. Efforts are made to keep the new rate secret and representatives are quietly making all the contracts they can at the reduced prices, and the agent of one the largest plants in the State will reach camp to-morrow to protect his company from the inroad that is being made by its competitors. This cut from $14 to $7 and $8 will undoubtedly stimulate production and at the same time make the smelters formidable competitors of the mills that have been getting almost as much for treating the ores as the new rates of the smelters. With a $7 smelter rate and a $5 freight rate it will be possible for some of the low-grade ores now going through the mills to be shipped to the smelters instead.

## NEW MEXICO.

GRANT COUNTY.

AT PINOS ALTOS.—*Enterprise:* The Golden Grant employs thirty miners working constantly on ore. The mill is turning out gold bullion and concentrates.

Spiller and McLean have twenty men at work on the Pacific company's claim on the Pacific vein. Ten stamps of the company's mill near Silver City are crushing ore.

A. Hersberger is working twelve men on the Western.

Eighteen men are employed on the Atlantic mine, sinking and crosscutting.

W. C. Chandler has twenty-six men at work on the first, second and third levels of the Mountain Key. The ore produced runs over two ounces per ton on the plates. The ore is being reduced at the Stanley-Martin mill.

## ARIZONA.

Dr. Theo B. Comstock, representing the Prescott Development syndicate of Glasgow, Scotland, has purchased the Elkhart mine at Chloride, Mojave county, twenty-five miles northwest of Kingman.

Positive denial is received of the alleged sale of the Casey mine, Dos Cabezos, Cochise Co. It is neither sold nor bonded.

The Golden Cross Mining Co., has organized at Yuma, Arizona; Mullins, Fuller and Hedges; capital stock, $10,000,000, amount paid up unstated. The articles of incorporation have been filed in San Diego, Cal.

## SOUTH AFRICA.

General Manager Mein reports the following operations of the Robinson company for February, coupled with statements of expenditure and revenue: Mine. Quartz mined, 14,075 tons.—Development. Drives, 693 feet; raises, 171 feet; crosscuts, 110 feet; total, 974 feet.—Main incline shaft (west): Fifth level. Driving west on south reef 16 feet.—Sixth level. Driving east on south reef 39 feet.—Seventh level. Driving west on main reef 40 feet; driving east on south reef 35 feet.—Eighth level. Driving west on main reef, 49 feet; driving on south reef 15 feet.—Ninth level. Driving east and west on main reef, 62 feet; driving west on south reef, 40 feet; raise, 39 feet; crosscut, 32 feet.—Tenth level. Driving west on main reef, 33 feet; driving east and west on south reef, 12 feet; raise, 37 feet.—Main incline shaft (east): Fourth level. Raise 55 feet.—Fifth level. Crosscut 29 feet.—Sixth level. Driving east and west on main reef, 60 feet; driving west on south reef, 31 feet.—Seventh level. Crosscut 49 feet.—Eighth level. Driving east on main reef, 36 feet; driving east and west on south reef 78 feet.—Ninth level.—Driving west on main reef 40 feet, driving east and west on south reef 44 feet.—Tenth level. Driving west on main reef 26 feet, driving west on south reef 37 feet, raise 40 feet. Total 974 feet.—Mill. Stamps at work 120, net running time 25½ days, tons crushed 14,075, tons per stamp per diem 4.6, gold won from above 8866 ounces 11 dwts.—Chlorination and cyanide works. Gold won from own concentrates (by chlorination) 1038 ounces, bullion from tailings (cyanide process) 1713 ounces, 13 dwts., bullion from slimes (Rand Central Ore Reduction Company, Limited) 1316 ounces 18 dwts., from own ore 12,935 ounces 2 dwts., gold from concentrates purchased (by chlorination) 1887 ounces 3 dwts. Total 14,822 ounces 5 dwts.

EXPENDITURE AND REVENUE.

Crushed 14,075 tons.

Working expenditure.

| | | Cost per ton. |
|---|---|---|
| Mining account (including mine maintenance) | £7,683 1 5 | £0 10 11·01 |
| Milling account (including mill maintenance) | 2,344 11 1 | 0 3 3·98 |
| General maintenance account | 344 12 6 | 0 0 5·88 |
| General charges | 1,665 5 7 | 0 2 4·39 |
| | £12,037 10 7 | £0 17 1·26 |
| Expenditure on mine development, (including main shafts) | 2,734 15 4 | 0 3 10·63 |
| Ditto on machinery, plant, and buildings | 1,056 15 0 | 0 1 6·02 |
| | £15,829 0 11 | £1 2 5·91 |
| Retreatment account: | | |
| Working expenses at cyanide and chlorination works | 2,131 3 11 | |
| Cost of concentrates purchased (including receiving) | 6,363 15 6 | |
| | | £24,324 0 4 |
| Profit for month | | 25,114 4 0 |

REVENUE.

| | | |
|---|---|---|
| Gold account (mill) 8866 ounces 11 dwt | £31,697 18 3 | |
| Sundry revenue | 170 0 0 | |
| | | £31,867 18 3 |
| Slimes plant account: | | |
| 2638 tons delivered | | 425 8 6 |
| Retreatment account: | | |
| Gold account (tailings) 1713 ounces 13 dwts | £5,483 13 6 | |
| Carried forward | £5,483 13 6 | £32,293 6 9 |

## NEW SOUTH WALES.

The Rothschilds have acquired a large interest in smelting works projected on an extensive scale for the treatment of silver ore from Broken Hill by the Ashcroft process. The company termed the New Sulphite corporation has purchased a site at Cockle creek, about twelve miles from New Castle, and works costing $290,000 are being erected, to employ 1600 men.

## Coast Industrial Notes.

—Last week the price of onions was $18 per ton, now it is $50.

—Newell Bros. are building a large soap factory on Army street, this city.

—Frosts have sent the price of grapes in Sonoma county up to $25 per ton—the highest for years.

—The track of the San Joaquin Valley road has reached the Merced river, which is now being bridged.

—A bill has passed both houses of Congress establishing a naval station on Goat island, in San Francisco bay.

—Southern California orange growers figure on a profit of $1.30 per box this season. Many groves produced from 200 to 300 boxes an acre.

—The Union Iron Works will expend $100,000 this summer in the construction of two buildings at the Potrero, an office building and an additional workshop.

—The Enoch Talbot is at Redondo loading oil for this city. At a recent meeting of the directors of the Los Angeles Oil Exchange a sale was made to the Arctic Oil Works of San Francisco of 9000 barrels.

—Oakland is sometimes charged with being a little slow, but the steamship Kodiac, for the Alaskan trade, 100 feet long, 22 feet beam, 9½ feet depth of hold, was recently built there in twenty-four days.

—Over nine years ago, March 3, 1887, Congress appropriated over $350,000 for the purchase of a site for a new postoffice in this city. The appropriation has since been increased and hope is entertained in some quarters that in nine years hence work may begin on the structure.

—Committees representing the Mechanics' Institute and the Manufacturers' and Producers' Association have about arranged a preliminary basis of operations to effect the union of the two organizations in an exposition of California products and manufactures next fall, under the joint management of both bodies.

—The U. S. Supreme Court this week decided that the Central Pacific Railroad Co. must pay taxes on the lands of its grant within the State of Nevada which have been surveyed but not patented, the costs for the survey not being paid, the taxation of such land being specifically authorized by act of Congress of July 10, 1886.

—The *Lumberman* reports that the total rail shipments of lumber from the State of Washington via the Northern Pacific, Great Northern and Canadian Pacific railroads in March were 762 cars as against 423 in March, 1895. The total number of cars of shingles was 1220, as against 1097 in March, '95, an increase this year of 239 cars of lumber and 123 cars of shingles.

—Five bushels of wheat are supposed to be required for a barrel of flour. According to a prominent California miller, by the new process four and a half bushels of wheat will make a barrel of fine flour. The figures are as follows:

| | *Per Cent of Wheat.* |
|---|---|
| Screenings | .04 |
| Finest flour | .12 |
| No. 1 flour | .25 |
| No 2 flour | .19 |
| No. 3 flour | .06 |
| Middlings | .20 |
| Bran | .14 |
| Total | 1.00 |

## Recently Declared Mining Dividends.

THE regular Alaska Treadwell dividend of $75,000 will be paid on the 28th inst.

THE Highland mine, South Dakota, pays its regular dividend of 25 cents per share this week.

THE Boston and Montana Mining Company has declared a dividend of $2 per share, payable May 20th.

THE Alaska-Mexican Mining Company, Douglas Island, Alaska, has declared a quarterly dividend of 10 cents per share, $18,000, payable on the 28th.

## Commercial Paragraphs

THE Dodge Mining Machinery Co., M. B. Dodge manager, have opened an establishment at 65 First street, this city, and exhibit a line of improved mining appliances.

Two 150x14 feet Ropp Straight Line Furnaces have been shipped to the Broken Hill Proprietary Co. by the Parke & Lacy Co. of this city. That firm this week sent a new plant to Monroe Salisbury, who is developing the newly purchased Salisbury mine near Placerville, El Dorado Co., Cal.

**No Intelligent Miner Should Be Without It.**

The MINING AND SCIENTIFIC PRESS gets more interesting every week. Last week's PRESS contains 32 pages. It is the only weekly mining paper in the State giving the general mining news of every district on the Pacific Coast, besides scientific and other valuable information. It is cheap at $3.00 a year. No intelligent miner should be without the PRESS. Georgetown *Gazette*, April 16, '96.

**"HISTORY OF CRIPPLE CREEK."**

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address, *Illustrated Weekly*, Denver, Colorado.

## Personal.

PAUL FOREST is now foreman of the Crown Point mine, Grass Valley, Cal.

D. H. JACKSON of El Dorado, is in the city arranging for further mining developments.

C. H. MORGAN succeeds Capt. Nihell as superintendent of the Brunswick mine, Grass Valley, Cal.

EX-GOV. N. B. WILEY of Idaho will be superintendent of the Redstone quartz mine at Blue Canyon, Placer Co.

W. S. MORSE of Prescott, Arizona, has been appointed general manager of the Huautla Santa Ana S. M. Co., Morelos, Mexico.

THOS. COUCH, manager Merced Gold Mining Co., has deferred his proposed European trip, and is at present in Salt Lake City.

J. D. FARRELL has been appointed general manager of the mining interests in Slocan district, B. C., of A. E. Humphreys and W. H. Yawkey.

HENRY A. BUTTERS has returned to Oakland, Cal., from the City of Mexico, where he recently purchased the street railway system of the Mexican capital for $7,500,000.

H. C. PERKINS of Oakland, Cal., who is succeeded in the management of the Deep Level Development Co.'s mines, near Johannesburg, S. A., by Geo. Weber, will return home via London, arriving here about July 1st.

GEO. E. WEBER, another California miner who is adding to his fame and fortune in South Africa, has assumed the management of the Deep Level Development Co.'s mines near Johannesburg at an annual salary of $25,000.

CURTIS H. LINDLEY returned this week from Washington, where he made a successful argument before the Supreme Court of the United States, opposing the granting of a review in the Providence-Champion end-line litigation.

CAPT. THOS. MEIN, general manager of the leading mine at Johannesburg, South Africa, expects to leave there May 6th, for his home in Oakland, Cal., to arrive about June 15th. He is credited with being about $1,500,000 better off than when he left California.

**All That Its Title Implies.**

An acquaintance of thirty-six years with the mines and mining industry of California, has made the MINING AND SCIENTIFIC PRESS, of San Francisco, all that its title implies. It is the best and most instructive mining journal in the world. And the valuable notice and space which it gives to the mines of El Dorado should be recognized and repaid by the liberal patronage of their owners.—Placerville *Democrat*, April 18, '96.

**A Wide Circulation.**

That master of mining journals, the MINING AND SCIENTIFIC PRESS, of San Francisco, Cal., in its issue of April 11, has an illustrated article on Cripple Creek by T. A. Rickard, State Geologist of Colorado. That the article will be given a wide circulation and do Colorado and this camp much good goes without saying.—Cripple Creek *Mail*, April 18.

**GOLD MINING PROPERTIES.**

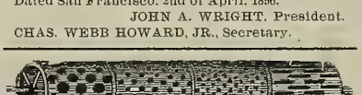
Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 68, Placerville, Cal.

TO THE STOCKHOLDERS OF THE SOUTH PALOMA GOLD MINING COMPANY, LIMITED:

Notice is hereby given that by resolution of the Board of Directors of the corporation, adopted on the 21st day of March, 1896, a meeting of the stockholders of the corporation was called for the purpose of increasing the capital stock to the amount of two hundred thousand dollars, to be divided into one hundred thousand shares of the par value of two dollars per share, and of determining the disposition to be made of the increased capital stock; and it was resolved that such meeting shall take place at the principal place of business of the corporation being the same building where the Board of Directors usually meet, to wit: No. 212 Sansome street, room 17, in the City and County of San Francisco, on WEDNESDAY, the 10th day of June A. D., 1896, at 11 o'clock in the forenoon of that day.

Dated San Francisco, 2nd of April, 1896.

JOHN A. WRIGHT, President.
CHAS. WEBB HOWARD, JR., Secretary.



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Have you ever heard of a Double Pipe Air Compressor? It has one disadvantage. It needs twice as much piping as is needed with the ordinary makes of Air Compressors. On the other hand, it has more real, genuine advantages than you can shake a stick at. It will do the same work as the ordinary Air Compressors, such as are in general use throughout the mines on this coast, on 30 per cent less power. We will guarantee this and prove it to your satisfaction, else you need not pay for the Compressor. It weighs less than half as much as the ordinary Air Compressor. It costs less for freights and is more easily carried up into the hills. It shows the same high efficiency at all altitudes, high or low. It takes no more fuel to do the work if located on the highest peak of the Sierras than it would take if located at the sea level. It enables you to buy a smaller boiler than you can use with any other Air Compressor to do your work. It does not overheat the air at the Compressor and freeze it at the rock drill. In short, it is the ideal Air Compressor. It has been tried in practice, and we can show you the highest recommendations and endorsements. We sell it on a strict, positive, iron-clad guarantee. If your power costs you anything, you want the Double Pipe Air Compressor, because you can buy it on a guarantee that it will run on 30 per cent less power than any other make of Compressor. If you have to take a Compressor to your mine over bad roads, you want the Double Pipe Air Compressor, because it weighs less than half as much as any other Compressor. It is cheapest to buy, cheapest to run, cheapest to transport, cheapest to carry anywheres. For pumping it beats the world. You can run it with steam or water.

Write to the Pneumatic Power Co. for further information. If you are in the city and want a compressor, call and see them. They will show you the Double Pipe Air Compressor in operation. Remember you run no risk. We claim wonders, but we have to perform wonders in Air Compression, or else you don't have to pay for the machine. We are ready. Are you?

Pneumatic Power Co., 306 Pine St., Room 10, San Francisco, Cal.

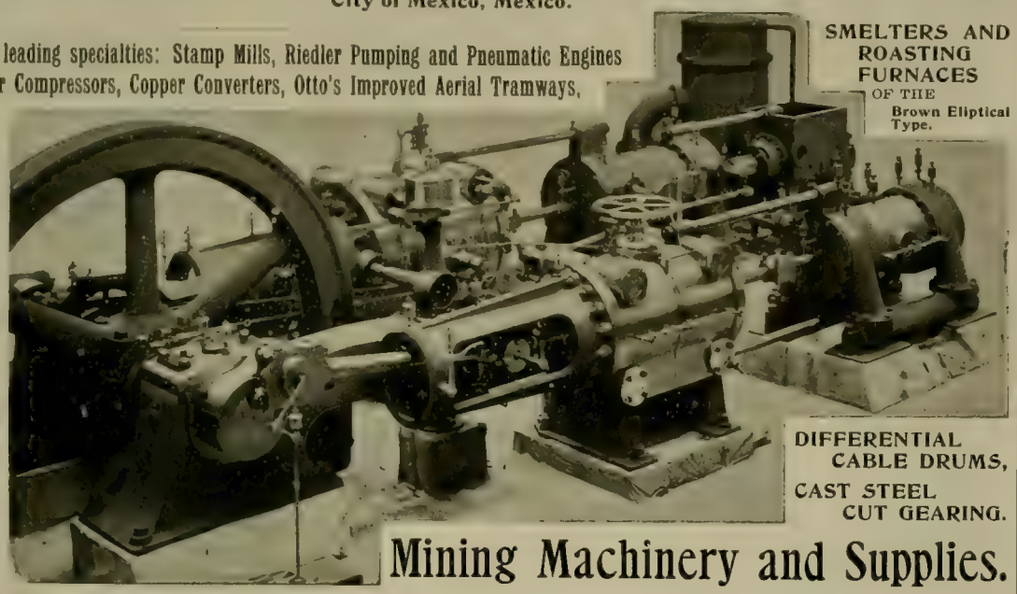
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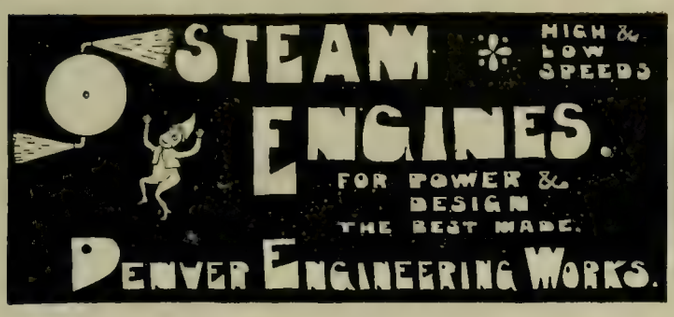


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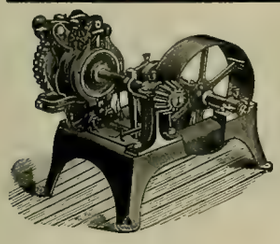
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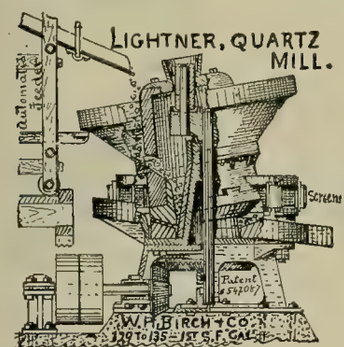


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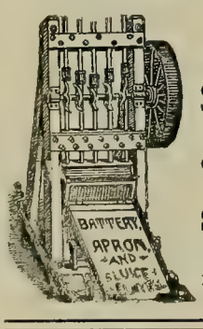
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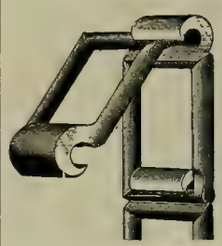
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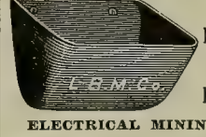
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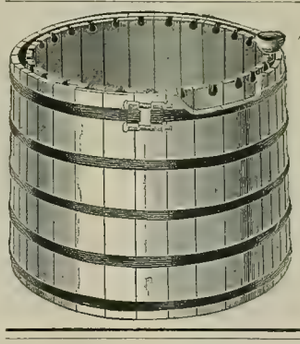
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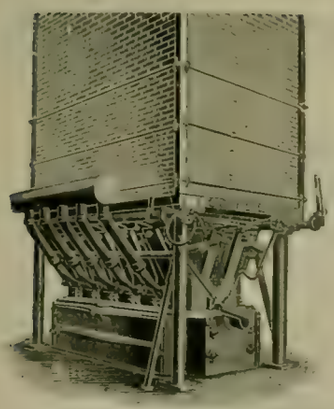


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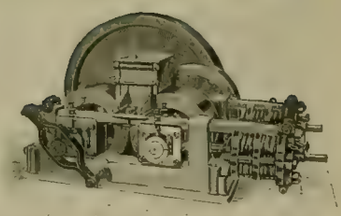
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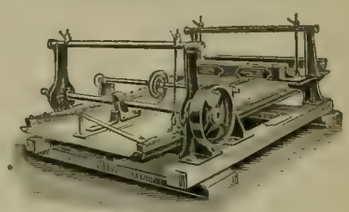
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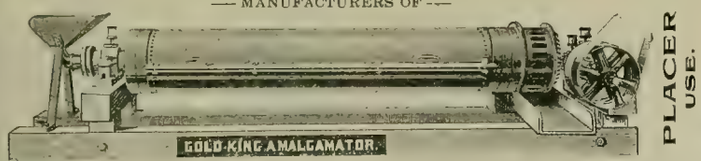
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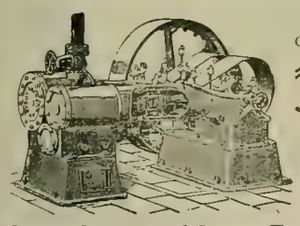
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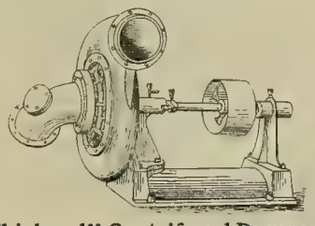
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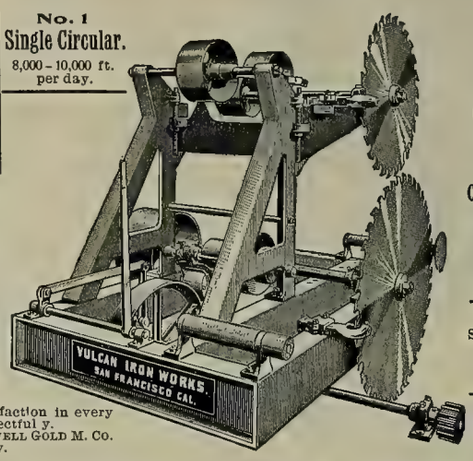
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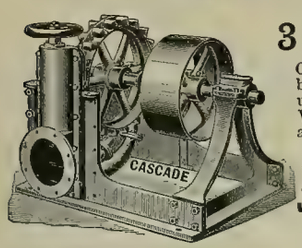
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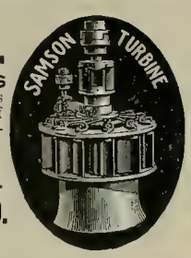
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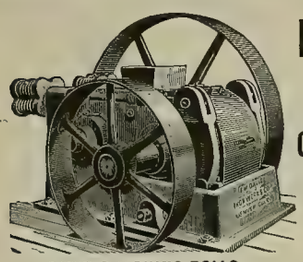
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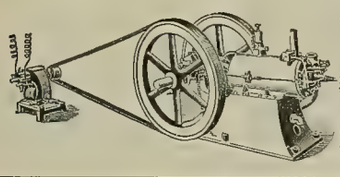
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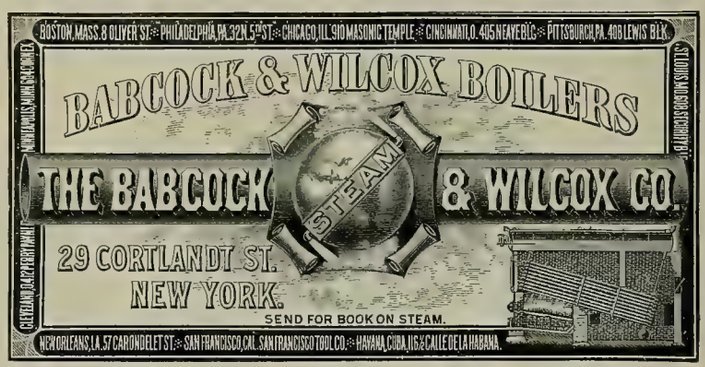
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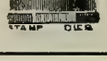
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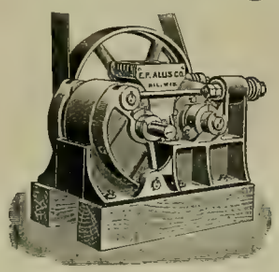
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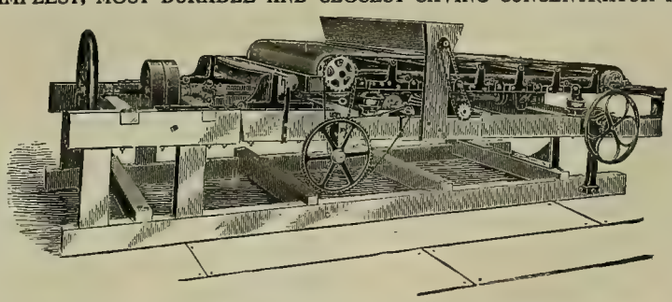
NINETY-FOUR AND ONE-HALF PER CENT —SAVED— ON ORES DIFFICULT TO CONCENTRATE.

A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.

SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION

CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
Including prepared canvas belt 4 ft. 6 ins. wide.



FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.

THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,
E. L. BALLOU, Propr. Ballou Reduction Works.

NOTICE TO GOLD MINERS!



# SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

## San Francisco Novelty and Plating Works

Incorporated.

SEND FOR CIRCULARS. 68, 70 and 72 First Street, San Francisco, Cal.

Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH.

—AGENT FOR—

Hoskins' Hydro-Carbon Assay Furnaces.

# RIX COMPRESSED AIR MACHINERY CO.

MANUFACTURERS OF

AIR COMPRESSORS AND ROCK DRILLS,

OFFICE AND WORKS — 11-13 FIRST STREET, SAN FRANCISCO.

# Market Reports.

## The Markets.

SAN FRANCISCO, April 23, 1896.

Cold and unseasonable weather the past week interfered with the distribution of goods. Although general trade is reported quiet, yet jobbers express themselves as looking for a better and more healthy business than for years past. Well distributed rains, combined with cool weather, have been of the greatest possible advantage to growing wheat. If present prospects for a large outturn to the acre are realized, it will admit of many old debts due from farmers to the retail trade being paid the coming fall. Frosts have unquestionably done considerable damage to some varieties of tree fruits, but this will not be an unmixed evil, for, with a less crop, better prices ought to rule for that which comes to maturity.

From the gold mining districts come confirmed advices of continued activity. More foreign and Eastern capital is being invested, which promises to enlarge as the season advances. New York mail advices are to the effect that considerable English, German and French capital is seeking investment in American gold mines. Referring to this the York York *Wall Street Journal* says: "A prominent firm received a letter yesterday, from London, from one of the leading houses there which has recently become interested in American mines, to the effect that London was directing its attention to American mines more than it had ever done before, and this disposition was stimulated by the South African troubles. West Australia has had a considerable boom and now it is believed that American mines will be taken up in earnest. Several prominent experts, among them noted South African miners, are coming to America this spring and will inspect gold mines in various localities. What they report will be accepted freely, and a large flow of capital to America is looked for."

With iron workers in this State business continues good for machinery, structural and railroad material.

Eastern advices state that the money markets are growing easier. This ease is shown in the disposition to place funds at slightly lower rates of interest, and also less scrutinizing of commercial paper. It is stated that with free exporting of grain in next month the ease in the money market will be more pronounced. European advices continue to state that money is more or less of a drug and investments are being sought, which is imparting a better tone to American securities, causing quite a perceptible advance in the more desired class on that market. In our own market there seems to be a growing ease as confidence increases that we have entered on a new era of prosperity.

### New York Silver Prices.

NEW YORK, April 23.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. |
|---|---|---|
| Friday | 31 | 67¾ |
| Saturday | 31 | 67¾ |
| Monday | 31 | 67¾ |
| Tuesday | 31 | 67¾ |
| Wednesday | 31 | 67¾ |
| Thursday | 31 | 67¾ |

| | Copper. | Lead. | Iron. | Tin |
|---|---|---|---|---|
| Friday | 11 00 | 3 05 | 11 00@13 50 | 13 35 |
| Saturday | 11 00 | 3 05 | 11 00@13 50 | 13 35 |
| Monday | 10 87½ | 3 05 | 11 00@13 35 | 13 40 |
| Tuesday | 10 75 | 3 05 | 11 00@13 35 | 13 40 |
| Wednesday | 10 75 | 3 05 | 11 00@13 35 | 13 35 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.88 |
| London Merchants | $4.86 |
| London Sight Bankers | $4.89½ |
| Refined Silver, per oz., 1000 fine | 67⅝c |
| Mexican Dollars | 54¾@55¾c |

SILVER.—The market has held steady throughout the past week. In this city the demand is light, but the East reports a continued fair export movement. From Europe press telegrams report that there is a movement to bring about an international bimetallic convention in the interest of silver. It would seem as if the time is approaching when such a movement can be inaugurated and carried to a success. This desired end will probably be hastened by the large and increasing output of gold, a decreasing output of silver and the general improvement in business which has set in abroad. In the United States the production aggregated as follows: Silver, 1894, 49,846,875 ounces, and 1895, 46,331,235; gold, 1894, 1,923,619 ounces, and 1895, 2,265,612. So far this current calendar year the output of silver is less than for the corresponding time of 1895, while that of gold is from 25 to 33⅓ per cent more.

MEXICAN DOLLARS.—The market has been quiet but steady. The export inquiry is not up to what it had been estimated it would be in this month. Dealers quote from 54¾ to 55¾ cents.

COPPER.—The market is essentially unchanged, but at the East it has shaded off, closing fairly steady. At the advance in New York the export movement slackened some and as the offerings increased buyers bid lower. The production in this country compares in tons as follows: 1893, 129,760; 1895, 142,543; 1895, 155,397. The exports for the first quarter of the year compare as follows in tons: 1894, 19,087; 1895, 14,196; 1896, 27,465. The statistics of European visible supply are remarkable, showing, as they do, a decrease to 39,540 tons, in the face of the late heavy shipments from the United States. A month ago the recorded visible supply was 41,000 tons, and that for February 15th about 43,990 tons. Spot stocks in the European markets were 40,420 tons two months ago, and 37,890 tons on March 15th, as against 36 240 tons on the middle of the current month.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

COAL.—There is a continued free consumption of household, owing to cold and unseasonable weather. It is reported that the demand for steamer shows a slight increase, with the outlook promising a further enlargement as the season advances. The stocks on hand show a decrease, but this is offset by free offerings of cargoes to arrive, and for prompt shipment.

SPOT FROM YARD—PER TON.

| | |
|---|---|
| Wellington | $7 50@ 8 00 |
| Greta | 6 00@ 6 50 |
| Nanaimo | 6 50@ 7 00 |
| Gilman | 5 50@ 6 00 |
| Seattle | 5 00@ 5 50 |
| Coos Bay | —@ 4 50 |
| Cannel | —@ 8 00 |
| Egg, hard | —@13 00 |
| Wallsend | —@ 6 50 |
| Scotch Splint | —@ 7 50 |
| Brymbo | —@ 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 25 |
| Liverpool Steam | 6 25 |
| Scotch Splint | — — |
| Cardiff | 6 25 |
| Lehigh Lump | 9 00 |
| Cumberland | 13 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

COKE.—The market is quoted as follows:

| | |
|---|---|
| Gas Companies' | — — |
| English, to load | 9 00 @ 10 00 |
| " spot, in bulk | — — @ 8 50 |
| " in sacks | — — @ 9 50 |
| Cumberland | — — @ — — |

LEAD.—There is nothing new to report either in our market or at the East. The output of the mines in this country shows a steady decrease. In 1894 the production was 160,867 tons and last year 156,854 tons.

The market is quoted as follows:

| | |
|---|---|
| Pig | 3 75 @ 4 00 |
| Bar | — @ 4 15 |
| Sheet | — @ 5 50 |
| Pipe | — @ 4 75 |

SHOT.—There is nothing new to report.

The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do. " " | 1 65 |

TIN.—For tinplate there is a light demand at unchanged quotations. The consumption of American plate on this coast shows a large increase, while that of foreign has decreased correspondingly. Pig tin at the East and abroad was held fairly steady. The market is largely dependent on the price of silver.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

ANTIMONY.—The market is steady at 9 cents as an outside figure. New York mail advices quote 7⅞@8c for Cookson's, 6⅞ for Hallett's and 6¾c for Japanese, from store.

QUICKSILVER.—The market is quiet at steady quotations. The production in this country was as follows in flasks of 76½ lbs.: 1894, 30,440; 1895, 33,978.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| Distant points up north | 38 00 |
| West coast of Mexico, for export | 34 00 |

POWDER.—A continued fair demand is reported at unchanged quotations.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " | 8½c |

BORAX.—The market is firm, and quoted as follows:

| | |
|---|---|
| Refined, in car lots | 6⅛ |
| Refined, in sacks | 5⅞ |
| Powdered, in car lots | 6¼ |
| Concentrated, " | 5⅝ |

LUMBER.—Advices from the lumbering camps up north state that the export movements so far in this year show a gain over the corresponding time in 1894. In this city the market is quiet but steady.

The market is quoted in this city from dock or yards as follows:

| | |
|---|---|
| Redwood, Fluming | 16 00 @ — — |
| Pine | 13 00 @ 18 00 |
| Spruce | 25 00 @ 30 00 |

NAILS.—The market is quiet but firm. The nail works at Oakland and in Washington are reported as running on full time. The company operating the two largest plants on this coast, while not in the Eastern combine, does not seem to work against it.

The market is quoted as follows:

| | |
|---|---|
| Wire, carloads, basis per keg | $3 07½ |
| " jobbing, " " | 3 20 |
| Cut, carloads, " " | 2 82½ |
| " jobbing, " " | 2 95 |

IRON.—A continued free consumption is reported on this coast, particularly by iron workers in this city. The market is essentially unchanged. The United States has grown to be the largest producing country in the world. Last year we made 9,000,603 metric tons of pig iron; Great Britain turned out 7,620,000 tons; Germany, 5,788,798 tons; France, 2,005,880 tons. A leading New York exchange says: "The prominent iron men, who are in the city, are particularly well pleased with the iron outlook. They say the business never was in better condition or position than it is to-day. As to orders, nearly all of the large manufacturers say they have more orders than at this time last year and are satisfied that the demand for and consumption of iron in its various forms will be as large or larger than last year. The Illinois Steel Co., for example, has order on its books for 140,000 tons more steel rails than at this time last year. It seems to be the universal feeling that iron interests this year would get a fair return on their output, and this output was certainly expected to be a very large one."

Our market is quoted as follows:

AMERICAN.

| | To Arrive. | Spot. |
|---|---|---|
| Sloso | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |

ENGLISH.

| | | |
|---|---|---|
| Barrow | $21 00 | $23 50 |
| Gartsherrie | 21 50 | 23 50 |

## Mining Share Market.

SAN FRANCISCO, April 23, 1896.

The market under the lead of Occidental has been more active, yet disappointing to the operators long on the market, owing to each little strengthening being followed by a decline. Last Friday there was no outward indication of a strengthening in prices which caused some of the more venturous professional traders to sell short. On Saturday Occidental showed more life, and under a fair demand the price advanced, causing the entire list to firm up. Monday the market opened strong, active and higher, with Occidental selling at $1.45 and $1.50 a share, which was a gain of 100 per cent on the lowest price touched this month. The shares in the Comstock mines moved up from 5 to 15 per cent on Friday's sales. The jump in Occidental was due to quite a number of short sellers, principally in the Pacific Stock Exchange, filling. This they did owing to official advices that $2 gold ore had been struck. With their filling, some long realizing and a few selling short, the prices set back, carrying the entire line with it. At the decline Hale & Norcross sold down to $1.05 and $1.10, the lowest price for some time; Crown Point to 27 cents, Occidental and Ophir to $1.10 each, while the others sold off from 5 to 15 per cent on Monday morning's highest figures. On the declining market several professional traders gained courage and put out a line of shares, particularly Occidental. Wednesday morning the market for Occidental, Hale & Norcross and Ophir opened higher—the former at $1.30 and $1.35, and two latter at $1.20 and $1.25, with shorts the principal buyers, owing to reports of three feet of gold ore being struck in the former which assayed about $80 a ton. After this spurt prices shaded off again. At the decline there seems to be some hesitancy on the part of the professionals to put out a line of shares. The action of the market gives coloring to the belief that shares in several of the mines are well in hand, or else are under manipulation. The writer maintains the opinion expressed last week, that the range of values for shares in the Comstock mines is lower than the work in them warrants, and whenever this is the case, two or more small outside pools can combine and promote a small up-move at most any time, so as to unload on the more credulous. The shorts in Bodie and Bulwer have exhibited more activity with livelier fluctuations than for many months past, but what the moves have been based on it is difficult to say.

From the Comstock mines our advices, taken as a whole, continue of a fairly favorable character. Much of the dead work which has been under way for some time has given place to exploiting. In the Alta group, so far as official reports go, no work is being done outside of Alta. In the latter they are raising more ore, for last week's report gave the quantity at about twelve tons of fair grade. In the Gold Hill group Seg. Belcher and Belcher have increased their output of ore, but Confidence's and Overman's output is about the same as heretofore reported. In these mines, as also in Crown Point, fair exploiting work is being done. In the latter mine they are not following up, so far as officially reported, the two-foot vein of ore struck the preceding week, but down here the management is following up a 20-cent assessment, which will come to a head the last of next week. From Yellow Jacket it is quite impossible to obtain any reliable advices. The joint Confidence, Challenge and Con. Imperial west drift is out 500 feet. This drift is being pushed ahead at a very slow rate. In Confidence they are exploring from the raise on the 200-foot level and extracting a small quantity of ore each week. The yield of ore milled by Confidence and Overman returned in bullion a little over $2,000 each. In Alpha they are still at work on the 500-foot level. Work on the long west drift in Bullion is being pushed slowly ahead, as is that in Gould & Curry. These drifts will drain the west country. Official letters from Potosi, Chollar and Savage do not indicate any material change in the character of the work, which continues on two or more levels. In Hale & Norcross active work is again the order. They are exploring around the 900-foot level, while getting ready for active work on the 1100-foot level. In prosecuting the work a few tons of ore is being extracted, which assays more in silver than in gold. The work under way in Best & Belcher, Con. Virginia, Ophir and Mexican is being closely watched by the better informed miners. In Con. Virginia they are quite hopeful of finding ore on the 1000-foot level. What effect it will have on the market, if found, depends largely on the grade and quantity. In this mine they are raising and milling a sufficient quantity of ore each week to pay current expenses. In Ophir and Mexican the work to the west on the 1000-foot level in each mine is being pushed ahead, the formation beginning to show signs of a more favorable character. The work on the Central Tunnel level of Ophir is also being pushed ahead. From Union and Sierra Nevada and Utah work is being done on the levels heretofore reported and no essential change in the formation. In Andes exploiting work is said to have started.

From the Brunswick lode our advices are generally of quite an encouraging character. While the attention of miners and operators seems to be centered on the work under way in Occidental it ought not to cause surprise if in the near future attention is largely attracted to the work at another point on that lode. This opinion is hazarded on the commencement of active exploiting elsewhere with the material encountered of quite a favorable character. Work in Occidental is being prosecuted on three levels. That under way on the 650-foot level has encountered gold ore which assays higher than heretofore reported. Of necessity they will run out of ore if the work is still pushed forward, but which can be followed by drifting on that already found to find its extent and value. On the 750-foot level the material encountered is of quite an encouraging character and inspires the belief that the ore found above extends down to that level, but as to what will be its extent and value is, as yet, purely guesswork. The work being done on this lode by other companies is exploiting. They seem to be pushing for the ore found in Occidental with every expectation that it will be found, but how long it will take before the ore will be struck it is hardly safe to mention an opinion.

From the Bodie district the work being done in Bodie and Mono and Bulwer is on the same levels heretofore reported. So far as official advices go there is not much of an encouraging character for shareholders, yet in prosecuting the work an improvement may be reported any day.

The following illustrates the changes of the week:

| Mines. | Apr. 16. | Apr. 23. |
|---|---|---|
| Alpha | $ 06 | .... |
| Alta Consolidated | .... | $ 08 |
| Andes | 26 | 26 |
| Belcher | 41 | 43 |
| Best & Belcher | 47 | 49 |
| Bodie | 40 | 48 |
| Bullion | 02 | 13 |
| Challenge | .... | .... |
| Chollar | 36 | 39 |
| Confidence | .... | 69 |
| Consolidated California and Virginia | 1 60 | 1 70 |
| Consolidated New York | .... | .... |
| Crown Point | 32 | 28 |
| Exchequer | .... | .... |
| Gould & Curry | .... | 22 |
| Hale & Norcross | 1 25 | 1 15 |
| Justice | .... | .... |
| Mexican | 31 | 33 |
| Ophir | 85 | 1 20 |
| Overman | .... | 10 |
| Potosi | 21 | .... |
| Savage | .... | 25 |
| Sierra Nevada | 56 | .... |
| Union | 48 | 48 |
| Utah | .... | .... |
| Yellow Jacket | .... | .... |

## San Francisco Stock Board Sales.

SAN FRANCISCO, April 23, 1896.

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 100 Belcher | 43 | 150 H. & N | 1 15 |
| 100 Bodie | 44 | 300 Mexican | 33 |
| 400 Bullion | 13 | 250 Occidental | 1 20 |
| 1000 Bulwer Con | 35 | 50 Ophir | 1 15 |
| 200 Chollar | 38 | 400 Overman | 10 |
| 50 Confidence | 69 | 100 Savage | 25 |
| 100 Crown Point | 28 | 200 S Belcher | 15 |
| 300 Gould & Curry | 22 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 400 Mexican | 34 | 400 Alta | 08 |
| 500 | 30 | 600 Occidental | 1 25 |
| 50 Ophir | 1 15 | 650 | 1 30 |
| 100 | 1 20 | 900 | 1 35 |
| 400 Best & Belcher | 49 | 350 Andes | 26 |
| 100 Con Cal & Va | 1 65 | 300 Bodie | 48 |
| 100 | 1 70 | 500 Bulwer | 33 |
| 100 Chollar | 39 | 200 | 34 |
| 100 Crown Point | 27 | 400 Overman | 10 |
| 200 Union | 48 | | |

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alpha Con M & M Co, Nev | 16 | 5c | Apr 7. | May 12. June 2. | C E Elliot, 309 Montgomery |
| Belcher S M Co, Nev | 52 | 25c | Mar 3. | Apr 7. Apr 28. | C L Perkins, Mills Building |
| Bodie Con M Co, Cal | 19 | 15c | Mar 7. | Apr 10. May 4. | M E Willis, 309 Montgomery |
| Bullion M Co, Nev | 47 | 10c | Mar 18. | Apr 22. May 14. | R R Grayson, 331 Pine |
| Caledonia S M Co, Nev | 46 | 5c | Apr 1. | May 6. May 27. | A S Groth, 414 California |
| Challenge Con M Co, Nev | 21 | 5c | Mar 27. | Apr 29. May 20 | C L McCoy, Mills Building |
| Con Cal & Va M Co, Nev | 6 | 30c | Mar 4. | Apr 8. Apr 28. | A W Havens, 309 Montgomery |
| Crown Point G & S M Co, Nv | 67 | 20c | Apr 2. | May 6. May 26. | J Newlands, Mills Building |
| Gould & Curry S M Co, Nev | 78 | 15c | Mar 25. | Apr 28. May 20. | A K Durbrow, 309 Montgomery |
| Inyo Marble Co, Cal | 28 | 10c | Mar 30. | May 4. June 4. | M A Cahn, Phelan Bldg |
| Lady Emma M Co, Cal | 1 | 15c | Feb 26. | Apr 6. Apr 27. | W W Boughton, Mills Building |
| Occidental Con M Co, Nev | 22 | 10c | Apr 2. | May 6. May 28. | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 2 | 3c | Apr 3. | May 10. May 26 | F L Olmstead, 315 Montgomery |
| Ophir S M Co, Nev | 68 | 25c | Mar 17. | Apr 20. May 11. | E B Holmes, 309 Montgomery |
| Potosi M Co, Nev | 45 | 20c | Apr 9. | May 14 June 4. | C E Elliot, 309 Montgomery |
| Summit G M Co, Cal | 14 | 5c | Mar 17. | Apr 20. May 12. | J E Jacobus, 309 Montgomery |
| Utah Con M Co, Nev | 22 | 5c | Apr 3. | May 6. May 27. | A W Havens, 309 Montgomery |

## ANNUAL MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Jamison M Co, Cal | Sam W Cheyney, 120 Sutter St | May 4 |

**Michigan Mining School.**

A high grade State technical school. Practical work. Elective system. Summer courses. Gives degrees of S. B., E. M., and Ph. D. Laboratories, shops, mill, etc., well equipped. For catalogues, address M. E. WADSWORTH, Ph. D., Director. Houghton, Mich

## Rainfall and Temperature.

The following data for the week ending 5 P. M., April 22, 1896, are from official sources, and are furnished by the U. S. Weather Bureau for the MINING AND SCIENTIFIC PRESS.

| CALIFORNIA STATIONS | Total Rainfall for the Week | Total Rainfall to Date | Total Seasonal Rainfall to Date | Total Seasonal Rainfall Last Year to Same Date | Average Seasonal Rainfall to Date | Maximum Temperature for the Week | Minimum Temperature for the Week |
|---|---|---|---|---|---|---|---|
| Eureka | 56 | 42 69 | 40 28 | 29 30 | 58 | 64 | 34 |
| Red Bluff | 41 | 17 65 | 27 90 | 28 08 | 66 | 96 | 36 |
| Sacramento | 50 | * | 22 28 | 15 30 | * | 88 | 38 |
| San Francisco | 39 | 17 60 | 23 98 | 22 68 | 60 | 64 | 42 |
| Fresno | 28 | 5 99 | 14 23 | 8 11 | 68 | 92 | 32 |
| S. L. Obispo | 28 | 16 06 | 24 97 | * | 62 | 82 | 32 |
| Los Angeles | 06 | 8.88 | 15 58 | 17 24 | 66 | 96 | 38 |
| San Diego | 06 | 5 80 | 11 98 | 6.11 | 62 | 82 | 42 |
| Yuma | ... | .88 | 3 01 | 3 02 | 86 | 96 | 42 |

* Indicates no record

## Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California. location of works, Virginia, Storey county, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees held on the twenty-fifth day of March 1896, an assessment (No. 78) of Fifteen cents (15c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the company, Room 69, Nevada Block, No 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-eighth (28th) day of April 1896, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on WEDNESDAY, the 20th day of May, 1896, to pay the delinquent assessment, together with the cost of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room 69, Nevada Block, No 309 Montgomery street, San Francisco, California.

OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 2d day of April, 1896, an assessment (No. 22) of ten cents (10c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of May, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on THURSDAY, the 28th day of May, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

CHALLENGE CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Gold Hill, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 27th day of March, 1896, an assessment (No. 21) of Five Cents (5c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 35, third floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 29th day of April, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on WEDNESDAY, the 20th day of May, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

C. L. McCOY, Secretary.

Office—Room 35, third floor Mills Building, corner Bush and Montgomery streets, San Francisco, California.

INYO MARBLE COMPANY OF CALIFORNIA. Location of principal place of business, San Francisco, California. Location of Works, Inyo, Inyo county, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 30th day of March, 1896, an assessment (No. 28) of ten (10c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 328, Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 4th day of May, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 4th day of June, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

M. A. CAHN, Secretary.

Office, Room 328, 5th Floor, Phelan Building, San Francisco, California.

### ANNUAL MEETING.

The regular annual meeting of the stockholders of the Jamison Mining Company will be held at the office of the company, Rooms 50 and 54, No. 120 Sutter street, San Francisco, California, on MONDAY, the 4th day of May, 1896, at the hour of 2 P. M., for the purpose of electing a Board of Directors to serve for the ensuing year and the transaction of such other business as may come before the meeting. SAM W. CHEYNEY, Secretary.

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## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice. There are delinquent upon the following described stock on account of assessment (No. 5) levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares | Amt. |
|---|---|---|---|
| Chas. A. Moore | 102 | 7,222 | 361 10 |
| Chas. A. Moore, Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6,000 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore Trustee | 130 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 160 | 6,667 | 333 35 |
| N. L. Reil, Trustee | 128 | 250 | 12 50 |
| A. U. Rugg | 16 | 1,000 | 50 00 |
| A. U. Rugg | 57 | 1,000 | 50 00 |
| Louise V. Rugg Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 155 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg, Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg, Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 109 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 146 | 1,667 | 83 35 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 133 | 3,135 | 159 75 |
| E. C. Godfrey | 134 | 4,000 | 200 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Nos. 37 and 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

### POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until SATURDAY, May 9, 1896, at the hour of 2 P. M., at the office of the Company, Room 38 Crocker Building, San Francisco, Cal.

E. C. GODFREY, Secretary.


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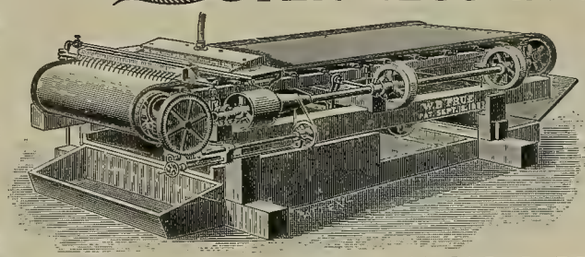
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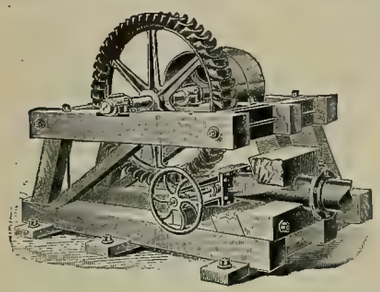
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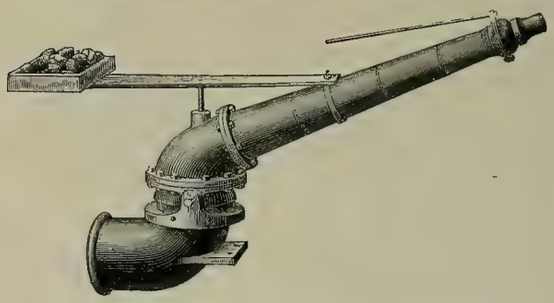


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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1869.—VOLUME LXXII. Number 18. SAN FRANCISCO, SATURDAY, MAY 2, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

## Largest Electric Power-House.

The third generator has been erected in the central station of the Niagara Falls Power Company at Niagara Falls, N. Y. As the generator is of 5,000 H. P. capacity, the same as the two previously installed, it makes the total installation in the power-house at present 15,000-horse power. This is to be increased by the addition of seven more generators, each of 5,000-horse power capacity, which will bring the installation up to 50,000-horse power, or just one-half the total capacity of the tunnel which acts as a tail-race in carrying the water from the mammoth turbines to the lower Niagara river. As yet it has not been decided just how these additional generators are to be erected, it being announced that the Niagara Falls Power Company has under consideration some suggestions of changes, which may eventually lead to placing the additional dynamos down in the big wheel-pit instead of in the power-house, as at present. This method of erection would save the expense of the 138-foot shafts which now connect the turbines with the generators.

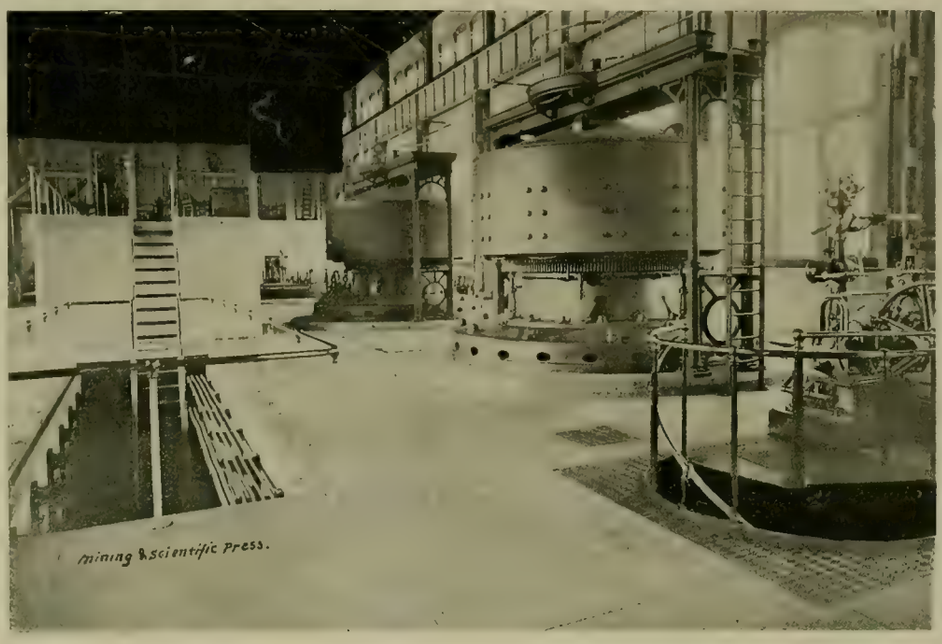



FIG. 1—UPPER WORKS OF DYNAMO NO. 1 IN THE POWER-HOUSE OF NIAGARA FALLS POWER CO.



FIG. 2—DYNAMO NO. 2 IN OPERATION IN THE POWER-HOUSE OF NIAGARA FALLS POWER CO.

This power-house of the Niagara Falls Power Company is the largest in the world, and the illustrations presented on this page (photographed and engraved especially for the MINING AND SCIENTIFIC PRESS) give a good idea of its magnitude and the manner of placing the great power producers. In the foreground of Fig. 1 is seen the upper works of dynamo No. 1. This machine was standing still when the exposure for the picture was made, and the rivets of its side are plainly visible. Just beyond it, however, dynamo No. 2 is seen in operation, making about 250 revolutions a minute, or something like 85 revolutions during the exposure for the picture. The steady manner in which it runs is well displayed by the excellence of the picture, and the reader will find it hard to comprehend that this machine at the time the picture was made was delivering such a mighty force as 5,000-horse power. Immediately to the left of dynamo No. 2 is seen the switchboard structure and the operator in charge. Placed on the switchboard platform are seen the instrument stands, one for each generator and two for the rotary transformers, while in front of each instrument stand is placed a cast-iron stand about 30 inches high, which carries the levers controlling the air for the switch cylinders. It also has other levers and wheels. To the right of dynamo No. 2 is seen the opening in the floor by which access is gained to the interior of the generator.

Beyond generator No. 2 is seen the foundation for dynamo No. 3. It represents the condition in which it was left at the conclusion of the labors of the company which had the contract for the installation of the 5,000-horse power turbines and connections.

Fig. 2 gives a better idea of the size of the Niagara dynamos, with one of them standing still and the other running. It also affords a fine view of the end of the switchboard structure and the subway beneath, in which pass the cables carrying power to the several factories that are supplied from this plant. It also gives a view of the entrance to the stairway leading to the elevator by which the descent is made into the wheel-pit.

On the 4th ult. it was just one year since Rudolphe Baumann, the Swiss engineer, moved the small hand-wheel which controls the first great turbine in this wonderful power plant. Instantly the field of the generator revolved. The movement was quiet and effective, and it told the civil, hydraulic and electrical engineers who had aided by their skill in building the plant, that their work was a thorough success. All that they had prophesied had been proven to be accurate. The mighty machines built to transform the energy of Niagara's water into electrical energy did their work well, and have ever since continued to do it on demand without injury or disappointment. It was a happy set of men that witnessed the successful test, and the year which has since passed has served to increase their admiration for the mammoth machines which work so perfectly. Since that day two more of these great turbines and their connected dynamos have been installed successfully. With the turbines and generators in place, all that remained to do one year ago was the construction of proper conductors to convey the electrical force to the point of application and use. This, too, has been successfully accomplished, developing much that is new in electrical science, so that to-day the lands of the Niagara Falls Power Company are enlivened by several busy factories, the growth of a year. Several of these have had extended mention in the MINING AND SCIENTIFIC PRESS, but briefly recalled they are a carborundum plant, an aluminum works, a carbide factory, a sodium and potash plant, while a chemical works is building.

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J. F. HALLORAN.....General Manager

San Francisco, May 2, 1896.


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THE Manufacturers' and Producers' Association and the Mechanics' Institute have about completed a mutually satisfactory basis on which to arrange for a joint exhibition of California products in the Mechanics' Institute Pavilion next fall—a happy solution of an industrial problem. In this regard it is in order to say that some day—how distant the day depends on ourselves—California industries will rise to the realization of their opportunities, cease considering this the back-door of the nation, and, facing around, stand at the country's front door, with all that that implies.

ACCORDING to programme, Senator Mitchell of Oregon this week opposed the California mineral land bill in the Senate by pressing his amendment that the State of Oregon be included in the measure, not in ignorance, but in defiance of the fact that his colleague, Senator McBride, had already introduced a separate bill, similar in intent, for his State. Senator Mitchell's solicitude is not for the Oregon miner, but for the corporate interests opposed to the passage of the California bill. This, fortunately, is well understood by the Senate and may neutralize his influence. The merits of the case are now so well understood in Washington that the whole question resolves itself into the amount of influence the corporation most interested in the defeat of the measure can bring to bear. We are more sorry than surprised to note the Oregon Senator's defection.

## Forfeiture of Claim.

Under date of April 20th, "A Subscriber" writes from Hassel, Montana :

Will you kindly interpret the co-partnership mining law as it is found in Section 2324, Revised Statutes. The point I wish to know is whether, in advertising a partner in a mining claim, he has ninety days after the expiration of non-forfeiture notice to pay for his part of assessment work or does his right expire with the ninety days' notice which reads: "If you fail or refuse to contribute your portion within ninety days after the publication of this notice, your interest will become the property of the undersigned." Your answer to this question will be recognized by this section of Montana as authority, as is everything seen in the MINING AND SCIENTIFIC PRESS.

The law requires that where any one or more of the co-owners of an unpatented mining claim fail to contribute due share of the required annual expenditure those of the owners who, desirous to hold the claim, shall have performed the required labor or improvements, shall give notice to the delinquent in writing, or by publication in some suitable newspaper once a week for ninety days, such written notice or publication to be made at the expiration of the calendar year for which the work was done. The delinquent so notified has ninety days from the date of the notice written and mailed to his last address, or ninety days from the first publication of the notice. If, at the end of the time, he fails or refuses to so contribute his just proportion of such expenditure his interest in the claim becomes the property of the other owner or owners complying with all the requirements of the statute. The ninety days begin with the first publication of the notice.

It is customary to give notice in writing, if the delinquent be a resident, care being taken to secure proof that such notice was properly sent, and in case he is a non-resident, publication is made in the paper issued nearest the claim, a copy of the paper containing the notice being mailed to his last-known address.

## Bonding Mines.

Bonding California mines is of considerable present prominence, and numerous requests are received for the proper form of a *pro forma* bond. It is not practicable to give any other than a general form. The special conditions of a bond vary with individual ideas and requirements. Any miner or prospector bonding his mine or prospect to any one should give the wording and tenor of the bond careful consideration. A contract is a contract, and it is always better to thoroughly understand and plainly set forth in black and white what is agreed to by both parties than to attempt any subsequent arrangement or interpretation after the bond is signed. While in the main prospective purchasers are bona fide, yet, occasionally a sharper can tie up a claim and its owner if the latter does not look closely at what he is signing. The following is an old form and is believed, in general, to be fair to both buyer and seller. It is, of course, subject to such individual changes as may be agreed upon by the parties interested.

This Agreement, made and entered into this ..... day of ....., 18—, by and between ....., of the town of ....., county of ..... and State of ....., known herein as the first party, and ....., of, etc., ....., known herein as the second party (or parties), Witnesseth, that the first party is the owner by proper location, recording and the necessary work thereon in accordance with the laws of this mining district and of the United States of America, of that quartz ledge or lode known as the ..... (here describe the location in detail), and that the same is free from any debt, lien, or claim; and whereas the second party is desirous of developing the same with a view to purchase: Now this agreement witnesseth that the first party agrees to bond the said mine to the second party for the period of ..... months from this date for the sum of ..... dollars, gold coin of the United States, on the following conditions (here insert the conditions as to the work to be done, or other details); and it is hereby agreed that at any time during the life of this bond the second party may demand, and the first party shall make, a good and sufficient bargain and sale deed for said mine, duly signed, sealed and acknowledged, and shall be delivered on the payment of the purchase price, the other conditions of this bond having been previously complied with, free from any debt, lien, or claim thereon. It is understood that the purchase-money may be paid in gold coin, or by certified check, certificate of deposit, or draft for gold coin on any solvent bank in.....; but if paid by a certified check, certificate of deposit, or draft, then the deed shall be held *in escrow* by ....., agent at ..... (or other person agreed upon), until in due course the check, certificate, or draft shall have been paid, when the deed may be delivered by ....., as agent of the first party, to the second party hereto. Should the second party fail in any of the conditions of this bond, then, upon demand of the first party, the second party shall surrender quiet and peaceable possession of the mine and appurtenances, free from all liens, debts, or claims.

It is understood and agreed that the words "first party" and "second party," as used herein, shall include and bind the assigns and legal representatives of the respective parties hereto.

Witness our hands and seals, at .. ..., the day and year first above written.

Signed in duplicate. ..... [SEAL.]
..... [SEAL.]

This should be duly signed, witnessed, acknowledged and recorded. It is also well for the owner, should he deem it necessary, to require "the second party" to give him a bond that no debts or liens or claims of any kind shall attach to the mine while so in bond, and if the owner posts conspicuously on the property a notice that he will not be responsible for any debt of any kind created or contracted by any one beside himself, it may occasionally save him and all concerned considerable bother.

In addition there is herewith presented another blank form of bond for mine. It is the one adopted by the Gold Mining Exchange of this city for its use.

Dated at SAN FRANCISCO, CALIFORNIA,.....189.....

.....being the owner.....of the mining claim.....and properly known as and called.....hereby covenant.....and agree.....that.....he.....will give to.....the right, privilege and option of purchasing the said above described mining claim.....and mining property, at and for the price and sum of.....Dollars, in gold coin of the United States, at any time within the period of.....days from and after the date hereof.

And.....agree to give.....the period of.....from and after the date hereof within which the said.....may survey and thoroughly examine said mining claim and property and may make such assays and working tests of the ores therein as may be requisite and necessary to determine intelligently whether the said.....will accept said offer of sale, and will purchase said mining claim at and for the price and sum above mentioned and described.

NOW THEREFORE THIS AGREEMENT WITNESSETH, That for and in consideration of the premises and the sum of.....Dollars, in gold coin of the United States of America, to the.....in hand paid by the said.....the receipt whereof is hereby acknowledged, the said parties to these presents have agreed as follows:

ARTICLE FIRST.

The said.....hereby covenant.....and agree.....to and with the said.....and.....executors, administrators and assigns, that at any time within the period of.....from and after the date of these presents, the said.....shall have the right, privilege and option of purchasing from the said..... the mining claim and property hereinabove described, by paying to the said.....on or before said last mentioned day, the price or sum of.....Dollars, in gold coin of the United States. .....Said payment of said purchase money may be made at the banking house of.....in the City and County of San Francisco, State of California, and an offer of payment to said Bank, for and to the credit of the said.....conditioned on the delivery of the deed mentioned in the next article of this Agreement, shall be deemed and regarded as equivalent to a tender to the said.....personally.

ARTICLE SECOND.

And the said.....covenant.....and agree.....that upon payment of said purchase price, as above specified, to the said Bank as above specified, within the time hereinabove specified, the said.....will forthwith make, sign, seal, execute and deliver to the said.....or to.....executors, administrators or assigns, a good and sufficient Deed of Conveyance of the said mining claim and property hereinabove described, free and clear of all incumbrances, and will put the said..... in quiet and peaceable possession thereof.

ARTICLE THIRD.

And the said.. ...covenant.....and agree.....that the said.....may immediately enter upon and have the right of possession of said mining claim and property above described, and may remain in possession for the purpose of examining, surveying, mining and prospecting the same at all times during the continuance of this agreement, and may sink such shafts and winzes, and run such tunnels, drifts and crosscuts, as the said.....shall deem necessary and proper to fully prospect said mine; PROVIDED, HOWEVER, and this permission is granted on the express condition, that the part.....of the second part will pay all the costs and charges and expenses of such work, labor, supplies and prospecting expenses.

ARTICLE FOURTH.

This Agreement shall extend to and bind the heirs, executors, administrators and assigns of the respective parties hereto.

ARTICLE FIFTH.

This Agreement shall terminate and be absolutely null and void on the.....day of. ....., A. D. Eighteen Hundred and Ninety.....at twelve o'clock noon, unless the said..... makes the payment of the purchase money, as described in Article First, on page one of this Agreement.

IN WITNESS WHEREOF, The parties to these presents have hereunto set their hands and seals the day and year in this Agreement first above written.

..... [SEAL]
Duly signed, sealed and delivered in the presence of ..... [SEAL]
..... [SEAL]
..... [SEAL]

The following is a third form of bond in present use by one of the most prominent mining operators in the State:

This agreement made and entered into this.....day of .....189.....by and between.....of the county of..... State of.....party of the first part and.....of the county of .....State of.....party of the second part,

WITNESSETH, That the said party of the first part hereby agrees that if the said party of the second part shall, on or before the expiration of.....from the date hereof, pay or cause to be paid to said party of the first part the sum of .....($.....) dollars in gold coin of the United States of America, he will, upon such payment being made, make, execute and deliver to said party of the second part a good and sufficient deed for the conveying and assuring to said party of the second part the title to all of th....certain lot, piece or parcel of land situate, lying and being in the county of..... State of.....bounded and particularly described as follows, to wit: .....

The said party of the first part further agrees that the said party of the second part, his agents, employes or assigns may at any time during said period of.....enter upon said premises and work, mine and prospect the same in such manner as he may deem best and mill any ore that may be taken therefrom (provided all work done thereon shall be done in a good, workman-like manner) and may place thereon (and remove at his pleasure) such machinery and fixtures as may be necessary for the convenient working thereof.

The said party of the second part hereby agrees that in the working, mining or prospecting of said premises he will not suffer or permit any lien to attach thereto for or in consequence of any indebtedness he may incur for labor, materials or improvements he may employ, purchase or place upon said premises during the said period of.....; and that in case he shall fail to pay or cause to be paid to said party of the first part the said sum of $.....within said period of.....he will at the expiration of said period of time quit and surrender to said party of the first part the said premises, and will within .....days thereafter remove any machinery and fixtures that he may have placed thereon.

It is mutually understood and agreed that the stipulations and agreements herein contained shall apply to and bind the heirs, executors, administrators and assigns of the respective parties hereto. In witness whereof the said parties have hereunto set their hands and seals the day and year first above written.

..... [SEAL]
..... [SEAL]
..... [SEAL]

Comparison of the three by the most casual reader will indicate wherein they differ and agree. Good intent is always assumed on both sides, but in each individual case everything should be written out in detail in duplicate and thoroughly understood at the time. Rightly used the system of bonding is of mutual value to all. Like other good things it has been abused. Bonding and development of a mine usually go together. Some men will only buy "a going mine:" in such cases a flat price is usually the only basis: more often a man or men with some money to invest that way will be willing or desirous to get hold of a property and see what is in it. It is to this latter class and the men with whom they deal that the matter in this article chiefly applies.

Viewed in the widest sense, nearly every mining

sale of any kind whether it be a hole in the ground or a million-dollar proposition involves a "bond," or an "option" of some kind, but in these cases the bond or option bears the same relation to the transaction as the abstract of title, or power of attorney in case of an agent or intermediary.

Any one desiring to use a bond will, it is believed, be able to find in the three all the requirements and practical information in any individual case.

## Concentrates.

GOLD MINING is the one present industry in which California has no competition.

THE Western Federation of Miners will meet at Denver, Colorado, on the 11th inst.

THE Pioneer Gold Mining Co., incorporated for $2,000,000, has been listed by the San Francisco Stock Exchange.

THE greater part of Ainsworth, B. C., on the west side of Kootenay lake, was destroyed by fire last Monday night.

THE entire townsite of Goldfield, in the Cripple Creek district, is reported sold to Eastern capitalists and Denver railroad men for $1,500,000.

MATTERS mining and otherwise look dismal in South Africa. In such countries circumstances follow the fortunes of war, and where fortunes may be made fluctuations must follow.

ON the 16th ult. four tons of dynamite exploded at the Alaska-Treadwell works, Douglas island, Alaska, blowing the watchman, W. Cota, to atoms and wreaking general havoc in that vicinity.

OF the total product of each laborer in the United States per capita, 20.18 per cent goes to labor, 55.08 per cent for materials, and 24.74 per cent to miscellaneous expenses, salaries, interest and profits.

FIRE broke out in the Standard mine at Bodie, Cal., last Saturday, on the 350-foot level. It was checked that night in time to prevent widespread ruin. The electric hoist machinery was partially destroyed.

THE Marysville *Appeal* says the prominent men of the Anti-Debris Association are no good and calls for their resignations. They say the *Appeal* threatened to "burn them up" if they didn't come up with coin.

THE Sunshine Mining Co. of Utah is stated by the *Tribune* to have bought of the Gold and Silver Extraction Co. of America the right to use their cyanide process "during the lifetime of the bonanza" for $119,000.

"SOUND MONEY OR SILVER" is the delightfully humorous headline of a solemn article in New York's leading financial journal, the humor lying in the assumption that "sound money" is synonymous with gold, alone.

THE trustees of the Golden Cross Mining and Milling Co. will sell the Golden Cross, Golden Crown, Golden Queen, Gen'l Miles, Sutton, Black Hawk, Leighton and Los Angeles mining properties, Hedges, San Diego Co., at Los Angeles, June 1st.

A RECENT landslide at the Carlisle mine, near Forbestown, Butte Co., carried away the sleeping house in which five men were asleep at the time. Four escaped; the fifth, Wm. Wolze, is missing and is believed to have been carried into the river and drowned.

A SYNDICATE has been formed in London to buy the Diadem and Edman mines in Plumas county, the basis of the sale being a report on the property by W. B Murdoch. The ore is low grade of considerable width, with spots of free gold and selenides of value.

TWO PORTLAND MEN wire that they have successfully shown gold in quartz by the cathode or anode ray. The same thing was done by Dr. P. M. Jones of this city some months ago. It is so far an interesting illustration of the new radiograph, but of little practical value to the miner.

THE HARRIMANS, of New York, propose to spend half a million dollars on the Golden Reward, South Dakota mine, in the enlargement of the reduction works. The mine turns out thousands of tons of ore that carries such a percentage of silver as to justify the erection of a smelter.

BY a huge caving in the ancient mines of Santa Eulalia, twelve miles from Chihuahua, Mexico, last Sunday, thirty Mexican miners were entombed. The mines had been worked for nearly 300 years and pillars of ore left holding up the roof of the drifts were recently cut away, with the natural result that the whole mass fell in.

THE fact that weddings are expensive in Circle City, Alaska, doesn't seem to hinder the course of nature. Harry Spence was married recently to Mrs. Kate Gilbert, and the justice taxed him six ounces of gold dust as his fee. Dust passes for $18 an ounce in the interior, which makes that a pretty good fee for one ceremony.

THE Young America mine in Sierra Co., advertised for sale in this paper, was sold by Jno. Bermingham, president of the Cal. Powder Works, last Thursday to David C. Green of Chicago for $13,100. The new owner has considerable money and will reopen the mine this season. It has paid big dividends and is considered to be a good property.

SPENCER & GOULD, Hopkins Creek, Plumas Co., now light their hydraulic mine by electricity, by a novel method. They tapped the main pipe near the monitor, inserted a 1-inch gas pipe reduced to ⅛-in. nozzle, the tiny stream playing on a 6-in. Pelton wheel attached to the dynamo, and though not a very extensive proposition answers all purposes.

SECRETARY OF THE INTERIOR SMITH has recently ruled that "a properly authenticated certificate of incorporation, filed by a corporation that is applying for a mineral patent, is sufficient proof of citizenship under the statute. It is not within the province of the Land Department to determine whether such a corporation is authorized under its charter to take patent for mineral lands."

THE Tombstone, Arizona, *Prospector* says: "A California capitalist named Moore was found dead on the desert near the Congress mine Tuesday. He had gathered considerable money and jewelry and was en route overland in a private conveyance to San Bernardino. The evidence shows that he was murdered, and it is supposed Mexicans followed him and committed the deed."

ABOUT two years ago this column contained a notice of a company of California mining men organizing to go to Buluwayo, South Africa, under the leadership of Andrew R. Hammond. There were about sixty Oakland and San Francisco men, and since their arrival they have met with varying fortunes. Mr. Hammond organized two companies in London—the Zambesi Gold Development Co. and the Hammond Matabele group. Word is now received that he and several others were waylaid and killed by Matabeles on their way last month from Buluwayo to the mines.

ACCORDING to Prof. S. F. Emmon's report, the gold production of Utah up to January 1st, 1896, reached a total of 265,600 ounces. Of this amount Tintic is credited with having produced 47.8 per cent, Bingham with 42.5 per cent, Ophir 2.2, Stockton 0.4, and Camp Floyd 7.1 per cent. Up to the date at which the professor closed his report 40 per cent of the gold product of Bingham is said to have been from the placers.

A RECENT decision from the office of the Secretary of the Interior is to the effect that an application for mineral patent must, at the time of application, or within the period of publication, file a certificate of the surveyor general showing an expenditure of $500 on the claim, and if the certificate so filed does not show such expenditure, additional time to make further improvements cannot be granted, but the entry allowed on such proof must be cancelled.

JOHN M. REYNOLDS, acting Secretary of the Interior, has affirmed the decision of the Commissioner of the General Land Office to the effect that a placer claim may be taken up by legal subdivisions and does not need to be staked or marked on the ground. The decision is an important one, as it interprets the law regarding the location of placer claims. It is held that the locator is not required to mark the boundaries of his claim when it is located on surveyed ground.

A JOHANNESBURG, SOUTH AFRICA, dispatch of April 29th represents the *Standard and Diggers' News* as saying "Barney Barnato, the Kaffir King, is very bitter concerning the sentences imposed upon Rhodes, Hammond and others at Pretoria, and is showing his resentment by closing all his mines and selling all his landed properties in the Rand. The people are paralyzed at the prospect, as the closing of the Barnato mines will throw thousands of men into the already overflowing ranks of the unemployed."

TALLON AND FREEZE, the two miners who recently made so good a record at the Butte, Montana, hand-drilling contest, are offering to drill any team in the world a double-handed contest for from $500 to $5000 a side. Some California miner will surely accept this challenge. The contest at the Midwinter Fair two years ago shows what can be done. The Amador *Ledger*, in a long article, suggests that the directors of the State Agricultural Society offer some prizes for such a contest at the next fair. 'Twould bring a crowd.

REGARDING the taxation of unpatented mining claims, Attorney-General Fitzgerald is of the opinion that they can be assessed and unpaid taxes held as a lien on the land to be collected in full by the State after the issuance of United States patent. That will doubtless do till another attorney-general files a contrary opinion. Meanwhile prospectors and locators can refuse to pay the taxes so assessed on unpatented claims and take the chances of being compelled to pay later on. It is largely a matter of individual opinion as to whether payment of taxes on undeveloped and unpatented prospects or claims shall be made or refused.

A COAL prospect is reported from the head of the lower Muddy Valley, Lincoln Co., Nevada. The formation was recognized in 1891 by the railroad corps of engineers when the Union Pacific Company projected its line of surveys across the county to the California line. Since then members of the survey party have kept the matter in mind, and the renewed talk now of railroad construction has caused them to send prospectors there. A seam has been found which burns in a blacksmith's forge and a shaft has been put down about 25 feet. Coal in that locality, where Utah, Arizona, Nevada and California come nearest together, besides furnishing fuel, would be a great thing for transportation and mining interests.

HELENA, MONT., ADVICES are to the effect that a war is about to be waged between the Eastern and Western producers of lead. The Eastern men are short many thousands of tons of the metal, and to be able to cover themselves at a figure not entailing a loss they are endeavoring to force down the price. The Western men, on the other hand, have plenty of lead and want the price up. To defeat the alleged scheme of the Eastern producers to lower the price of lead much below what it now sells at, the producers of Montana and Idaho are making arrangements to form a copartnership to greatly control the production of the same in their States. The producers of Missouri have been written to asking them to join the partnership. The Montana and Idaho producers claim that, with the co-operation of the Missouri producers, they can defeat the Eastern men. Unless the price of lead goes up materially before the date set for the opening of the war, the output of Montana and Idaho will be curtailed.

THE Salt Lake *Tribune* tells this. If it isn't true it ought to be: Mary Palody, a widow, has just left that city with $60,000. Many years ago she had two sons, who staked out and located the famous Utica mine in California. They finally sold out their interests for $60,000, and transmitted $20,000 to their mother in Illinois. Both of the boys finally died while prospecting for other mines. That was nearly eighteen years ago. With the disappearance of the boys all knowledge of the fact that to them was due a balance of $40,000 from the purchasers of the Utica disappeared, so far as the information at home was concerned. The owners of the Utica, that had in the meanwhile developed into one of the greatest bonanzas, stood ready to pay the balance, but having no knowledge that an aged mother was awaiting the return of her boys, didn't know to whom to pay it. And so it was that the money was allowed to remain in the Utica's gold box to the credit of the dead. A few months ago the mother was made aware of the fact that Utica, which in January last is credited with having produced $200,000, was indebted to her sons in the sum of $40,000. The owners of the Utica willingly delivered to her a check for the amount due her sons, which, with interest, amounted to the round sum of $60,000.

CRIPPLE CREEK, COLORADO, was swept by fire last Saturday, four business blocks in the middle of the town being burned. The work of rebuilding the burnt district immediately began and everyone was congratulating himself that things were no worse, when, on the afternoon of last Wednesday, the 29th ult., another fire broke out, apparently of incendiary origin, which, with a brisk wind and the absence of water, almost completely destroyed the town. Dynamite was freely used in efforts to stop the fire by blowing up buildings in its path and several lives were lost. Banks, hotels, stores, offices, residences and nearly all that comprised the town are in ashes and three thousand people left homeless. With the prompt generosity characteristic of miners, every surrounding community has afforded immediate assistance. The calamity is not irrevocable- it is an experience that has befallen every mining town, the mines are uninjured and the prosperity of Colorado's foremost gold camp is only temporarily checked. Mass meetings were held at Denver and Colorado Springs last Thursday to consider measures of relief for Cripple Creek. Secretary Jackson of the Denver Chamber of Commerce, who returned from the scene of the disaster, reported there were not enough provisions in the district to last twenty-four hours. This is a case where "he gives twice who gives quickly," and everyone everywhere who knows by experience what it means to be burned out in a mining town, will need no urging to promptly contribute to the relief fund.

A PRETORIA, South African Republic, dispatch appearing yesterday morning, says: The sentiment caused by the sentencing to death of Hammond, Rhodes, Phillips and Farrar, and the subsequent commutation of their sentences, has not worn itself out. Burghers of influence are flocking into the city begging the Government to totally abolish the sentence imposed upon the so-called reformers. It is reported that the Executive Court has decided to impose sentences of five years' penal servitude and at the expiration of that time banishment for life upon the four men named. In order to justify such severe treatment, the Executive Council refers to the record of the trial. Telegrams were put in evidence which, from the cipher key discovered in Jameson's baggage, proved beyond doubt the complicity of the British South African Company with the Johannesburg Reform leaders and with Jameson's raid. Hammond was evidently opposed to any breach of law, for in a telegram dated December 27 he condemned further prosecution of the contemplated movement. There is breathless astonishment here over the severe sentences that Judge Gregorowski has pronounced. After his sentence Mr. Hammond collapsed and was taken directly to jail in charge of his doctor and the chief jailer. The principal prisoners were driven to the prison with a strong police escort. The remainder walked the distance of half a mile, surrounded by a small detachment of artillery. The prisoners are very bitter, and say they were ill-advised in pleading guilty. Fully forty of them avow that they could have proved their innocence of connivance or participation, except in joining the movement late in the day, and signing the manifesto. A strong feeling exists that behind those standing in the dock were absent men far more guilty, who were plotting against the independence of the republic. Secretary of State for the Colonies Joseph Chamberlain announced in the House of Commons, London, on Thursday afternoon, that he received the following dispatch from Sir J. A. Dewett, British Agent at Pretoria: "The Boers themselves condemn the severity of the sentences and are petitioning for mitigation or free pardon."

TELEGRAMS have been flying between here and the national capital during the week regarding the status of the $250,000 appropriation for the restraining barriers. Last Saturday President Neff and Secretary Sonntag of the California Miners' Association wired T. L. Ford, their representative at Washington, that: "After thorough examination and discussion of the California Debris Commission reports to date, the miners of the California Miners' Association are firmly convinced that the passage of the so-called hydraulic appropriation clause, as now worded, being the clause adopted in committee on April 21, will work a grave injury to the hydraulic miners of California, and they would prefer that no appropriation at all should be made at this session if no change can be had. The appropriation as worded looks solely to the construction of a dam at De Guerre Point, and would result principally in benefiting the owners of that certain individual water right taken up at that place and intended to be especially protected by the act of the California Legislature entitled, 'An act to amend Section 1416 of the Civil Code of this State, relating to water rights,' approved March 23, 1895. The last report of the Debris Commission is against the building of a dam at De Guerre Point at present. See page 4064 Report of the Chief of Engineers, United States Army, 1895. The miners, believing that the works to be constructed should conform to the present views of the commission, as well as to the results of their future investigations, desire particularly that the appropriation clause shall read as follows: For protecting the navigable waters of the United States in the State of California, $250,000, to be expended in the construction of works for the restraining or impounding of mining debris, under the direction of the Secretary of War, in accordance with such recommendations and plans of the California Debris Commission as shall be approved by the Secretary of War for the purposes defined by section 4 of 'An act to create the California Debris Commission and regulate hydraulic mining in the State of California,' approved March 1, 1893; provided, that the Treasurer of the United States be and he is hereby authorized to receive from the State of California, through the Debris Commission of said State, or other officer thereunto duly authorized, any and all sums of money that have been or may hereafter be appropriated by said State for the purposes herein set forth. And said sums, when so received, are hereby appropriated for the purposes above named, to be expended in the manner above provided. The use of the word 'navigable' in lieu of the words 'Sacramento and Feather' is considered extremely desirable to prevent possible conflict, as regards the California appropriation, with subdivision 33 of section 25 of article IV, California constitution." The fact that a water right was located below the proposed DeGuerre Point dam by private individuals, et al., was generally known and commented upon about a year ago. It is hoped that the appropriation clause can be put in satisfactory shape, as much has been expected in this regard, and that the erection of dams, the site and construction shall be left entirely to the United States Debris Commission. It is worthy of note that the recommendations of the Commissioners five or six years ago in no way bind the future action of the Commission, if specific location be eliminated from the appropriation act. Secretary Sonntag says: "The California delegation at Washington did excellent work last Saturday when they eliminated the executive document, No. 16, H. R., Fifty-third Congress, second session, regulating hydraulic mining. If they will further eliminate document 267 and document 98, as referred to in section 25 of the Caminetti act, it will be a satisfactory bill."

## Matte Smelting.

NUMBER III.

Written for the MINING AND SCIENTIFIC PRESS by W. L. AUSTIN, Ph. D., Denver, Colorado.

In a former article the writer endeavored to explain the differences which distinguish carbonaceous and pyritic fuels, and mentioned some of the phenomena which are observed when these are employed, either singly or together, to generate high temperatures in the blast-furnace.

From the facts already given it is evident that in dealing with a fuel of such peculiar characteristics as pyrites, a radical departure from the general lines of coke-burning furnaces becomes a necessity.

For the present it is proposed to regard pyrites simply as a fuel, without reference to its absolute calorific power, or to the percentages of iron sulphide in a charge essential for good work.

Contrary to the statements made in Mr. Lang's book (see page 55), sulphides carrying iron and sulphur enough for smelting, with little or no coke or charcoal, are found in various places, and in such vast quantities that only these ores will be considered in these articles. The treatment of pyritic ores of low sulphur percentages may possibly be taken up later.

At Iron Mountain in Shasta county, where Mr. Lang is now erecting his plant, the ore is an unusually pure iron sulphide, with very little silica (about 5 per cent at the time of the writer's visit to the mine) and runs from $5 to $6 per ton in gold and silver, with about 5 per cent of copper. It is therefore a very basic smelting proposition, and silica, etc., must be added to the charge to insure a proper slag.

This ore it is proposed to smelt without calcination, and therefore it becomes of interest to note the style of furnace which is being put up for the purpose.

Mr. Lang in his book (see page 60), in treating of the most desirable type of furnaces for "cold-blast pyritic work" (II. (*a*), see table MINING AND SCIENTIFIC PRESS, Vol. 72, page 245,) recommends doing away with boshes, or a tapering stack, and using only vertical walls. One of his objections to boshes is that they collect obstructions, which are not readily removed; but as he proposes using brick stacks, it is an open question whether obstructions will not adhere to the hot brick walls and build out into the furnace from a prismatic shaft about as readily as though moderate boshes had been used. In referring to boshes on another page (see page 59) the author uses the following language: "The function of boshes in a furnace is well understood. They are to concentrate the heat and the chemical action within a small space, whereby intensity of combustion and reduction results. * * * We may infer from this that to remove the boshes so as to enlarge the zone of fusion horizontally would have the effect of diminishing the reduction of oxides and of volatizing sulphur, and consequently diminishing the production of matte." The quotation is given in full to assist the reader in understanding the author's position relative to boshes.

As Mr. Lang proposes using "a very great volume of air" "at the low pressure necessary," and recommends a Sturtevant fan-blower, and as he regulates the width of his prismatic shaft so "as to allow the blast to penetrate all parts," the inference is that the shaft will of necessity be rather narrow. Its narrowness is assumed because of one of the well known characteristics of a raw sulphide charge in a blast furnace, which is to gradually form a dense column, owing to the decrepitation and incipient fusing of the pyrites. Such a column is with difficulty penetrated by a moderately strong blast, and hardly at all by a weak one, unless a large percentage of fuel is fed with the ore. In the latter case the advantages of pyritic smelting are very much decreased, as has already been explained.

Mr. Lang proposes to make the length of his furnace proportionate to the "quantity of work desired" and to regulate its depth by the fusibility of the slags. The depth he states (see page 60) "need be but slight" where fusible slags are made.

He, furthermore, does not approve of the external well or forehearth, so generally in use in blast furnace matting as practiced in Colorado and Montana, and advocates in its place a removable interior crucible (see page 65). The idea of a removable crucible is old and such contrivances have probably been experimented with by many, but the writer does not recall ever having seen one in successful operation. A removable crucible of the dimensions necessary for a furnace of ordinary capacity (about 100 tons of ore per diem) is a very heavy and awkward piece of apparatus to handle even when entirely new, and before it has become incrusted and its brickwork saturated by heavy metals. It must have comparatively thick walls and bottom, to avoid the chilling of its contents, a misfortune which is especially apt to take place when the furnace is driven very slowly, although this mode of procedure is advocated in the book (see page 63).

After a furnace has been in operation for a time the space around and above the tuyeres becomes cemented to the crucible by fused material so that the whole is practically one structure. Now, as it is not necessary to remove a crucible except in case of serious derangements of the furnace (in which case the whole lower part of the apparatus, charge, hearth and crucible all become one solid mass) it would be interesting indeed to know how the changing of crucibles can be effected "with as much facility as the forehearths," assuming the furnace to be built of brick and having a capacity of from 100 to 125 tons of ore in twenty-four hours, which is common practice in smelting ores of the class found at Iron Mountain.

But Mr. Lang not only proposes doing away with boshes, tapering stacks and external wells, and discarding modern pressure blowers in favor of fans; he also prefers a return to brick as a substitute for the water-jackets which have now become so generally introduced. Quoting again from his book (see page 64): "It also follows from what I have said about the effects of the copious air blast, that water-jackets are not necessary in all cases to protect the furnace wall. * * * It is my firm conviction that water-jackets are used in many situations where brick or stone work would answer better." It is to be feared that not many metallurgists will agree with the author in his preference for brick versus water-jackets in blast furnace work; in fact the only probable case to make an experienced smelting man hesitate between these alternatives, if the matter were left entirely in his own hands, would be the absence of available water.

To sum up, Mr. Lang advocates for pyritic smelting, low, brick shaft furnaces, with vertical walls and limited tuyere section area (limited in breadth but indefinite as to length, which is governed only by "the quantity of work desired") and removable interior crucibles. In many of its characteristics this proposed furnace corresponds closely with the so-called Orford or Lake type of stack used by the Orford Copper and Sulphur Company at their works in New York harbor. The main point of difference between the two furnaces is, that Mr. Lang's has an interior removable crucible, whereas with the Orford furnace an external well is used. The Orford is also wider than Mr. Lang's, because, as the ore is calcined and the usual amount of coke is used as fuel, the charge is much more easily penetrated by the blast than where raw pyrites are smelted with a weak blast, and an economy of coke is aimed at by burning the sulphides.

In referring to the Orford furnace, a well-known writer upon metallurgical subjects once made the following statement: "The largest type of brick cupola as yet found *unmistakably practical and advantageous** will, therefore, be selected for detailed description, the accumulated experience of several years, and covering almost every grade and variety of copper-bearing material, having *emphatically demonstrated its economy and general superiority.*" The use of the word "superiority" here naturally implies superiority over all (?) other kinds of furnaces used in treating ores (material) similar to those mentioned. Some years later the same writer modified this statement to the following: "Although some 90 per cent of the copper blast furnaces in the United States are now water-jacketed, one progressive and thoroughly experienced concern, The Orford Copper Company, still uses the large brick Raschette furnaces that they introduced some twenty years ago. Such results as they obtain in these furnaces, which are now cooled in the region of the tuyere openings by means of water circulating in pipes embedded in the brick work, cannot properly be ignored. This type of furnace also demands so much care and skill in its management, that it forms a peculiarly instructive study."

The decided difference between the two statements is significant. Assuming the latter to represent more nearly the present status of the brick furnace, it is evident that this type is not altogether what it was first supposed to be, and that experience with it disclosed difficulties in its operation, for it is in fact no longer a purely brick furnace, but a defectively water-cooled one. The above strong endorsement of the prismatic brick shaft would assist Mr. Lang materially in his advocacy of that type of furnace, were it not for the subsequent modified statement by the same author, and for the further fact that the use of such furnaces does not appear to have met with the endorsement of those experienced practical smelting men who have made brilliant successes in treating ore by the matting process, for instance, at Bisbee and Jerome, Arizona, or at Butte, Montana, and elsewhere. The decided preference for water jackets on the part of such men should lead those contemplating the erection of brick or stone stacks to investigate the record made by such brick furnaces as have been built, and to ascertain upon what facts the high opinions of their supporters are based. It is also well to bear in mind that the history of mining in this country shows many instances where the erection of defective or unsuitable metallurgical plants has brought about results which have so discouraged the owners of what otherwise would probably have been profitable enterprises that they have abandoned the field in disgust. Water-jacketed cupolas are employed throughout the Western States and Territories—for instance, at Clifton, Morenci and United Verde in Arizona; at the Parrot works, the Butte & Boston smelter, the Butte Reduction Company's works in Montana; in fact, wherever copper ores are smelted and reverberatories are not used. It would almost seem as though the manifest advantages of the water-jacketed furnace are so paramount that the subject is no longer open to discussion. But brick cupolas have not been neglected by metallurgists. They antedate the water-jackets, the introduction of which was hailed as a great advance in blast furnace construction, and they have been given a fair trial in Western mining fields also; yet they are, as far as known, nowhere in use in this country to-day, except at the works already referred to, where the conditions of charge, etc., must be unusual to warrant their retention.

The facts regarding the use in the West of the style of furnace advocated by Mr. Lang are these: One of the Orford furnaces was put in at the works of the Butte Reduction Company, in Butte, Montana, some time previous to 1887. While it was in operation the writer had repeated opportunities of studying it, but upon a recent visit to Butte he found these works in other hands than those of the original owners. The Orford furnace had been torn down, and standing on its former foundation was a water-jacketed cupola which the manager of the works stated was giving every satisfaction. So in Butte, at least, it was demonstrated in a most practical manner that the brick cupola could not hold its own against the water-jacket.

Two others of these Orford furnaces (constructed like the one already referred to, with an air chamber for warming the blast placed in the bottom of the stack) were erected within the past few years at different points on the California copper belt. Whether their building was a direct result of such glowing statements of their superiority as that given above, the writer is not prepared to affirm. Neither of these furnaces is now in operation, although there is a bountiful supply of good ore within easy access of each, and at one of the works piles of coke laid in by the company are still unconsumed. The ore available at the two points mentioned is easy to smelt and sufficiently high in grade to be profitably treated, but the works are closed because the results obtained from these prismatic brick stacks were such as not to warrant a continuance of their operation.

There are, therefore, three separate instances of brick cupolas of the type recommended by Mr. Lang, having been built in recent years for working Western ores, and in each case a failure has resulted. They are the identical type of brick cupola so enthusiastically advocated by that other metallurgical writer already referred to. They are modern furnaces of large capacity, fully supplemented with all the necessary paraphernalia for successful smelting operations, and were presumably run by competent men. They did not fail from lack of capital to operate them, nor on account of "refractory" ores. Such warnings should not go unheeded. Whether any other specimens of the prismatic brick or stone stack have been put up in this western country within late years, the writer is not informed. There were at one time some stone furnaces at Eureka, Nevada, used for smelting lead ores, but they are not now in operation. They were constructed of rhyolite.

It is nothing unusual to find smelting works standing idle throughout the western mining districts, but there are usually good causes to be assigned for these conditions. Nor have brick furnaces a monopoly of such idleness, for many water-jackets can be shown which are not at present in operation. There is, however, no instance in this country in the writer's knowledge where a brick stack has replaced a water-jacket; and in the cases of the brick cupolas referred to above, the failures occurred in districts abundantly supplied with all the requisites for successful smelting operations. It seems strange at this late day, when the advantages of water-cooled surfaces in blast furnace smelting have been so repeatedly demonstrated, that the reintroduction of brick stacks with all their well-known defects should be again advocated, especially for pyritic smelting, for which they are least fitted.

Of course, it is true that there is a great variety of classes of fire brick, some of which are suited to one purpose, some to another, and that certain kinds will withstand the scouring action of a hot, basic, ferruginous slag better than others. But firebrick are expensive in most mining regions, especially those kinds which are most desirable for the purpose; and the repairs on a brick stack, once it has been put into operation, are enormous. Still, the cost of repairs is not so serious a matter as the interruptions which they occasion. When a furnace is laid up for repairs the pay-roll goes on just the same although there is no production of marketable commodities. One of the first requisites for the successful operation of a smelting plant is to keep it in continuous operation. With a low-grade ore, constant stoppages for repairs will kill almost any enterprise.

One of the greatest drawbacks to brick or stone

*The italics are the writer's.

furnaces is, of course, the burning out of the walls. Now Mr. Lang proposes to use "a very great volume of air" at low pressure, and such conditions, he states, produce (see page 64): "secondary effects, which have an important bearing on furnace construction. A good proportion of the blast fails to enter the charge to any distance, but finds its way to the surface by following up the walls where the charge lies loosest and producing a *cooling effect* there, which prevents fusion, while the excess of oxygen serves to *effectually roast* a proportion of the ore."

If Mr. Lang's premises are correct—that is, if that portion of the charge next to the walls lies the most loosely—then the weak blast, following the lines of least resistance, will of course pass out of the stack along the walls. Now, on page 53, Mr. Lang states: "I advocate and practice the method of feeding by layers, as in lead and copper smelting, while I attach little importance to exactness in placing the materials so long as they are in position to become mingled during the fusion." Therefore, as the blast passes up along the walls and comes in contact with the charge, mixed in right proportions for smelting, it might be assumed that a smelting will take place at these points, and, where the blast is strongest, there would naturally be the theater of the greatest chemical activity, and, consequently, the smelting would mostly take place in the vicinity of the walls. It is not very clear what Mr. Lang means by "a very great volume of air," but, evidently, he intends it to be sufficient to produce "a cooling effect" on the walls, that is, it is to be a great enough volume to prevent the smelting of the charge, which is to be blown cool, on the principle that a candle is blown out by an excess of air over that necessary to carry on combustion. But while the walls are blown cool, the charge is not to be similarly effected, for "the excess of oxygen serves to effectually roast a portion of the ore," and to roast an ore requires a very considerable degree of heat. It would seem that Mr. Lang is demanding a good deal of an air-blast when he requires it to exercise a selective action, such as leaving the walls cool and yet smelting (roasting) the next lying ore. Under the conditions Mr. Lang lays down, namely, a charge consisting of fuel and unroasted ore mixed, distributed in horizontal layers in a blast furnace, run by a weak blast of large volume, the writer would anticipate that the greatest smelting activity would take place along the walls. This would be all the more likely to occur if unroasted pyrites were a prominent ingredient in the charge, for, as already stated, they possess the characteristic of decrepitating to a great extent, producing a sand which packs in the charge and prevents the entrance of the blast. If, then, the blast follows the walls (of a brick or stone furnace) so does then smelting, and the scouring action of the slag rapidly corrodes them, and it is not long before they are burned through. The same burning through of the walls of brick furnaces takes place when the charge is too silicious and for other reasons; so that the operation of such stacks is a very delicate matter, and their use is not to be recommended where it can possibly be avoided.

W. L. AUSTIN.

Denver, March 10, 1896.

### Selling Mines.

TO THE EDITOR:—The recent sale of the "Blair" suggests a few reflections on the subject which heads this communication. The "Blair" has been on the market for two years; nobody had any exclusive claim on it, but it was notorious the mine was for sale and the owner would recognize anyone who brought him a customer. It was the sweetest plum the capitalists of the curb had enjoyed in twenty years. Here was a mine with a vein 100 feet across, all going from $8 to $20 a ton (far surpassing the average value of the Utica and double its width) and fully 200,000 tons of ore in sight, ready for a mill, and the price variously stated at only $350,000 to $400,000. One would think that such a mine as this would be snapped up in ten minutes, but it was not. On account of the owner's known desire to sell, it is probable that no property on record was ever presented to so many men capable of buying it as this. Almost everybody on Pine and Montgomery streets who had any acquaintance in the East had sent them the "Blair," and these latter had presented it to every recognized New York promoter and capitalist in Chicago, Boston and New York—but all to no purpose. For some mysterious cause, people who were purchasing six-foot ledges of $7 ore, with perhaps only a few hundred tons exposed, had no use for a mine 100 feet wide, going $12 a ton, and with 200,000 tons all blocked out and ready for extraction. At last the company deputized one of their number to go East with a report, samples, abstract of title and power of attorney to treat without impediment should the occasion arise, and the result was the mine was placed in less than four weeks. Now, why did the sale in this case hang fire so long, and why did the property go off so quickly at last? Simply because there was no bond or option on it, or, in the place of such, no one authorized to act officially for the owners. Now it has often been urged, but cannot be too often reiterated, that in none of the great money centers like Boston, New York or London will the slightest attention be paid to any proposition for which the promoter has not a power of attorney or contract of some kind. They will not even read your reports nor listen to what you have to say. The reason for this is obvious. There is no class or syndicate of capitalists already formed and looking for mines anywhere. The sale of every mine is a singular and distinct operation by itself. When a banker or other capitalist accepts a desirable property, he sends an expert to look at it; if the report is favorable, he proceeds to organize a company to purchase, and this generally involved an outlay of from $10,000 to $75,000. Who would send an expert on the say-so of an irresponsible intermediary? Who would go to the enormous expense of getting up a company without a contract giving the time necessary for the work and fixing the price? It is useless to kick against the goad. If a man wants to sell a mine, he must submit to the requirements which govern the situation. Every great transaction that ever took place in this State or in the United States had a bond behind it. The Sierra Buttes, the Union and the Ilex, the Josephine, the Amador Queen, the Banner, the Feather River, the Holcomb Valley, and, latterly, the Iron Mountain, were not sold in any other way. These were all genuine deals, where the full price agreed on was really paid, and have nothing in common with the gas-bag sales so common in the newspapers, which either never took place at all or at the very best amounted to a small pittance down and a mortgage for the balance. The man, therefore, who will not give a contract, who says: "First come, first served," who dictatorily orders you to bring along your man with money, cash down, is sure to be left in a state of lonely blessedness, as far as the sale of his property is concerned. Of course, it will be urged that options have been given without number and nothing was accomplished by so doing. To this we reply that in such cases the bond was either given to worthless parties or the properties themselves had no value. A mine of first-rate excellence, that can stand close inspection, that is held at a fair price based on developments, can always be sold. This, however, is beside the main argument itself. No mine can be sold without the necessary bond, abstract of title and power of attorney, as so manifestly illustrated in the recent instance of the "Blair." This is the law in the premises and there is no appeal from it. Selling a mine must always be a case of the mule going to the trough—the trough will never come to the mule.

VIATOR,

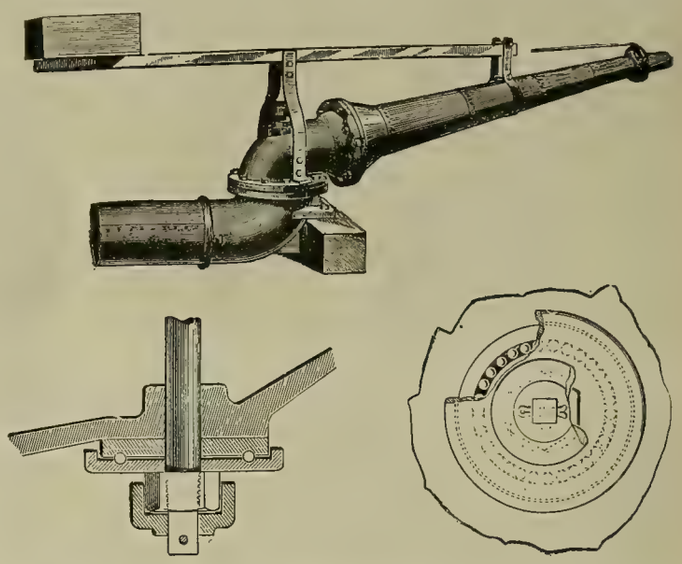
San Francisco, April 25, '96.

## Scientific Progress.

### An Improved Form of Hydraulic Giant.

In view of the fact that hydraulic mining has measurably resumed its former prestige as one of the prominent and valuable industries of California, a contribution to scientific mining is herewith presented—the latest improved form of hydraulic giant, for which letters patent have been granted John H. Hendy, superintendent of the Joshua Hendy Machine Works of this city, for the United States and the Dominion of Canada, covering the Province of British Columbia. This device relates to monitors or giants used in hydraulic mining, particularly to an improvement in the bearings for the rotary or swiveled parts of such monitor or giant, by the adjustment of which the direction of the stream of water issuing from the nozzle can be changed at will.

The object claimed is the introduction of an anti-frictional bearing, by which adjustment of the nozzle-pipe is facilitated. When a giant is in use, the enormous pressure of the water flowing through the elbow is naturally exerted in an upward direction and against the upper bearing upon which the nozzle-pipe is horizontally attached.



HYDRAULIC GIANT—DOUBLE JOINTED, BALL BEARING.

The friction thus occasioned in the bearings of the ordinary double-jointed giant is so great that the angular movement is a matter of difficulty, and this introduction of a ball-bearing surface obviates this defect by materially lessening this frictional resistance.

In the cuts, it will be noted that the lower section represents the water-supply pipe as having an upturned, flanged end which is bolted to a similar flange on the lower part of the curved elbow above it. This elbow is formed with a ball upon which the nozzle-pipe is fixed adjustably to permit of its deflection in a vertical line. The nozzle-pipe and upper elbow are made adjustable by a rod passing through the elbow and an anti-frictional ball-bearing is provided which surrounds this rod at or near its top or upper part. This arrangement of ball-bearing plates, shown in the two small cuts, keeps the plates free from actual contact and hence they can never become set by rusting or other causes, and the friction incidental to the construction of the bearing plates of the old form of hydraulic giants is necessarily relieved to a very great extent by the interposition of this ball-bearing groove and the ball-bearing action thereby obtained. It is intended that the frictional resistance in the horizontal movement of the giant shall be decreased eighty (80) per cent and the torsional or twisting strain upon the king-bolt also materially relieved and the liability to crystallization and consequent breaking of the king-bolt thus precluded.

This ball-bearing arrangement can be attached at a comparatively small expense to any double-jointed giant.

These improved giants are built and furnished by the Joshua Hendy Machine Works, No. 42 Fremont street, S. F., who state that, though letters patent were granted but a few months ago, a large number have already been placed in successful operation.

THE theories in existence to account for solar energy—light and heat—are many, but the principal ones are seven in number: 1. That it is now giving off the energy imparted to it at its creation by Divine agency. 2. That it is burning up. 3. That it is caused by currents of electricity generated by itself. 4. That it is heated and supplied with fuel by stray comets running into it. 5. That a stream of meteoric matter is pouring into it from the regions of space, and the arrested motion is converted into heat. 6. That the mass remains constant and the temperature is maintained by a diminution in its size, the contraction, though slow, being sufficient to account for the phenomena, and slowly enough to keep up the present supply for millions of years. 7. That the sun's rotation causes a constant flow of gases from equator to poles with a rapidity sufficient to heat the gases, decompose them and burn them up. The sixth is the theory generally maintained by scientists now, but there is a growing belief that electric currents between the planets and the sun serve to, at least partially, maintain the temperature of the latter, though Prof. Schaeberle, in his recent lecture in this city on the Chili eclipse, distinctly stated the absence of all electrical indications during his observance of the eclipse.

THE first edition of Prof. C. A. Young's work on "The Sun," published in 1881, mentions twenty-one elements as having been detected by the spectroscope in the sun. In all of these 860 lines had been identified. The new edition of Prof. Young's book states that Prof. Rowland has now compared sixty elements with the solar spectrum, and established the existence of thirty-eight of them in the sun, being doubtful in regard to eight of the others. Of iron lines alone he has identified more than two thousand.

A CURIOUS property of potassium uranyl sulphide has been reported by M. Besquerel to the French academy. When excited to phosphorescence, this substance emits rays which last a long time—more than 160 hours—after phosphorescence ceases, which pass through paper, aluminum and copper, and which discharge electrified bodies like the Roentgen rays.

ONE of the greatest inventions ever added to the granite business is being given a test in Montpelier, Vt. The machine is for sawing granite; contains $4000 worth of diamonds, the total construction costing nearly $10,000.

# CALIFORNIA MINES AND MINERS.

## Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

(Continued from last issue.)

### CALAVERAS COUNTY—Continued.

| NAME OF MINE. | Character of Mine..... | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| Eclipse. | Gold quartz. | | 1½ m NW of Angels Camp | T. E. Kellogg | Angels Camp |
| Enterprise | " | | 4 m N W of Angels Camp | G.W. Grayson, Owner | S. F. |
| Excelsior | " | | Angels Camp | John Meyers, Own | Angels Camp |
| Esmeralda Mint | " | | 10 m S E of San Andreas | Jno. T. Doris et al, Own | Jackson |
| Fine Gold | " | Idle. | 5 m N E of R. R. Flat | J. B. Haggin & Co. | S. F. |
| Ford | " | 9 | ½ m N E of San Andreas | Ford Bros. | San Andreas |
| Flamm | " | 2 | 2 m W of San Andreas | Flamm Bros. | San Andreas |
| Fellowcraft | " | | San Andreas | B. H. West, Supt | San Andreas |
| Finnegan | " | | 3 m S of Angels Camp (Carson Hill.) | R. Breckenbridge & Co., Own. | Angels Camp |
| Forty-nine | " | | Angels Camp | Jos. Eastman | Gas Co., S. F. |
| Gwin | " | 48 | 4½ m SW Mokelumne Hill | F. F. Thomas, Supt. | Mokelumne Hill (E. L. Parker, Sec., Nev. Block.) |
| Green Mountain | " | 10 | 4 m S E Mokelumne Hill | Jno. J. McSorley | Mokelumne Hill (W. K. Thomas, Sec'y, Oakland.) |
| Golden Cup | " | 3 | 8 m S E of San Andreas | Geo. Hengen, Own | Murphys |
| Gavner | " | 18 | 4 m S E of Jackson | S. H. Lucas | Jackson |
| Gardella | " | 2 | 1 m W of Mokelumne Hill | Chas. Gardella, Own | Mokelumne Hill |
| Gurley | " | 10 | 4¼ m W of San Andreas | — Gurley | North Branch |
| Gottschalk | " | Idle. | 1½ m NW of San Andreas | Judge C. V. Gottschalk | San Andreas |
| Goodenough | " | | 2½ m NW of Copperopolis | D. Jutton | Copperopolis |
| Gold Cliff | " | 13 | ¼ m W of Angels Camp | W. Garrard, Supt | Angels Camp |
| Gold Hill | " | 11 | 1½ m NW of Angels Camp | S. V. Ryland, Supt | Angels Camp |
| Gold Reserve | " | | 2 m S of Angels Camp | Jas. Deitrick, Supt | Angels Camp |
| Gold Valley | " | | 1½ m W of Angels Camp | H. F. Rickitson, Own | Angels Camp |
| Golden Hill | " | | 2½ m W of San Andreas | L. A. Irvine and W. A. Hawley, Own. | Angels Camp |
| Ghost | " | 7 | ¼ m S E of Angels Camp | C. W. Tryon, Own | Angels Camp |
| German Ridge | " | 1 | 4 m N E of Angels Camp | W. H. Steffes et al, Own | San Andreas |
| Golden Queen | " | | 6 m N of Murphys | J. E. Jennings, Own. | 101 Devisadero. S. F. |
| Gladstone | " | | ½ m S W of Murphys | E. H. Schaeffle, Own. | Murphys |
| Hartman | " | 1 | 5m S E of Mokelumne Hill | Geo. Hartman | Mokelumne Hill |
| Hard Lead | " | Idle. | 4 m E of West Point | John Allen, Own | West Point |
| Hancock | " | 2 | Middle Bar Bridge | C. O. Mitchell & Co. Own | Middle Bar |
| Jenkins | " | Idle. | 1 m S of Mokelumne Hill | Hutchinson & Co, Own | Mokelumne Hill |
| Hutchinson | " | 2 | 3 m S of San Andreas | Wm. Holland, Own. | San Andreas |
| Holland | " | " | ½ m N of North Branch | A. Macchiavello, Own | North Branch |
| Hudson | " | " | 5 m W of San Andreas | G. Hoswell. Own | North Branch |
| Hoswell | " | | | | |
| Homestead and Guadaloupe | " | " | 1¼ m S E of Glencoe | S. Tyson, Own | Glencoe |
| Hercules | " | " | 4½ m N of Murphys | Conliffe & Driver, Own | Murphys |
| Hot Stuff | " | | 4½ m S of Angels Camp | L. A. Irvine et al, Own | Angels Camp |
| Homestake | " | | 7 m E of Murphys | W. Collier, Own | Murphys |
| Illinois | " | Idle. | 6 m S of San Andreas | B. K. Thorn | San Andreas |
| Iron Rock | " | 5 | Carson Hill | G. W. McNear, Own. | Oakland |
| Jennie | " | 4 | 1 m W of Angels Camp | T. E. Flagg, Supt | Berkeley |
| Jones | Gold. | 4 | 2 m E of Glencoe | M. Keating | Glencoe |
| Jenkins | " | Idle. | Cave City | Jenkins & Wheelock. | Mountain Ranche |
| Jackson | " | " | ½ m S of North Branch | Adam & John Jackson | North Branch |
| Johnson | " | " | 2½ m SW of Angels Camp | Thos. Hardy, Own | Angels Camp |
| Jupiter | " | 6 | 5 m N of Angels Camp | W. A. Keefer, Own | Angels Camp |
| Josephine | " | | 10 m E of San Andreas | John Saultery, Own | Esmeralda |
| Kelly | " | 2 | 3½ m W of Cave City | J. C Lewis & Co., Own | Mountain Ranche |
| Keltz | " | Idle. | 4 m N E of West Point | John Morgan, Own | S. F. |
| Keystone | " | " | At North Branch | J. H. Wester, Own | North Branch |
| Kentucky House | " | " | Near San Andreas | John Seiffort, Own | San Andreas |
| Keystone | " | | South slope Carson Hill | Wood Bros., Own | Robinson's Ferry |
| Keystone | " | | Railroad Flat | E. C. Loftus, Own | Sonora |
| Linderaxa | Gold quartz. | 4 | 1½ m NE Mokelumne Hill | F. O. Cortmarsh | Mokelumne Hill |
| Lamphyre | " | Idle. | 1 m S of Mokelumne Hill | Roanoke M. Co., Stockton. | Mokelumne Hill W. T. Harris, Sec. |
| Lucky Tom | " | 20 | 1¼ m E of San Andreas | W. H. Clay Jr., Supt. | Sheep Ranch |
| Lone Star | " | Idle. | 2½ m NW of West Point | M Hinley | Palace Hotel, S. F |
| Lone Star | " | 2 | 1½ m NE Mokelumne Hill | H. B. Havens | Mokelumne Hill |
| Lockwood | " | 14 | 2 m E of West Point | H. Calbick | West Point |
| Lewis | " | 4 | 1½ m N of Cave City | J. C. Lewis & Co., Own | Mountain Ranch |
| Leonard | " | Idle. | 1½ m N E of San Andreas | W. S. Weymouth, Own | Drytown |
| Larson | " | 12 | 2¼ m N W of Comanche | Larson, Kaisser & Co., Own. | Comanche |
| Last Chance | " | | South slope Carson Hill | G. W. Cortez and Wood Bros., Own | Robinson's Ferry |
| Laswell | " | | 3 m S of Vallecito | Laswell Bros., Own. | Vallecito |
| Lindsey (San Antonio) | " | | 1½ m W of Angels Camp | B. R. Prince, Own | Altaville |
| Long Gulch | " | | 2½ m SW of Angels Camp | Thos. Hardy, Own | Angels Camp |
| Lightner | " | 6 | Angels Camp | Joe. Eastman | Gas Co., S. F. |
| Last Chance | " | 7 | Angels Camp | G. C. Tryon & Sons, Own. | Angels Camp (Bonded.) |
| Louisiana (Louisa) | " | 4 | 2½ m W of Murphys | Stephen Carley, Own; Mrs. Dubois, Supt. | Murphys |
| Legal Tender | " | 4 | 5 m N W of Murphys | Geo. S. Taylor, et al., Own. | Murphys |
| Magog | " | 8 | 1¼ m W of Angels Camp. | Flagg, Rutledge & Higgins, Own. | Berkeley |
| Mineral King | " | Idle. | 12 m N E of West Point | J. Gouldson & Co, Own | West Point |
| Mount Ophir | " | 5 | 4½ m SW Mokelumne Hill | W. P. Ball | Mokelumne Hill |
| Mountain Mine | " | 6 | 2 m N W Mokelumne Hill | J. W. Provard | 1505 4th Ave. Oakland. |
| Meteor Mine | " | | 8 m E of San Andreas | W. B. Swank, Own. | Mountain Ranch |
| Murray Creek | " | Idle. | 2 m S W Mountain Ranch | Murray Creek M. Co., Own. | Mountain Ranch |
| Merrimac | " | 4 | 4½ m NW of San Andreas | John Shaw. Supt | North Branch |
| Macchiavello | " | Idle. | ½ m S of North Branch | A. Macchiavello | North Branch |
| Mount King | " | " | 3 m NW of Copperopolis | W. Womble, Own | Copperopolis |
| Morning Star | " | 3 | 8 m N E of Milton | Robt. Donner and Thos. Dolan. | Milton |
| Madison | " | 38 | Angels Camp | Naylor Williams, Supt | Angels Camp |
| Meinecker | " | | 2 m S of Vallecito | Meinecker and Sanguinetto, Own. | Vallecito |
| Melones | " | | South slope Carson Hill | Geo. W. Grayson, Own | S. F. |
| Merrimac | " | | 4 m S of Angels Camp | D. J. F. Wall, Supt | Angels Camp |
| Morgan | " | | Carson Hill | Est Jas. G. Fair, Own | S. F. |
| Mount Nebo | " | 2 | ½ m W of Vallecito | Jno. W. Moyle, Own. | Vallecito |
| Moyle | " | 10 | 2 m S of Vallecito | Wm. Moyle, Own | Vallecito |
| Maltman | " | | ½ m N of Angels Camp | Jas. Maltman, Own | Angels Camp |
| Mayflower (Banner) | " | | 1½ m W of Murphys | W. S. Edwards. Supt. | Calico |
| Mokelumne Hill Water Canal | " | | Mokelumne Hill | Chas. Prindle, Supt. | Mokelumne Hill |
| McSorley & Co | Gold. | 2 | 5 m N W of San Andreas | J. McSorley et al, Own | Mokelumne Hill |
| McCreight, Hurdy & Co | " | | North slope Chapparal Hill. | Hayward & Lane, Own | S. F. |
| McQuig | " | 3 | 2 m W of Murphys | John McQuig, Own | Murphys |
| McKinley | " | | 2½ m S Angels Camp. | John Meyers (In dispute.) | Angels Camp |
| North Star | " | Idle. | 2 m E of West Point | M. D. L. Wickham | West Point |
| New York | " | " | 2 m N E of R. R. Flat | In dispute—tied up in litigation. | |
| Neversweat | " | " | Cave City | J. C. Lewis, Own | Mountain Ranch |
| Nixon | " | 2 | 1½ m N E of West Point | Robert Nixon, Own | West Point |
| Noriolk | " | | 1 m E of Murphys | Willard & Co; J. H. Heard, Agt. | Murphys |
| Old Calaveras | " | | 5 m N of Murphys | J. F. Horswell | Valley Springs |
| Orr y Plata M. Co | " | | ½ m N W of Murphys | John H. Heard, Agt | Murphys |
| Our Flag | " | 2 | 1 m E of Robinson's Ferry | McArdle Bros., Own. | Robinson's Ferry |
| Pine Apple | Gold quartz. | Idle. | 1¼ m E Mokelumne Hill | — Harris, Own. | Mokelumne Hill |
| Poorman | " | 17 | 1½ m E of Glencoe | C. L. Morrill | Glencoe and S. F. |
| Pioneer Chief | " | Idle. | 1½ m W of San Andreas | B. K. Thorn, Own. | San Andreas |
| Petticoat | " | " | Railroad Flat | W H Clary | Stockton |
| Putnam Shaft | " | " | 4 m W of San Andreas | I. H. Reed | San Andreas |
| Ponticelli | " | " | 3 m W of Mokelumne Hill | — Ponticelli, Own | Mokelumne Hill |
| Plymouth | " | Opening. | 6 m N of Milton | Smith & Co.; Bondelli-Thomas Co. | Angels Camp |
| Poverty | " | 1 | 8 m E of Milton | John Howard, Own | Milton |
| Pine Log | " | Idle. | 2½ m NW of Copperopolis | D. Jutton, Own | Copperopolis |
| Point Rock | " | | South slope Carson Hill | Geo. W. Grayson, Own | S. F. |

### CALAVERAS COUNTY—Continued.

| NAME OF MINE | Character of Mine..... | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| Pine Quill | Gold quartz. | 4 | ¾ m S W of Angels Camp | F. Bruner | Angels Camp |
| Prince No. 2 | " | | ½ m N W of Altaville | B. R. Prince, Own | Altaville |
| Prince | " | | ½ m N W of Altaville | B. R. Prince, Own | Altaville |
| Pierce | " | | 7 m E of Murphys | Perry Condit, Own | Murphys |
| Quartz Glen | Gold. | Idle. | 6 m N E Mokelumne Hill. | Henry Atwood, W. T. Harris. | Mokelumne Hill |
| Quaker City | " | " | 4 m S W Mokelumne Hill. | A. Knell (In charge) | Mokelumne Hill |
| Roanoke | Gold quartz. | 20 | 1 m S E Mokelumne Hill. | W. T. Harris | Mokelumne Hill |
| Rose Hill | " | Idle. | 1 m S W Mountain Ranch | Rodesius Estate | |
| Riverside Mine | " | " | 2½ m W of West Point | Thos. J. Severns | West Point |
| Reed & Hillary | " | " | 2½ m N W of West Point. | Hurly Mining Co., M. Hurly, Pres't. | Palace Hotel, S.F. |
| Rathgeb Union Mine | " | " | 3 m S E of San Andreas | W. Holland, Agent | San Andreas |
| Royal (Royal Con) | " | 26 | 2½ m N W of Copperopolis | D. Jutton | Copperopolis |
| Relief | " | | ½ m W of Angels Camp | Naylor Williams et al, Own. | Angels Camp |
| Reserve | " | | 4 m S of Angels Camp | Geo. W. Grayson, Own | S. F. |
| Romargi | " | | 2 m S of Angels Camp | N. S. Newell, Own; Jas. Deitrick, Sec'y. | Angels Camp |
| Rose Rock | " | 3 | 3½ m N of Murphys | Conliffe & Driver, Own | Murphys |
| Right & Left | " | 2 | 6 m N of Murphys | Geo. McCollum et al, Own. | Murphys |
| Reef Rock | " | | 3 m N E of Angels Camp. | Geo. S. Taylor, Own. | Murphys |
| Rising Sun | " | 2 | 1 m E of Robinson's Ferry | McArdle Bros., Own. | Robinson's Ferry |
| Starlight Mine | Gold. | Idle. | 8 m E of San Andreas | W. B. Swank, Own. | Mountain Ranch |
| Sparks Mine | " | " | 4 m S E Mokelumne Hill. | J. B. Sparks et al, Own | Mokelumne Hill |
| Silver Mountain | " | " | 8 m S E of West Point | C. E. Congdon, Own. | West Point |
| Shenandoah | " | " | 2½ m NW Mount'n Ranch | Wm Nixon | Mountain Ranch |
| Sheep Ranch | " | " | Sheep Ranch | W. H. Clarey | Stockton |
| Shaw Mine | " | " | ½ m W of North Branch | Jno. Shaw (Phœnix M. Co.) | North Branch |
| Slate Creek | " | 4 | 4 m S of Valley Spring | Bonded to Johnson Wilde; Chieland & Caldwell, Own. | Valley Spring |
| Spring Gulch | " | Idle. | 3 m N of San Andreas | J. S. White et al, Own | San Andreas |
| Stony Gulch | " | " | 3½ m N E of Milton | G. Findley and M. L. Hunt, Own. | Milton |
| Stars and Stripes | " | " | 2½ m N E of Milton | W. Owens, Own | Milton |
| Safe Deposit | " | | 2 m N W of Angels Camp. | Chas. D. Smythe, Own | Angels Camp |
| Santa Ana | " | 1 | 2 m S of Angels Camp | Col. H. D. Woodson et al, Own | Salt Lake City |
| Smythe (Sloan) | " | | Vallecito or Red Hill | Chas. D. Smythe, Own | Angels Camp |
| Sheridan | " | | Robinson's Ferry | Thos. Richards, Own | Sonora |
| Sloane & Rudorff | " | | 2½ m S of Vallecito | Sloane & Rudorff, Own | Vallecito |
| South Carolina | " | 10 | South slope Carson Hill. | Ballard & Martin, Own | S. F. |
| Spring Gulch | " | | 2½ m S of Angels Camp | T. Smith et al, Own | Angels Camp |
| Suffolk | " | | 4 m S E of Angels Camp. | Jas. Copeland, Own. | Vallecito |
| Star of India | " | | 1½ m W of Angels Camp. | Jas. F. Curtis & Co, Own | Angels Camp |
| Stonewall | " | 2 | 2½ m S W of Murphys | Geo. S. Taylor, Own | Murphys |
| Shaw Mine | " | 5 | 2 m N W of Murphys | Alfred Shaw et al, Own | Murphys |
| Single Standard | " | 1 | 2 m W of Murphys | Jas. McQuig, Own | Murphys |
| Stickle | " | 172 | Angels Camp | T. T. Lane, Supt-Own | Angels Camp |
| Sperry Iron Mine | | | 1 m N of Murphys | — Sperry, Own | Murphys |
| Tripp & Allison | Gold quartz. | Idle. | 4 m S E of Jackson | Tripp & Lucas, Own. | Jackson |
| Treat Mine | " | 3 | Cave City | Geo. Treat, Own | San Andreas |
| Thorp Mine | " | 12 | ½ m E of Fourth Crossing. | L. Allgewahr, Supt | Fourth Crossing |
| Table Mountain Water Ditch | | | Table Mountain | Treat & Wylie, Own | San Andreas |
| Tulloch | Gold. | | 2½ m S of Angels Camp | Jas. Tulloch, Own | Angels Camp |
| Tryon | " | | ½ m S of Angels Camp | C. W. Tryon, Own | Angels Camp |
| Total Wreck | " | | 1 m W of Murphys | Colin Campbell, Own | Murphys |
| Union Shaft | " | | 4 m N San Andreas | Ira H. Reed, Own | San Andreas |
| Uptograph | " | 5 | Douglass Flat | John Black et al | Douglass Flat |
| Utica | " | 202 | Angels Camp | T. T. Lane, Supt-Own | Angels Camp |
| Union Ditch & Flume | " | 6 | Angels Camp | C. D. Lane, Supt | Angels Camp |
| Vallecitos | Gold quartz. | 3 | Vallecitos | Isaac Copeland, Supt | Vallecito |
| Vanderbilt | " | | South slope Chapparal Hill. | E. K. Stevenot, Own | Sonoma |
| Woodstock | Gold. | 4 | 4 m S W Mokelumne Hill. | W. P. Ball | Mokelumne Hill |
| Williams | " | 7 | 3 m E of Mokelumne Hill. | Geo. Edwards | Mokelumne Hill |
| Wheelock | " | 7 | ½ m E of Cave City | E C. Rogney, Own | Oakland |
| White Oak | " | 2 | Smith's Flat | Mercer & Gilman, Own | Angels Camp |
| Whittle | " | | 4 m S W of Angels Camp | Reddick Soulsby et al, Own. | San Andreas |
| Washington | " | | 5½ m N of Murphys | C. V. Compere, Own | Murphys |
| Yellow Pine | " | 1 | 3 m N E of Milton | T. E. Findley et al, Own | Milton |
| Yellow Stone | " | | 2 m N W of Angels Camp | Chas D. Smythe, Own | Angels Camp |
| Young America | " | | 2½ m N W of Murphys | Dora Mining Co., Own | S. F. |
| Zaccatara | " | 4 | 3 m N E of West Point | Porterhouse & Field, Own. | West Point |

### COLUSA COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Central Q. S | Quicksilver. | | 27 m W of Williams Sta'n | G. W. Northey and E. Lake, Own. | Colusa |
| Clyde | Gold. | 2 | 30 m W of Williams Sta'n | A. James, Supt | Sulphur Creek |
| Cooks Mineral Sp'gs | | 1 | 30 m W of Maxwell | Chas. Young, Supt | Cooks Springs |
| Elgin | Quicksilver. | 3 | 29 m W of Williams Sta'n | Wm. Oeldart, Supt | Sulphur Creek |
| Empire | " | 4 | 27 m W of Williams Sta'n | E. McCook, Supt | Sulphur Creek |
| Fonts Springs | | 1 | 40 m W of Maxwell | John F. Fonts, Own | Stony Ford |
| Last Chance | Copper & gold. | | 3 m N E of Spencerville | D. O. Mills et al, Own | |
| Manzanita | Gold & quicksilver. | 12 | 29 m W of Williams Sta'n | Geo. W. Northey, Supt | Sulphur Creek |
| Rathburn | Quicksilver. | | 30 m W of Williams Sta'n | E. McCook, Supt | Sulphur Creek |
| Strong Ditch | | | Orland | J. N. Burns, Supt | Sites |
| Wilbur Springs | | 1 | 26 m W of Williams Sta'n | Wm. Oeldart, Supt | Sulphur Creek |
| Wide Awake | Quicksilver. | 2 | 27 m W of Williams Sta'n | A. A. Gibson, Own | Sulphur Creek |

### CONTRA COSTA COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Alhambra Springs | | 1 | 5 m SW of Martinez | Dr. C. G. Merrill, Supt | Martinez |
| Biso Artesian Well | | | Concord | Mrs. Rose Biso | Concord |
| Galinda Artes'n Well | | | Concord | John Galinda | Concord |
| Pacheco Artes'n Well | | | Concord | Mrs. Holler | Concord |
| Central or Stewart | Coal. | 33 | 7 m W of Antioch | M. McBride | Stewartsville |
| Mt. Diablo Pottery & Paving B | | | ½ m W of Antioch | E. T. Maple | Antioch |
| Pittsburg Coal Mine | | 80 | Somersville | Jas. Rankin | Martinez |

### DEL NORTE COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Aurora Extension | Copper | | 10 m E Smith Riv. Corners | A. B. Townsend. | Crescent City |
| Aurora | " | | 10 m E Smith Riv. Corners | R. D. Miller | Crescent City |
| Alta | " | | 10 m E Smith Riv. Corners | Bacon & Co., Agt | S. F. |
| Baumgarten | Gold. | 2 | 25 m S E of Crescent City | Chas. Baumgarten | Crescent City |
| Big Flat | " | 15 | 25 m S E of Crescent City | Jno. McLaughtin, Sup | Crescent City |
| Butler Claim | " | 2 | 3 m S of Gasquet | Jas. Butler, Own | Gasquet |
| Bartlett | " | | E of Crescent City | Jno. Young, Own | Crescent City |
| Burrows & Peak | " | 4 | 17 m E of Gasquet | Burrows & Peak, Own | Gasquet |
| Crescent City Beach Mine | " | | 3 m S of Crescent City | Edw. Yates, Own | Crescent City |
| Coon Flat | " | 3 | 8 m S of Gasquet | Chas. Goodridge, Own | Crescent City |
| Cleary Claim | " | 2 | 3 m S of Gasquet | Lawrence Cleary, Own | Gasquet |
| Christensen | " | 3 | 10 m S E of Crescent City | Nel. Christensen, Own | Gasquet |
| Casey Claim | " | 2 | 7 m W of Gasquet | Casey & Moore, Own | Gasquet |
| Cooke Claim | " | 4 | 3 m W of Gasquet | Geo. Cooke, Own | Gasquet |
| Coleman Claim | " | 6 | 15 m E of Gasquet | Coleman & Haight, O'n | Gasquet |
| Emmetsburg | Coal. | | 3 m N of Crescent City | Pet. Emmetsburg, O'n | Crescent City |
| Eastman Claim | Gold. | 2 | 20 m E of Gasquet | Frank Eastman et al, Own. | Gasquet |
| French Hill | Chrome | | 25 m S of Gasquet | Tyson Co | |
| French Hill | Gold. | | 3 m S of Gasquet | French Hill W. & M. Co., Own; L. S. Cooper, Supt. | Crescent City |
| Frank Claim | " | 2 | 3 m S of Gasquet | Antone Frank, Own. | Gasquet |

(To Be Continued.)

# Mechanical Progress.

### Largest Cable on the Coast.

Herewith is illustrated the largest cable on the coast, as it appeared on the truck in transit through the city to be delivered to the Market Street Railway Company from the works of the Washburn & Moen Manufacturing Co., Nos. 8 and 10 Pine street, whose Pacific works are running full time, a portion of the establishment running night and day to fill orders. The cable illustrated is 31,000 feet in length, and, extended, would reach from Market street well out toward the Cliff House. It is 1¼ inches in diameter and weighs 100,000 pounds. Cable and truck make a gross weight of 130,000 pounds, requiring fifty-six horses to haul it. The transit of such an immense weight and such a cavalcade of horses through the crowded streets of the city is always an interesting sight to the thronging thousands, who pause to view the huge wide-tired wheels and the immense coils of wire rope that, like a gigantic python, encircle the drum in their steely folds.

Illustrative of the efficiency of this firm's Pacific works, mention may be made of a cable they have just delivered to the Oakland Cable Railway Co. for their San Pablo avenue line. The company received the order for the cable late Thursday afternoon and had the cable ready for delivery Monday afternoon following, thus turning out a $1\frac{5}{16}$-inch dameter cable, 29,500 feet in length, within four days from the receipt of the order. This cable weighs 65,000 pounds and was hauled to the railroad ferry by forty-eight horses. The intention was to drive on to the ferry with the truck, but the drivers found the truck was too wide to go on to the ferry; hence, it was necessary to load this cable on to a specially constructed flatcar for transportation to Oakland.

The company is supplying many of the large cables in use on the Pacific coast. At the present time their large cable machine is at work winding a cable for the Madison Street Cable Railway Co. of Seattle.



LARGE CABLE MADE BY THE WASHBURN & MOEN M'F'G. CO.

GLASS HOUSES of a very substantial kind can now be built. Silesian glass makers are turning out glass bricks for all sorts of building purposes, claiming for them such advantages as variety of shape, free transmission of light, strength, cheapness, and general adaptability. Where complete diffusion of light is needed, as in factories, conservatories, courtyards, etc., they are especially suitable.

COMPRESSED PULP FIBER of manilla, rope and similar stock appears to possess the proper consisency for a pad that is sufficiently porous to absorb oil and deliver it again to the parts of a rapidly revolving shaft bearing, yet impervious to wear, says an exchange. The need of a perfect form of oiling mill shafting, loose pulleys of machinery, heavy driving system of water wheels, etc., is obvious to all mill men. The loose-pulley problem is one of importance. Loose pulleys usually get heated first, as they are most constantly running. When a part of a mill is run by night, all the loose pulleys of idle machines in other departments are revolving, and as some of these are in out-of-the-way places, they often get heated and start a fire before discovered. Besides there is the wear of the shaft. This is overcome by inserting a paper pad in a slot in the shaft.

# Electrical Progress.

A DESCRIPTION by J. W. Dickerson of the running of a telephone line from Leadville to Aspen, Colorado, shows that telephone construction in the Rockies is not all plain sailing. It took two months to cover the entire length, 48 miles. In ordinary construction, the poles would be set 42 to the mile, but at certain points, where sharp turns were necessary, the number would sometimes be increased to 75 to the mile. The members of the construction gang had to be as expert as axmen as they were as linemen, for when timber was encountered a path of 200 feet on each side of the line had to be cleared in order that wires might not be broken when trees were blown over by the terrific blasts which at times prevail in that region. A great deal of the comparative slowness of the installation was owing to the inability of the workmen to labor in such a rarified atmosphere. At one point the wires were strung at an elevation of 12,000 feet above the sea level. In such an altitude the lineman soon becomes completely tired; after he has climbed two or three poles, he has to take a rest to recuperate his energies. The preparation of the holes for the poles, which would have been tedious in similar ground even in an ordinary atmosphere, was an especially slow and fatiguing operation. It was often necessary to blast a hole for the pole by the use of giant powder, and an ex-miner, who had had an extensive experience with explosives, was assigned to the job. The digging of one pole hole would sometimes occupy him for a whole day, working honestly. Over 300 pounds of powder were used on the line for this purpose. When the Continental Divide was reached, the poles had to be abandoned and the wires were placed in a submarine cable, which was buried in a two-foot trench for a distance of 7,600 feet. The advisability of abandoning aerial construction at this point was demonstrated by the experience of the company who maintain the Denver and Leadville line. At one point on that line, Mosquito pass, the poles were originally set 100 feet apart. As soon as the wires were covered with sleet they promptly snapped and the line was useless. Double the number of poles were then used, with the same result. The space between the poles was then reduced to 15 feet, but as soon as the sleet came the line was swept down flat. Eventually an underground cable was laid for two and a half miles and there has been no trouble since.

# Practical Information.

### Why Steam Fuses Soft Plugs.

"Will you please tell me," writes a subscriber, "why a soft plug will fuse when exposed to steam? Why does it not fuse in contact with water? Is not the water as hot as the steam?"

Yes, the water is as hot as the steam, but the plug must get hotter than either before it will melt. Tin, with which these plugs are usually filled, melts at about 450° F.—a temperature which could be attained by water only under about 350 pounds pressure. You cannot heat a plug while one end of it is immersed in water, much hotter than the water about it, for the water will receive and carry off the heat at one end as fast as it is absorbed by the metal at the other. Steam, however, while no hotter than the water, is not anywhere nearly so good an absorbent of heat. It would take about 700 times the volume of steam at 100 pounds to absorb the same amount of heat as a given volume of water, with the same rise in temperature. To do as effective work as a pint of water in keeping a plug cool would involve about 700 pints of steam, and the water can never get above the temperature of the boiling point at the existing pressure, while there is no limit to the temperature that the steam can attain. After the water leaves the plug the steam cannot absorb the heat as fast as it is absorbed by the plug at the fire end, so the temperature of the fusible metal rises above the softening point and it is blown out.—Porter.

AT a recent meeting of the Philadelphia Academy of Natural Sciences, Prof. Carter referred to a so-called "iron tree," discovered at Three Tuns, Montgomery county, Pa., imbedded in a sandstone quarry, about ten feet below the surface. The tree is about eighteen feet long, and the trunk is about eight inches in diameter. It has been completely turned to iron, and is composed mostly of brown hematite. A portion of the tree is of imperfect lignite, resembling charcoal. No doubt exists in his mind that it is a real tree, because knots were found, many of which had also turned to iron. "The phenomenon is accounted for," says Prof. Carter, "by the fact that the shales and sandstone in that neighborhood are covered with red oxide of iron, and sometimes with brown hematite, and it is supposed that the iron ore, which contains a coloring, was reduced by organized matter, and that it was made soluble in water containing carbonic acid gas. As the water holding the iron in solution came in contact with the tree, the iron was precipitated on the tree, and there was an interchanging of vegetable and mineral matter, so that the rocks were relieved of their coloring matter, and the tree took it up."

WITHOUT a proper amount of carbon in food, one suffers from cold, and is without energy. The foods that contain the largest amount of heat and energy (chiefly in the form of starch) are barley and rice. In 100 ounces of barley or rice 76 ounces are pure heat-giving or energy-producing materials. Next to these comes wheat, which contains 69 ounces of carbon in the 100 ounces; and, after that, figs and dates, but in these cases the heat and energy producing elements are presented in the form of sugar. One hundred ounces of the substances of either of these foods contain 66 ounces of heat and energy producing material. Next to these comes oatmeal with its 63 ounces, and after this the pulse tribe, peas and beans, which average from 50 to 60 ounces of heat and energy producing material in every 100 ounces.

REGARDING the growth of population in the various countries of Europe during the decennial period 1885–95, the aggregate increase was 29,922,800. Russia added 12,510,800 to her existing population; Germany, 4,522,600; Austria-Hungary, 3,502,200; Great Britain, 2,452,400; Turkey, 1,100,000; France, 67,100.

LIEUT. W. S. SMITH, U. S. Navy, advances a novel theory for boiler explosions, being resonance, the principle upon which the fiddler threatened to fiddle the bridge down if they did not let him cross. His argument in favor of the idea is, however, more ingenious than conclusive.

### Assays of Copper and Copper Matte.

NUMBER III.

Discussion of the Results presented at the Florida Meeting of the American Institute of Mining Engineers.

There is one question only here and there touched upon in the reports of the several assays which is bound to come to the front in business practice very soon, namely, Shall allowance for cupel absorption, volatilization or loss in slag be made in commercial reports of silver assays?

In copper assaying the returns aim to represent the total copper present; and the allowance for subsequent loss in smelting is fixed by an arbitrary and uniform agreement or usage between shipper and buyer or smelter.

In gold assays, likewise, the reported result is understood to show the total contents of gold in the sample; and the buyer is accustomed to receive one-eighth or one-quarter of an ounce per ton free, to compensate for loss in smelting, and also to pay for the remainder of the gold at less than its full value as refined metal (say 90 or 95 per cent. of this value, according to the agreement he may make).

But in the assay of copper or copper matte containing silver, it is probable that the reported value in silver always comes short by an ounce or two per ton at least, of the actual total contents in that metal, by reason of the general practice on the part of commercial assayers of ignoring the losses to which I have referred. The question is, whether this practice shall be continued, or whether the assay report shall be corrected by an allowance for this loss.

It seems to me that the matter is one to be settled primarily by agreement between buyers and sellers, rather than by the assayers who stand between them. But it is unquestionably important that whatever is determined upon should be adopted by all those interested in public sampling works or in the business of commercial assaying. Otherwise, there would be interminable disputes arising, not out of lack of skill or care in either party, but out of a difference in the rules of practice.

Pending the settlement of this question, it is highly advantageous that the nature and extent of such assay losses should be investigated, and that the most accurate and convenient method of allowing for them should be determined.

I feel greatly encouraged by the interest shown in this subject, and trust that the result will substantially benefit both the metal trade and the guild of assayers.

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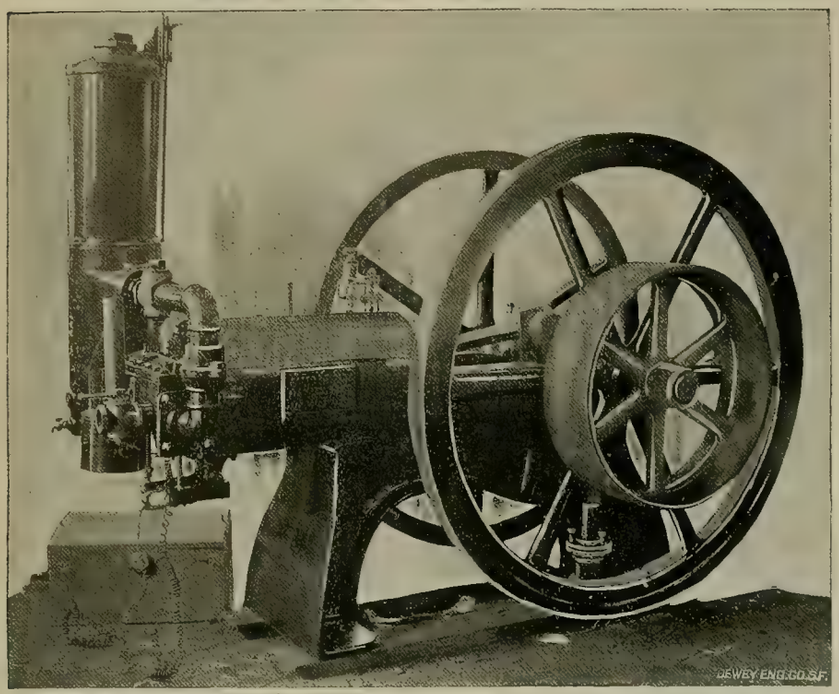
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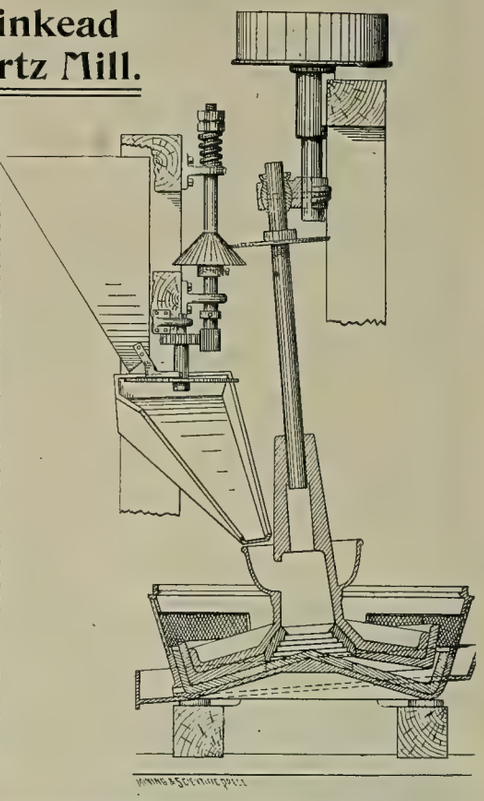


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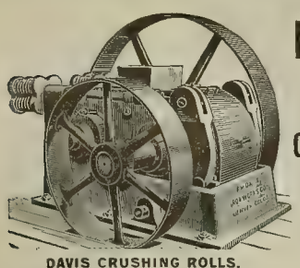
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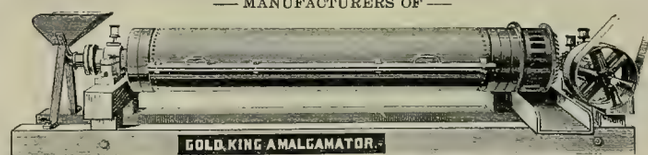
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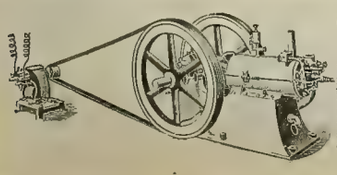
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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING APRIL 21, 1896.

558,629.—PRESERVING FRUITS, ETC.—C. F. Buckley, S. F.

558,548.—PICTURE HANGER—W. P. Cave, San Bernardino, Cal.

558,833.—WATER HEATER—G. H. Colt, San Jacinto, Cal.

558,645.—TRANSPORTING EARTH, ETC.—A. S. Hallidie, S. F.

558,879.—BASKET CARRIER—L. S. Manning, Oakland, Cal.

558 513.—FIRE LIGHTER—J. T. McDowell, Ellensburg, Wash.

558,510.—FURNACE—C. W. & J. A. Mohr, Spokane, Wash.

558,835.—POWER TRANSMITTER—F. Rademacher, Los Angeles, Cal.

558,639.—CAR COUPLING—D. J. Stevenson, Bakersfield, Cal.

558,625.—ADVERTISING CLOCK—R. G. Wenzel, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ROTARY ENGINE.—A. W. R. Berr, San Jose, Cal. No. 558,144. Dated April 14, 1896. This invention relates to an improvement in that class of mechanical contrivances in which any medium under pressure is employed to propel pistons attached to, varied by and rotating around a central shaft or axis. The device being also applicable to those machines in which power is applied to drive the shaft and piston so that they may be used as pumps and water meters and for similar purposes. It consists of an exterior case having eccentric chambers fixed therein side by side, with their eccentricities diametrically opposite; a shaft extending through the heads of the case, disks fixed to the shaft intermediate between the eccentric chambers and exterior thereto, with spring actuated packing rings to form joints between the disks and chambers, piston carrying drums fixed to the shaft within the eccentric chambers, pistons sliding in radical channels in said drums and transverse bars fulcrumed in the intermediate disk between the chambers, the ends of said bars engaging with the oppositely placed pistons whereby the inward movement of one piston is transmitted to produce an outward movement of the corresponding one in the other chamber. The arms connecting the pistons are so formed as to tilt upon fulcrum blocks intermediate between the two chambers, these blocks being made adjustable to compensate for wear.

PROCESS OF PRESERVING FRUITS, VEGETABLES, ETC.—Cornelius F. Buckley, San Francisco, Cal. No. 558,629. Dated April 21, 1896. This process consists in first innocuously sterilizing ordinary air, then in causing said air to serve as a vehicle for the vapor of an innocuous volatile sterilizing substance or compound, and finally, in causing said vapor carrying sterilized air to enter the compartment in which the materials to be preserved are confined, and to displace the ordinary air therein. The process also is one for sterilizing air, consisting in passing the air through a germ-destroying liquid or liquids and subsequently washing the same to remove the noxious products of such sterilization. The object of the process is to provide simple and practicable means for preserving perishable articles, especially fruit, vegetables and meat, so that they may be transported on long journeys and may be kept as long as necessary.

ADVERTISING CLOCK.—Rudolph G. Wenzel, San Francisco, Cal., assignor to Louis A. Robertson and Warren F. Mills, of same place. No. 558,625. Dated April 21, 1896. This invention relates to that class of advertising devices in which a series of cards bearing advertising or display inscriptions is operated by means of and in connection with a clock, so that said cards are successively exhibited. The device consists of a series of advertising or display cards, a driving mechanism for operating said series, a tripping and releasing device comprising a rotable stop bar and a pivoted lever to detachably engage the same for permitting the periodic operation of said driving mechanism, a clock mechanism, a cam in the clock mechanism and driving mechanism therefor, a retaining and tripping device operated by the clock mechanism for periodically permitting the operation of the cam and power transmitting connections between said cam and the tripping and releasing device of the card driving mechanism, whereby the latter is operated.

COLLECTING AND TRANSPORTING EARTH, ETC.—Andrew S. Hallidie, San Francisco, Cal. No. 558,645. Dated April 21, 1896. This invention relates to a means for collecting and transporting loose material, such as sand, gravel, earth, etc., by means of an endless moving wire rope, in conjunction with scrapers or excavators, which are hauled by the moving rope. The object is to provide an apparatus by which any loose material, such as sand, gravel, earth, etc., may be scooped up and transported from the point where it is taken to any other desired point. The apparatus consists of an endless traveling rope, hangers and buckets suspended therefrom, clips by which the hangers are connected with the rope, draft ropes extending from each clip to the bucket or hanger next in rear thereof, stations with pulleys over which the endless traveling rope is carried and mechanism whereby the pulleys may be adjusted up or down.

CAR COUPLING.—David J. Stevenson, Bakersfield, Cal., assignor of one-half to Henry Hellwegen, of Santa Rosa, Cal. No. 558,620. Dated April 21, 1896. This coupling is an automatic double hook coupler. It comprises essentially opposing draw heads, each having at its front and on opposite relative sides thereof a coupling hook, and each having an internal chamber, provided with shoulders, and a swinging gravity latch or tumbler, adapted to be seated against said shoulder, and to automatically engage the hook of the opposing draw head. Means are also provided for releasing the coupling from the side of the car.


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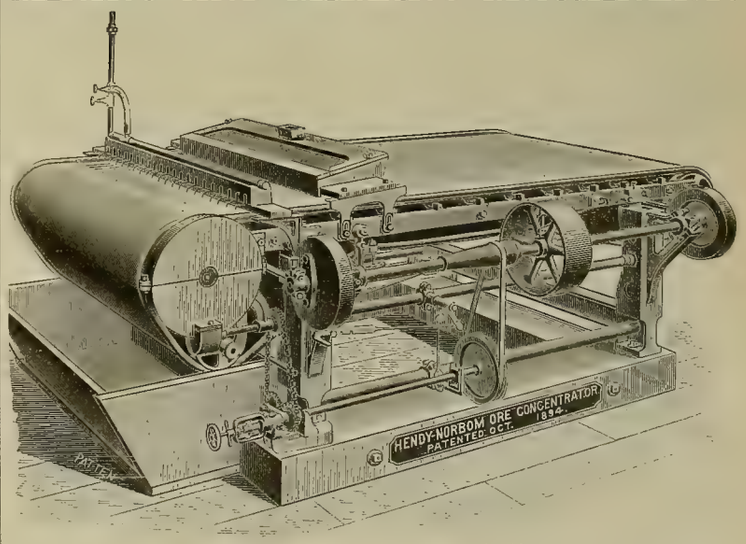
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**HENDY - NORBOM ORE CONCENTRATOR.**

OFFICE OF O'LEANS MINING COMPANY, GRASS VALLEY, CAL., Dec. 12, 1895.

*Mr. John O. Norbom, San Francisco, Cal.*—DEAR SIR: Replying to your inquiry regarding the working of your Concentrator, I take pleasure in stating that the machine is doing excellent work. The curve springs give the machine a very gentle motion, which makes it mechanically perfect. We are saving our sulphurets very clean and lose a trace only in the tailings. The machine takes pulp from five stamps, handling about nine tons per twenty-four hours with ease. Our ore carries from 3½ to 5 per cent of sulphurets. The latest improved belt gives good satisfaction; it has now run about five months. I expect it will last about fifteen which speaks well for canvas belts. As for little attention and easy working, I can recommend it to any person as being the best machine I have ever used. Wishing you success, I remain, yours truly, [SIGNED] C. A. BROCKINGTON, Superintendent.

OFFICE OF FEDERAL LOAN MINING COMPANY, NEVADA CITY, CAL., Dec. 10, 1895.

*Mr. John O. Norbom, San Francisco, Cal.*—DEAR SIR: Your Concentrator, which has been in use in our mill for the last six months, is still doing excellent work. At present we are running the pulp of ten stamps on one machine, without seeming to be overloaded. I can recommend the machine to do all and more than you claimed for it. Yours truly, [SIGNED] J. VINCENT, Superintendent.

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# Mining Summary.

## CALIFORNIA.

### Amador.

At the Zeila the water has made it necessary to lay off some of the men a few shifts this week. There is sufficient ore on hand to keep the mill going. A shed 36x40 feet is being erected at the Zeila blanket plant, in which will be placed six concentrators.

Sinking goes on at the Amador Queen.

At the Good Hope mine, near Jackson, the shaft is down 110 feet. At 70 feet levels were run north and south from the shaft in the ledge. Twenty tons of ore were taken out years ago and crushed in the Oneida mill at that time, without saving any sulphurets, the returns being $6.02 per ton. The old shaft will be sunk to a depth of 300 feet.

The South Eureka Company has paid off the last of the bond held by the Tanner heirs – $23,000. The ore comes from the 900 and 1050 foot levels. Sinking below the latter level progresses. The company employs fifty men.

The McIntire mining property has incorporated under the name of the South Keystone Consolidated. Active operations will begin this month. Three shafts will be simultaneously sunk at different points.

The *Record* says preparatory work for sinking the main shaft is being rapidly pushed at the Central Eureka mine.

The shaft at the Bay State mine is now down over 600 feet, and it is intended to open up an 800-foot level.

*Republican:* At the Kennedy mine they are sinking the shaft 200 feet deeper, which will take it down to the depth of 2200 feet, including the sump. About 150 feet of the sinking has been completed. The intention is to open up another level at 2150 feet. The mine has reached such a depth that the hoisting capacity is taxed to the utmost. To relieve this strain in a measure the water power is being erected at the foot of the gulch, which will give an additional pressure of 60 feet. The machinery is being put in place for this change, and when completed the hoisting power will be materially increased.

### Butte.

Snow covers the ground as low as Mountain House, 4500 feet altitude.

The tunnel in the Golden Butterfly is now in about 1200 feet.

The shaft in the Banner mine is now down almost to the 1000-foot mark.

In the Standard mine at Oregon City sinking the shaft from the 500-foot level began last week.

At Enterprise, Slater & Alm and G. W. Bothwell are each running a two-stamp mill. Burroughs, Moore and Brooks are each erecting a small quartz mill.

Lynch Bros. of Oregon City are opening a quartz mine near the junction of the North and Middle Forks of Feather river.

At Magalia four men are running a tunnel at the Bader mine and the same number at the Lucky John. Five men are employed at the Higgins mine in Nimshew. Twenty-five miners are at work in the Princess mine and about thirty five at the Magalia mine. T. J. Sparks is opening a new gravel mine on Little West Branch.

### Calaveras.

From Ponte's ranch, near Murphys, come reports of a gold strike of unusual promise.

The *Prospect* learns that preparations are under way to expand operations at the Thorp mine. The work of digging a twelve-mile ditch which will convey water from the south fork of the Calaveras to the mine is about to be commenced. A forty-stamp mill will be put up. In the mine the 500-foot level has been reached and the rock proves satisfactory. A forty-foot sump is now being sunk preparatory to crosscutting and stoping. The water is kept out of the mine with a Cornish and jack-head pump with a capacity of 250,000 gallons per hour. Ten men are employed down in the mine, working three eight-hour shifts. Five men are engaged on the surface about the works, and six are out on the hills around the place cutting wood.

The Blazing Star mine near West Point is being put in working order.

The shaft of the Gwin mine is now down 1160 feet.

Messrs. Buffert and Woods of San Francisco propose to soon start up the Lockwood mine.

Twelve men are working the Soap Root mine. The shaft is down 100 feet and a 4-foot ledge has been struck with good ore.

Col. Woodrow has bonded the Missouri mine near Angels and will sink the shaft 1000 feet.

The shaft in the Perrano mine, on the Carson road, is to be sunk to a depth of 500 feet by Salt Lake men.

At the South Paloma mine sinking will be pushed to a depth 600 feet.

At Machu mine near West Point twenty-five men are employed.

The *Prospect* says the water supply has so increased at the south fork of the Calaveras as to furnish power enough to run ten stamps at the Donnalan mill. The mill is kept going twenty-four hours a day.

At the old Granite mine the property is being put in shape in order to work again.

Philip Deidesheimer who recently bought the Spencer mine begins development this week.

In the Esperanza mine, at the 300-foot level, the lead is 75 feet in width from wall to wall and the ore is of good quality. The Mokelumne *Chronicle* says a $10,000 hoist capable of sinking 3000 feet is to be erected at once. Col. Robinson is superintendent.

The bond held by Livingston & Co. on the Empire mine expired last week; no payment has been made. An assay made of the sulphurets at the State University shows good values.

### El Dorado.

(Special Correspondence.) — A. E. Head is here to inspect development work in progress on the Blue Gouge properties. The new tunnel on the ledge has reached 200 feet and will be continued 200 feet farther. Another tunnel will be run 1000 feet north of that being opened at present.

The long continued litigation over the Lone Jack near Garden Valley has been adjusted. This property has a creditable history as a gold producer and it is encouraging to note that work will be resumed in the near future.

The sprightly little *Gazette* of Georgetown has long and perseveringly maintained a characteristically firm stand against many and strong odds in favor of El Dorado county as a fertile mining region. The *Gazette* has the proud satisfaction of seeing its good judgment verified and has added the laurels of victory to its good missionary work in the mining field.

John Skinner is running a tunnel on the old Fisk property one mile from town. The tunnel is 140 feet long and taps a rich ore body at a depth of 120 feet.

F. B. Rice has reached 140 feet, tapping a good ore body at forty feet. He is operating under lease on the Lemmons claim, about a mile from town.

M. Varozza has granted a bond and lease to Wm. Berry of Oakland for the old Barbara mine at Granite Hill, six miles west of town.

The old Kates mine on the Georgetown Divide, near the Two Channel Company, is being reopened as a drift property.

Richard Hosking is tunnelling and drifting on his property adjoining the old Pacific, within fifteen minutes' walk from the Court House, and meets with good success. He has for some years taken rich products from this property. He is aiming for the channel. In the course he is taking he will no doubt find the bench of the old Coon Hollow, famous in the days of hydraulic mining as a wonderfully rich territory.

Roberts, Gillinwater & Melton are running several tunnels, all on a ledge, on the Rosebud, near Brownsville. The ore is all high grade. This was operated years ago with an arrastra.

The rainstorm, so unusually persistent in its long continuance, has seemingly ceased, and strangers seeking deep mining properties are again coming in.

### Inyo.

The *Register* hears that a hill of phosphate has been located east of Alvord, by G. D. Rochford, representing Denver men. The principal source of this fertilizer is in Florida, and most of the phosphate used in southern California comes from there. The deposit now reported from Big Pine is said to carry 33¼ per cent of the necessary chemical.

### Kern.

The owners of the new prospects at Randsburg write to the Bakersfield *Californian* that the stories of the strike have not been exaggerated in the slightest. Their claim is called the Hector.

### Nevada.

Regarding the negotiations pending for the sale of the Sneath & Clay mine to French bankers, the *Transcript* believes that a transfer will be made. The mine has produced about half a million, plates and blankets being used in the mill, but no sulphurets were saved.

Messrs. Rapp, Engelbright, Waggoner et al have sold to F. W. Page and associates the Fortuna, formerly the Live Yankee, and right of way through contiguous property. Capt. Nihell will take charge of future work. A 1000-foot shaft will be sunk on the contact vein, crosscutting beginning at the 500-foot level.

### San Bernardino.

A strike is reported in the McHaney district, east of Banning, by the Eagle Cliff Mining Company, at a depth of seventy-five feet of twenty inches of ore.

### San Diego.

In the Picacho gold belt, says the *Sentinel*, are a large number of white quartz veins which carry no mineral whatever, the gold in that section being found in the porphyritic and schistose rocks, carrying a good per cent of silica in their makeup. Mining men not acquainted with this fact and accustomed to the white quartz veins in other mining regions which carry gold have been puzzled whenever they have visited Picacho and seen an entirely different formation and the mineral-bearing rocks of another character.

A small vein of copper carrying rock has been found in the Alcyon mine in the White gold basin, carrying free gold. It was only a stringer in appearance, four or five inches in width. Development shows a body of ore carrying gold, silver and copper.

Senator Dorsey has had a large amount of thorough prospecting and development work done on his twenty-six mines, with satisfactory results. Work will be prosecuted during the summer.

At Galanal, twelve miles west of Picacho, rich ore has been found in the Matilda, Silver Prince, Rainbow and Estrella mines.

### Santa Barbara.

Reports received of gold discoveries in the Santa Ynez valley, Santa Barbara Co., are to be largely discounted. A competent representative of this paper, who has given it recent personal observation, writes that the samples of rock (largely silicate of lime) submitted for examination carry no gold, and that whatever of value exists depends entirely on future development.

### Shasta.

The smelter of the Mountain Mines limited, has resumed. A private letter from Keswick reports excellent results.

### Sierra.

At the North Fork drift mine a 2200-foot tunnel has been run under the overlying lava, and a 375-foot crosscut shows paying blue gravel. An 800-foot flume has been built, and the company expects before long to handle 1000 carloads daily. In the South Fork mine a tunnel 1700 feet is expected to strike the ancient channel. Nearly 1200 feet of this tunnel is completed.

J. B. Wheeler of Manitou, Colo., is managing a New York syndicate which has bought a gold property, incorporated as the Crœsus Gold Mining and Milling Company, in Sierra county, twenty-six miles north of Nevada City. He tells a N. Y. reporter that it is a close corporation, only five stockholders, no stock for sale, and that he has run an experimental tunnel for 700 feet and struck ore at 500 feet.

### Siskiyou.

The Charles Hansen mine near Somes Bar, has been bought by Abner Gerrish.

*Journal:* The Distlehorst Bros. are ready to commence work on their boats as soon as the weather permits. Mining men are watching this enterprise with interest, as some are rather skeptical as to its success, while the Distlehorst Bros., who have worked their dredger in other streams, say they are satisfied there will be no trouble about its successful operation in the Klamath.

The miners on Hungry creek, Grouse creek, Elliott creek, Beaver creek and the head of Cottonwood creek, in the Siskiyou mountains, near the Oregon line, expect a good season.

Several claims of copper ledges have lately been located at the head of Indian creek, above Happy Camp, in this county, along the Coast range dividing Siskiyou and Del Norte counties, and also on the head of the Illinois river, which rises at the Del Norte and Siskiyou boundary, running northward into Josephine county, Or. The ledges also contain considerable gold and silver, and it is probable that other rich discoveries of gold and cinnabar may be found on the Siskiyou mountains near Preston's peak, at Copper lake. Copper lake evidently feeds the Illinois river and Althouse creek, running down the north side of the Siskiyou mountains into Oregon, and also Indian creek and Thompson creek, running southward into Klamath river near Happy Camp.

### Trinity.

*Journal:* The Altoona mine at Cinnabar shipped 94 flasks of quicksilver to San Francisco this week.

George Bach has sold his gravel mine, above Don Juan point, to Butte county men.

Carter, Montgomery & Tinsley have located 320 acres of gravel at Cox's Bar and will give the ground a thorough prospecting test.

Trinity Center is full of strangers waiting for the Berlin syndicate to begin operations.

The Brown Bear Mining Company of Deadwood have begun work in the old Lambert tunnel, the lowest one on the property, it being about sixty feet below the McDonald tunnel. A pumping plant will be put in to preserve the water for use in the mill.

On the new ditch from Big and Little Papoose creeks, in the Bolt's Hill district, sixty men are employed. F. Scironi has charge of the work. The ditch when completed will be twelve mines in length, and will convey the water of the above creeks to the mines on Mooney gulch, above Lewiston, recently purchased by the St. Helena Mining Company.

The Don Juan mine, owned by Charles L. and Wilbur A. Huestis, is turning out better than expected. They have a gravel bank that prospects 10 cents to the pan.

At the Highland placer mine at Taylor's Flat, the property of Peletreau & Hedges, the last cleanup from a six days' run netted twenty-three pounds of gold.

### Tuolumne.

*Democrat:* At the App mine there has been sunk a new incline three-compartment shaft on a 54 deg. dip, 270 feet, and an upraise driven from the 800 level to connect with it is already advanced 500 feet. Work has been stopped on the upraise and the connection will be made this month by sinking. They are also drifting south from the 200 and 800 to tap the old workings and commence stoping. The new twenty-stamp mill is going from the dump. There are at present 47 men on the payroll.

At the Rawhide sinking continues. Thirty-five stamps are kept dropping steadily. It is expected that the Tuolumne Water and Electric Power Company will soon be able to turn on the current for both the mill and hoist.

At the Dutch mine Supt. Trittenbach will put in four concentrators. Ten stamps are at work. Twenty-seven men are employed.

At the Punter, two and a half miles east of Sonora, Supt. Witney has ten men at work.

The Golden Rule hoisting machinery is almost completed.

*Independent:* The Marcus mine at Saw Mill Flat is being worked by two shifts.

E. C. Frisbee of Sonora has sold the Tarantula mine to H. McDonald of Alameda for $7000.

The Mountain Lily quartz mine, situated about six miles northeast of Columbia, is bonded for two years by Schoenfeld and Adler of San Francisco and A. S. Graham of Saw Mill Flat. Development will commence at once, with Mr. Graham as superintendent.

### Yuba.

At Brown's Valley the Dannebroge, superintended by J. C. Campbell of Brownsville, employs about forty men. Half of these are engaged in leveling off a mill site, others are putting a fifteen-drill air compressor in position and will soon be ready to start sinking by machinery. The mill for the present will contain only ten stamps. The Flag mine, about half a mile from the Dannebroge, has let a contract to sink the incline deeper. It is reported that the old Pennsylvania mine will be pumped out by the Dannebroge company as soon as its own mine is in good shape.

The miners in Brown's Valley mining district will elect a Recorder next Monday.

## NEVADA.

The Zirn-Schulz mill at Pine Nut has been running a week and the plates are covered with gold.

Manager C. H. Wilbur proposes to put in a concentrator with a daily capacity of twenty-five tons on the property of the Ophir Con. M. Co., Central, Nev.

### LINCOLN COUNTY.

The Pioche *Record* is publishing a notice of sale of the property of the Keystone Mining Company in Yellow Pine mining district, to satisfy judgments in the sum of $64,050.39, the sale to take place on May 19th.

The Lincoln Company, to whom the property was recently leased, has taken charge and are making an experimental run at the mill, and preparing to begin work on the 100-ton cyanide mill which it is proposed to erect near the mine.

### STOREY COUNTY.

The yield of the Belcher mine for the past week was 42 tons of ore, the average top car sample of which assayed $19.23 per ton.

The joint Confidence, Challenge Consolidated and Imperial west crosscut No. 1 from the surface tunnel is out 504 feet. The face is in hard porphyry.

In the Crown Point mine the west crosscut on the 700-foot level started from the main north lateral drift, 75 feet south of No. 1 crosscut, is out 40 feet. The face is all in quartz of low-grade. The raise from the south drift on this level is up 35 feet. The top is in quartz and porphyry of about the same appearance and grade as last reported. The south drift on the seventh floor of the raise on the 1100-foot level is now out 80 feet. The face is in porphyry and low-grade quartz.

The Segregated Belcher mine produced 21 carloads of ore averaging $22 67 per ton during the week.

The ore yield of the Savage mine for the past week was 52 carloads, of the average assay value of $22.67 per ton.

## OREGON.

Two hundred and twenty-five mining claims have been filed in McMinnville, Yamhill Co., during the last month. There is little being done in the way of mining, except at the Semmens lode, where work is going on day and night. They have run a 5x7-foot tunnel 20 feet into the lode, and sent a few tons to have a mill test.

Operations have been temporarily suspended at the copper mines in Josephine county pending investigation by experts. Less confidence is felt in the future of the Waldo mines than of those on the Illinois river.

## WASHINGTON.

The Red Hill Mining Company, fifty miles north of Leavenworth, has run a 50-foot tunnel, sunk a 15-foot shaft on the property and suspended until the 1st of June, or until there is less snow than at present. There is 16 feet of snow near the mouth of the tunnel.

E. C. Sterling, superintendent of the Blewett mines, in the Peshastin, tells the Ellensburg *Localizer* that the mill will be started up about the 1st of May on 1000 tons of ore, and will be employed during the summer most of the time.

W. T. Goode, on Chloride mountain, three miles south of Boundary, has gray copper ore running well in silver, $8 gold, 20 per cent lead, 3 per cent copper and 2 per cent antimony. Fifty locations have been made recently.

A contract has been let to W. J. Jackman to drive a 100-foot tunnel on the Edith Gillis, a gold property belonging to the International Mining Company.

On the 5th will be started up the hydraulicking works at Seven Mile.

The *Review* reports that Captain Fitch is building a boat at Wenatchee, to dredge the bars of the Similkameen and Okanogan rivers and the gravel to save the gold. The experiment will be tried in a few weeks. It is equipped with pumps.

Deputy Collector M. J. Maloney, talking about the opening of the Colville reservation says since the act was signed by the President he has received from five to fifteen letters per day asking for practical information. He believes that the west Kootenay mining district in British Columbia and the portion of the Colville district referred to contains great mineral deposits. Over 1500 locations have been made in the Colville reservation since it was opened. Perhaps one in 50 of these will prove a paying mine. Instead of every individual going plowing around prospecting in a handicapped manner, ignorant of the country and working for results in a blind fashion, it would be better for two or three or half a dozen to employ some experienced man to examine the prospects that have been made and report. As a rule prospectors are broke when they make their location and are only too glad to give an interest to have the property developed. Any country with such prospects attracts a mass of all kinds of labor and competition in labor is as sharp there as any place on the coast. Mr. Maloney says that during 1885, $54,000 was collected as duties on importations of ore at Northport. "The tremendous increase may be judged of from the fact that for the first months of this year alone the duties were $18,000, or one-third of all the previous year."

## BRITISH COLUMBIA.

The Rossland *Miner* is authority for saying that two new smelting plants will shortly be erected in the vicinity of Trail Creek; one, to treat both gold-copper and silver-lead ores, will be erected in connection with the C. P. R. on the Columbia river, either at Nakusp or Robson, or possibly nearer Trail. The other, which will be a matting plant, will be put up in connection with the Spokane Falls and Northern line. Both works will be erected by American capital.

From Rossland comes a report that M. Reilly, a prospector, while crossing a dry bed of the Columbia river below Trail creek discovered a boulder of ore weighing many thousand tons that assays $50 in gold.

Diamond drill prospecting at the Le Roi continues. At the 450-foot level the drill has disclosed to the west of the present shaft a body of ore 91 feet in extent. W. M.

Ridpath is manager of the Trail office of the Le Roi Company.

The Washington concentrator at Three Forks is expected to start up next week.

Eighty-five men are now employed at the Silver King mine at Nelson. The present output is about 80 tons daily. The upper section of the tramway handled 513 tons of ore in four days last week, working ten hours a day.

### ALASKA.

The Jualin Mining Co. are having the Fulton Engineering & Shipbuilding Works build them a ten stamp mill, which with the concentrators will be operated by water-power with 100 feet head, at their property at Berner's Bay, Alaska. The name of the company is made up from the words Juneau, Alaska, Indiana. The machinery will have to be carried two miles up the almost precipitous side of a mountain. The 1,000 pound stamps can be taken up easily, but a little difficulty may be experienced in pulling up the 5,500 pound mortar which will be taken in on skids and rollers. Judge Mellin of Juneau is superintendent.

### IDAHO.

At Mullan, Idaho, the Morning mine is reported to have compromised its differences with the Miners' Union and will hereafter employ union men. This is denied by the local paper.

The Trade Dollar mine at Silver City makes weekly shipments of bullion and also produces about a carload of concentrates each month, giving employment to 100 men.

The Blue Jacket, near Caldwell, has been sold for $4000. Baxter of Boise City has taken charge of Bishoprick's stamp mill at Pearl and will run it on custom work. The Leviathan mill run of ten tons at the Richmond netted $60 per ton in gold

Horn & Staples are loading an outfit for their placer mines on the Middle Boise, seventy miles from Boise. They will send up a pack train consisting of ten animals and a working party of ten men.

J. E. Branscombe has leased the Stemwinder mine, mill and tramway at Wardner and has put on men working the mine to its fullest capacity.

The Dubois *Enterprise* says the old Nicolia mining camp, which has lain comparatively idle for the past seven years, will make quite a respectable showing this year in the output of ore. The original Viola mine, owing to its being in litigation, will probably remain idle, but there are other mines in that vicinity which have produced sufficient ore during the past winter to justify the letting of contracts to freight the output to Dubois, where it will be shipped to Denver. The ore is low grade in silver, but runs from 60 to 80 per cent lead, and is of such a character as to make very valuable for fluxing and the owners realize nearly the full value of the lead.

The Wallace *Miner* reports that a new mill of 100 tons capacity is to be erected by Burke and Gies on the Formosa mine on Canyon creek, two and a half miles east of Wallace. The mine has a nine-foot ledge of concentrating ore running 60 per cent lead, 53 ounces silver and $5 in gold. The Black Bear mine is to be opened as soon as legal complications are settled. Between the Frisco and Black Bear mines twenty miners have formed a cooperative association, are developing a group of mines known as the Great Eastern, with favorable prospects. The Standard is working eighty men, the Gem fifty or sixty, and the Frisco one hundred and fifty. At present the Cœur d'Alene mines are employing about the same number of union men as non-union men.

The Idaho Chemical Gold Mining Co., supersedes the New Columbia G. M. Co. at Yellow Jacket. H. Armstead is general manager.

At Leesburg the Gold Dust Mining Co. proposes to put in a 20-stamp mill.

The Bunker Hill and Sullivan Mining and Concentrating Company at Wardner has received 300 feet of new cable for its tramway. The new cable will extend from the ore bins at the mine to the snowshed and will replace the portion of the tramway over the town. The general manager of the company says the tramway since it was put in, in 1890, has transported 450,000 tons of ore. Its operating expenses are represented to amount to 5 cents per ton.

### UTAH.

"Never in the annals of mining in Utah has there been so much ore blocked out as at present. Give us a fair price for silver, deliver us from the trust that is bearing lead, and, with the increased production of gold, I have no doubt of our ability to tie, if not surpass, the record of all time," says Col. E. A. Wall in the *Tribune*. "Concentration has done more, perhaps, in these hard times, to maintain the camps and afford employment for the miner than has any one thing connected with the art of mining up to date. The average reader, especially of the East, does not understand this. People don't stop to inform themselves that since the slump in silver in 1893, several tons of crude ore have been, by concentration, put into one, and that it is the mill that enables the miner to do this that has kept many of the camps alive. A good example of this is revealed at Park City, for, notwithstanding the magnificent bodies of marketable ore, the larger portion of the output comes forth in the form of a concentrate, and, if I am correctly informed, the new concentrator proposed by T. R. Jones for that camp will enable it to handle 500 tons of concentrating ore a day. All the while it has been a hard struggle for us, however, and not until the price of silver is restored will the wrong the great industry has suffered at the hands of the East be repaired."

*Tribune*: T. R. Jones, who is with his associates projecting the big concentrating plant at Park City, says that the company is not yet ready to release the details. From other sources it is learned that the plant will cover an enormous lot of ground and that the boilers alone will represent a plant of 460 horse-power. The concentrator promises to revolutionize the method of handling the sulphide ores of Park City and to render the operation of the present mills in that locality unnecessary.

### MONTANA.

The State of Montana, by William L. Hill, County Treasurer of Silver Bow county, has brought suit against the Anaconda Mining Company and the Anaconda Copper Mining Company for $59,450, principal sum for back taxes, and $5,950, 10 per cent penalty thereon, amounting in all to the sum of $65,150, with interest and costs of suit.

The travel from Troy to the Yahk gold camp is increasing three pack trains are busy packing in miners' tools and supplies.

### WYOMING.

The American Gold and Copper Mining Company commences active operations May 1st by running a tunnel on the Ray Boy, Copper Queen and McKinley lode, also in sinking a 200-foot shaft on the Helen and Prince of Wales lodes. The placer claims of the company will be worked to their full capacity. Louis Miller of Laramie, stockholder and trustee of the company, is manager of the properties.

The Buffalo *Courier* says a test run of the Burlington stamp mill demonstrates the richness of the conglomerate, as the plates saved from $3 to $10 in coarse gold, while the tailings treated with cyanide would yield as much more.

W. Goode, at Timber lake, in the Four Mile district, has a placer mine and will perfect arrangements for constructing a large ditch from Snake river to supply the claim with water. The surveys have been completed, and the estimated cost of the ditch, which will be over fifty miles in length, is $250,000.

### SOUTH DAKOTA.

(Special Correspondence.)—Henry Robinson, of Akron, Ohio, is here looking over the ground with a view to adding ore reduction works to his plant. When he built his present works he put in much more power than he needed with a view to adding something to it.

Custer, S. D., April 24, '96.

(Special Correspondence.) — The Hawkeye Mining Co. has started its forty-stamp mill on ore from the Hawkeye mine, thus adding one more to the list of contributors to our gold reserve. Before starting up the mill they put about 200 tons of ore in their bin, so as to have a little lee way.

Pluma, S. D., April 28, '96.

(Special Correspondence.)—D. A. McPherson, of the First National Bank, and associates have purchased of the McShane Bros. the controlling interest in the Wasp No. 2 mine on Yellow creek and have commenced work preparatory to shipping ore. This mine made the original owners wealthy and the indications are that it will do the same by the new owners.

Deadwood, S. D., April 26, '96.

(Special Correspondence.) — The owners of the Mandolin mine are putting on a night shift in their development shaft, thereby doubling the force of men they have been working. They are also preparing to start a force of men to work taking out and sacking the ore. The richness of the ore continues as greater depth is obtained.

Custer, S. D., April 28, '96.

Statistics of the production of gold and silver in South Dakota for 1895 show the value of the gold produced during the year to have been $4,267,000, and of silver, coinage value, $136,943. The output of the Black Hills during the coming year gives promise of a large increase.

### COLORADO.

The Pueblo *Adviser* says Creede is blue. The big mines are closing down and the outlook is not bright. A freeze-out game is supposed to be under way and the county of Mineral suffers temporarily.

### ARIZONA.

The Tucson *Star* thinks there is a probability of the rich copper mines of Planet being sold to the Bisbee Copper Company. The mines were worked by a San Francisco company about twenty years ago, but since that time no work has been done on them. The copper on the surface was so rich that it paid to ship via the Colorado river and the Gulf of California to San Francisco thence to Swansea, England, for reduction. A smelter was built at Aubrey, but it was a crude affair and failed to do the work intended.

Tombstone *Prospector*: George Fitzgerald, of the Duquesne Mining and Reduction Company, from Crittenden, says the machinery is in place and working at Washing Camp. There are 3000 tons of good copper ore on the dump ahead of the ore haulers, and shipments to the east-side smelter in El Paso are now being made.

Prescott *Courier*: The tunnel on the Hamilton-Poland-Bell mines, Big Bug district, is now in over 1550 feet and shows a continuous ore body averaging $65 per ton, silver and lead predominating; the average width of the pay streak is 20 inches.

Prescott *Journal-Miner*: C. E. Donaldson has resigned as superintendent of the Etta mine in Cherry Creek district, and, with Geo. Watson, has taken a bond on the Cross Cut, Nazareth, Supply, Black Chief and White Chief mines, which are extensions of the Etta. The claims are owned by Munds, Campbell and Olden, and Messrs. Donaldson and Watson propose to proceed at once to the development of them, and have in fact a force of men at work already on them. They expect to have a mill in operation soon treating the ore. Mr. Donaldson is confident in his belief that they will turn out as rich, if not richer, than the Etta.

The new find at the Harqua Hala is reported to hold out well. Some time since the theory was advanced by experts that the original discovery there of what was known as the Bonanza claim was simply in the top of a mountain which had fallen over and that the main ledge was not there at all. This theory seemed verified by the explorations made with a diamond drill, as sandstone was struck at quite a depth below where the ore was lost. The new find of the Quinn Bros. is now supposed to be on the vein from where the break occurred, and so far the deeper they have sunk on it the better is the ore produced.

The old Howard mine on the Hassayampa is coming to the front again. This mine created a sensation when discovered by the fabulously rich ore taken from it by the late J. W. Barrington and W. H. Harlan, the latter afterwards purchasing his partner's interest in it. They took out about $50,000 in sinking only a short distance when the rich ore gave out.

### LOWER CALIFORNIA.

*Lower Californian*: P. L. Griffin, the representative agent of the Pyramide Mining Company, reports the company incorporated under the laws of California; capital stock of $2,000,000; L. Hahn president, W. E. Howard vice-president. The plant to work this placer ground to which they are seeking title will be one of the most extensive of its kind in Mexico, the method used being the same as is employed at the far-famed North Bloomfield hydraulic mine in California. The field has been surveyed by a corps of competent engineers, and the company are in readiness to commence one of the most important mining developments ever proposed on this peninsula.

### MEXICO.

From the mining district of San Jose de Gracia in Sinaloa, the house of Tarribay Echavarria recently remittted two bars to the mint, valued at $11,450 52 in gold and $292.57 in silver. The Anglo-Mexican Company also shipped four bars valued at $76,050.52 in gold and $1,703.23 in silver.

## The Overland Monthly.

The editor of this paper buys the *Overland Monthly* at the news stand every month and always finds much in it to commend. It is an institution that is deemed worthy of favorable comment. The fact that it is distinctively a California production is of secondary home recognition, but apart from that it consideration. By reason of its home, it merits has a strong claim on the good will of Californians in being a magazine that every Californian can refer to with just pride. It is representative of California and of value to the State. It does not appear to ask patronage or support because of its environment but assumes to benefit its surroundings. Certainly no traveler or chance reader can fail to have a better idea and a higher opinion of the State after perusing any one of its monthly issues. We know nothing of its affairs, its circulation, or its advertising receipts, but it is spending considerable money. In the May number are thirty-six half-tone engravings, evidently made specially for that issue, twenty-one of which would do credit to any magazine in the world. In their execution and typographical production they are excellent. Besides these appear sixteen others, any one of which is superior to the ordinary "picture," or "cut." The paper on which these engravings are printed is the finest heavy plated, the most expensive that can be put in a magazine. If the circulation is extensive—runs into the thousands—the paper bill alone is a big item; the illustrations for that one number must have cost in all close on to $1000. On the cover is the old, familiar grizzly crossing the railway track, as in the '60s, the main representation being a California miner whose pick has just uncovered gold. He could well dispense with the dirk in his boot and the ill-drawn pistol in his belt, but that, like the story of "Doc Willis" on pages 510-526, is a concession to the Bret Harte period, a reminiscence that serves to give a wrong impression of California, past or present. The magazine has thirty-six pages of advertisements. Were it published on the Atlantic slope it would have been double that number, and deserves a better showing in that regard. The article on "Unexplored Regions of the High Sierras" is of unusual merit, reminding the reader how little the natural mountain grandeur of our State is even now known. "The Quicksands of Pactolus," its main serial, a California story, is excellent in many regards, with insufficient attention to local details, and needing an immediate finis. "California Artists," is superbly illustrated. There is nothing finer in any of the current magazines than the engravings on pages 506 and 507, the one on the latter page being, next to the frontispiece full page portrait of Irving M. Scott, the best among the many fine engravings in the issue under discussion. "The Deserted Homes of a Lost People," though of little literary merit, is a valuable historical contribution. "The Simple Story of a Tailor-made Overcoat," is a clever and original short story, and "Nature's Thermometer" is far above the average magazine poetry, which, ordinarily seems strung together solely for the convenience of the foreman of the composing room, just right in size and handy in making up the forms. There are three didactic articles on education, which, in their scope and treatment, justify the claim of the magazine for recognition by the educators of our California youth. "The Silver Question" is discussed by the versatile Jno. P. Irish, whose present views on this subject differ diametrically from his Des Moines utterances. A thoughtful article, "Hard Times; Causes and Remedies," an answer to inadequate criticism and a sequel to a former article, is Irving M. Scott's formulation of the present main political question. The article is a timely and valuable contribution to the manifestly correct doctrine that in bimetallism and protection lie the cure of the prevalent hard times in the nation. The "Etc." is somewhat self-laudatory, but that is allowable, for in these days of fierce competition in all lines of business no one or more dependent on the work of hand or brain for support can ignore the homely apothegm, "He that tooteth not his own horn the same shall not be tooted." As an entirety the magazine is worthy of praise. It is clean, honest, and possessed of considerable artistic, literary merit; it seems to have an ideal, and minds its own business, not sneering nor carping; not meanly personal nor vauntingly arrogant; but with a commendable determination to honorably fill a worthy place in current literature and honestly make the profit of the work exceed the expense.


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These Gas Machines are perfectly safe, and free from any danger whatsoever. Every modern house built for gas should have one of these machines. No public institution should be without one. I have no hesitancy in saying that there is no other gas machine in the market that can compete with mine as to prices, and they surpass as to perfection in all its requirements.

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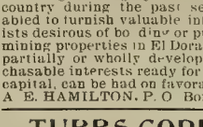
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## Coast Industrial Notes.

—It is proposed to connect Grass Valley with Colfax by telephone.

—The steam road from the Park to the Cliff House, this city, is to be changed to an electric railway.

—The California combination of redwood lumber sellers have raised the price $1 per M. all along the line.

—A new evening newspaper, the *Daily News*, will be started by unemployed printers about the 15th inst.

—The Southern Pacific Company has decided to use petroleum for fuel on its entire system south of Fresno.

—The Northern Pacific Railroad and all its properties is to be sold at West Superior, Wis., before July 1st, '96.

—The schooner J. D. Colman, bound for Siberia, shipped a crew last Wednesday at the rate of $16 per month.

—California shipments of green and dried fruit for '95 amounted to 360,459 tons, of which 156,845 tons were shipped by southern California.

—The battleship Oregon was successfully drydocked at Hunter's Point last Sunday, came off the next day and will have her trial trip next week.

—The Southern Pacific Co. has reduced wool rates from San Francisco to the Atlantic coast, greasy wool eighty cents and scoured wool one dollar per cental.

—It is expected that the bridge across the Merced will be built in time to move a portion of this season's San Joaquin wheat crop on the Valley road to tide water.

—It is said that the white ant in Central America will destroy pine, but will not touch California redwood or fir. A good trade is being developed in these countries.

—At the request of the San Francisco subtreasury Secretary Carlisle has directed the coinage of $50,000 in pennies, nickles and dimes, for distribution in California.

—From motives of economy the narrow gauge South Pacific Coast road to Santa Cruz will, after the 1st of next month, be consolidated with the broad gauge Coast road from Third and Townsend.

—The Puget Sound and Central American Steamship Company say that by June 1st they will dispatch four ships from Seattle, Wash., to Central American points with cargoes constituted mainly of goods sold by Seattle wholesalers.

—The California manufacturers of blasting and gun powder have been trying to consolidate. Increased consumption occasions little profit owing to competition. Three San Francisco companies make nearly 15,000,000 pounds of dynamite annually.

—The Treadwell Bros. expect to have their railroad from Stockton to the Corral Hollow coal mines finished in thirty days, when they calculate on employing 1000 men and daily turning out 3000 tons of coal. They propose to carry the coal from Stockton to this city in steel barges.

—The Pacific Torpedo Co. has incorporated to build submarine projectiles invented by F. M. Close of Oakland, Cal., which are intended to carry 700 pounds of dynamite and be susceptible of being guided from shore to annihilate a vessel. Col. Geo. H. Mendell is one of the directors and says the scheme is feasible and scientifically correct.

—In a recent address delivered by W. L. Watts, of the State Mining Bureau, before the Los Angeles Chamber of Commerce, he expressed the opinion that the local oil deposit would not yield a large supply for any length of time unless extensions of the present territory were discovered, and he estimated that the Los Angeles oil field, which is bounded on the west and east by breaks in the formation, contains something less than 3,000,000 barrels of oil, of which about one-fourth has been pumped out.

—The Manufacturers' and Producers' Association is trying to get the managers of the California insane asylums to buy California coal. The following letters have been sent by the association during the week:

SAN FRANCISCO, April 29, 1896.

*To the Honorable Board of Trustees of the State Asylum for the Insane, Napa, Cal.*—GENTLEMEN: Our attention has been called to the fact that on the 25th inst. bids were opened at the Napa Asylum for its supply of coal, and we are further informed that the following bids were received:

Six hundred tons Welch coal at $6.03, $3618; 800 tons Clarke coal at $3.65; $2920; 800 tons Clarke coal being required to evaporate 13,888,400 pounds of water as against 600 tons of the Welch.

We are further informed that although there is a difference of $698 in favor of the Clarke, which is a California coal, the contract was awarded to the parties bidding on Welch coal from Great Britain.

This association, numbering among its members some of the largest taxpayers in the State, has considered it a part of its duties to call the attention of State institutions to the fact that they should, at equal price and quality, give the preference to California manufactures and products. In this connection communications have been sent to said public institutions from time to time.

An interview was had some months since with Governor Budd on the subject, at which he declared himself very warmly in favor of the patronage of home industries by said public institutions. Therefore, it was with much surprise that we heard of the action of your board in awarding this contract to the highest bidder; and supposing it was an oversight on your part, we would most respectfully request that you cancel said contract and award the same in favor of the California coal, thereby assisting home industries, as well as saving a large amount to the State.

Trusting that this matter will receive prompt attention at your hands and awaiting your favorable reply, I am, for the association, yours very truly,

S. H. TACY, Manager.

SAN FRANCISCO, April 29, 1896.

*To the Honorable Board of Trustees of the State Asylum for the Insane, Stockton, Cal.*—GENTLEMEN: We have been informed that on the 23d inst. bids were opened at Stockton for the coal supply of the asylum, and that among others the following bids have been received: 10,315,200 pounds of water evaporated with 500 tons Welch at $6.83, $3415; 10,315,200 pounds of water evaporated with 822 tons Clarke at $3.74, $3074.48, making the difference in favor of the Clarke coal (which is the California production) of $340 52.

Although I suppose it is hardly necessary, I desire to call your attention to the question of patronizing home products, and urge that the contract be given for the California (Clarke) coal. I have no doubt that the bid on Clarke coal being lower for equal quality that this course will be taken by your honorable board, and thanking you in advance, I am, for the association, yours truly,

S. H. TACY, Manager.

## Personal.

W. G. DODD is in Nevada City in the interest of the Dodd water wheel.

S. F. MOUCK, a prominent Colorado mining man, died at Marcus, Wash., last Saturday.

G. A. NIHELL is now superintendent of the Fortuna or Live Yankee mine, Nevada Co.

C. W. TOZER is examining a copper property at Grand Canyon, north of Flagstaff, Arizona.

GOV. BLAISDELL has returned from an extended trip through Amador and Calaveras counties.

MINT SUPT. DAGGETT has returned from Siskiyou Co. and makes good report of his Black Bear mine.

J. R. BURNS, the constructing engineer of the Hammond Manufacturing Co., is visiting San Francisco.

JAS. SPIERS of the Fulton Engineering and Shipbuilding Works has returned from southern California.

JAS. D. HAGUE of the North Star mine and Raphael Pumpelly are visiting the mines of Deadwood, S. D.

COL. PAT DONAN, the prince of boomers and a leader in the use of superlatives, is inspecting Mercur, Utah.

C. H HOLBROOK will have charge of the Young America mine, Sierra City, sold last week to S. M. Green.

THOS. JAMES has resigned the superintendency of the Ashland, Or., mine. He is succeeded by Foreman Kinney.

JUDGE RICHARD RISING, well known to old Nevadans, is going to open a law office in Johannesburg, South Africa.

O. B. WHITNEY has organized a new company which takes charge of the Cerbat, Arizona, mine. O. D. Clack is superintendent.

A. K. P. HARMON, a California pioneer, and a prominent figure for many years in mining and banking corporations, died at his home in Oakland, Cal., on the 30th ult., aged 75 years.

SUPT. MCNALLY, of the Virtue mine, Baker City, Or., is credited with receiving an annual salary of $6000. The mine is now yielding at the rate of $400,000 per year and is owned by G. W. Grayson, of this city.

EDWARD WHILDEN, probably the oldest miner in the State, a resident of Nevada county for over forty years, died last week at Gold Flat. He had worked forty years underground and was nearly 84 years of age.

PROF. KIMBALL, a mine reader, who claims to be "possessed of a magnetic invention for detecting the proximity of ore bodies," has arrived on the Comstock. A local paper declares that "he located many of the Cripple Creek mines."

CONSIDERABLE anxiety is felt at Sutter Creek, Cal., by the relatives and friends of James H. Tibbits, who left there last fall for Buluwayo, South Africa, under an engagement with an English mining company. When last heard from he was 75 miles from Buluwayo, in the heart of the country since raided by the Matabeles.

W. B. DIGERT, a miner, has returned from Cuba, where he spent two months in jail, the charge against him being that a Spanish soldier found an old Sharpe's rifle near the place where he was arrested. After suffering the horrors of incarceration with thirty-two others in a room 16x18 feet, he bribed a guard with $100 to report the case to the American Consul and finally succeeded in getting out.

PROF. VAN DER NAILLEN, of the school of engineering in this city, left here a few days ago on an extended trip throughout Europe. While abroad the professor will devote much of his time to the investigation of the latest developments in applied science, as well as to the securing of a complete equipment of newly developed and the new modern apparatus to facilitate experimenting in the higher branches of scientific research, as applied to electricity, mining engineering, assaying, etc. Prof. Van der Naillen has for many years been looked upon as a pioneer in the engineering profession on the Pacific coast.

JNO. HAYS HAMMOND, on trial at Pretoria, South Africa, with other prominent American miners for alleged complicity in recent political troubles there, pleaded guilty of treason last Monday and was sentenced to death. The receipt of the news created widespread remonstrance, modified twenty-four hours after by official announcement that his sentence was commuted, though in what the commutation consists has not yet been determined, the latest from Pretoria, South Africa, under date of May 1, being that it was then reported that the Executive Court had decided to impose a sentence of five years, and at the expiration of that time banishment for life.

## Recently Declared Mining Dividends.

THE Morning Star gravel mine, Iowa Hill, Placer Co., has declared another dividend, No. 65, of $4 per share.

## Recent Mining Incorporations.

Table Mountain Gold Mining Company; L. Van Laak, J. F. Fletter, F. W. Wallace, D. W. Martin, E. C. Rigney; capital stock, $1,000,000, all subscribed.


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Have you ever heard of a Double Pipe Air Compressor? It has one disadvantage. It needs twice as much piping as is needed with the ordinary makes of Air Compressors. On the other hand, it has more real, genuine advantages than you can shake a stick at. It will do the same work as the ordinary Air Compressors, such as are in general use throughout the mines on this coast, on 30 per cent less power. We will guarantee this and prove it to your satisfaction, else you need not pay for the Compressor. It weighs less than half as much as the ordinary Air Compressor. It costs less for freights and is more easily carried up into the hills. It shows the same high efficiency at all altitudes, high or low. It takes no more fuel to do the work if located on the highest peak of the Sierras than it would take if located at the sea level. It enables you to buy a smaller boiler than you can use with any other Air Compressor to do your work. It does not overheat the air at the Compressor and freeze it at the rock drill. In short, it is the ideal Air Compressor. It has been tried in practice, and we can show you the highest recommendations and endorsements. We sell it on a strict, positive, iron-clad guarantee. If your power costs you anything, you want the Double Pipe Air Compressor, because you can buy it on a guarantee that it will run on 30 per cent less power than any other make of Compressor. If you have to take a Compressor to your mine over bad roads, you want the Double Pipe Air Compressor, because it weighs less than half as much as any other Compressor. It is cheapest to buy, cheapest to run, cheapest to transport, cheapest to carry anywheres. For pumping it beats the world. You can run it with steam or water.

Write to the Pneumatic Power Co. for further information. If you are in the city and want a compressor, call and see them. They will show you the Double Pipe Air Compressor in operation. Remember you run no risk. We claim wonders, but we have to perform wonders in Air Compression, or else you don't have to pay for the machine. We are ready. Are you?

Pneumatic Power Co., 306 Pine St., Room 10, San Francisco, Cal.

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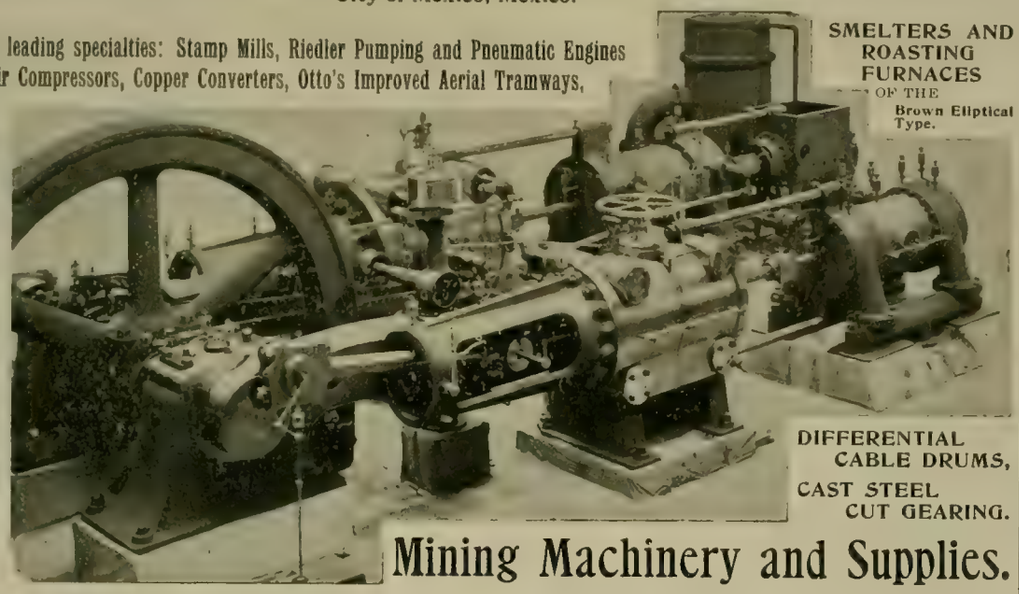
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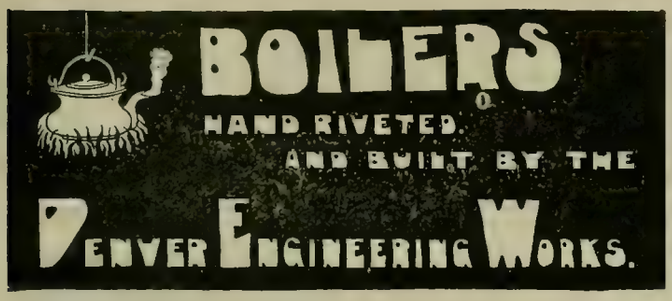


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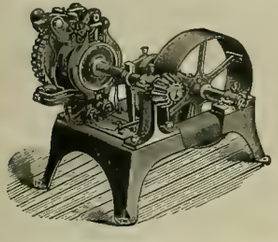

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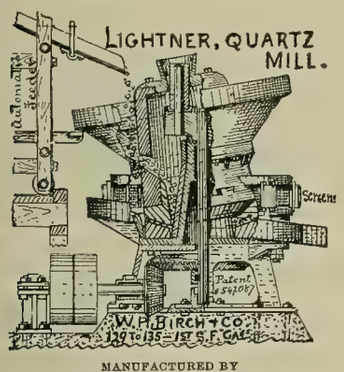


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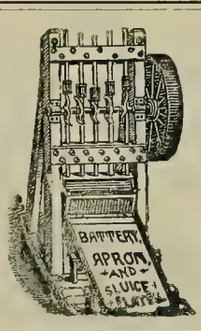
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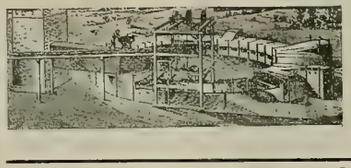
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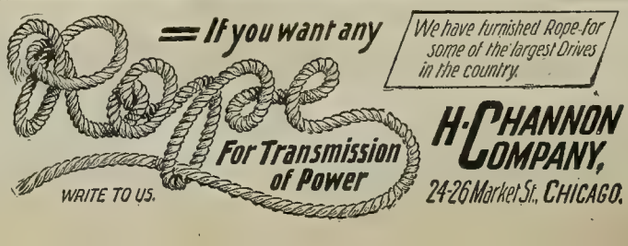
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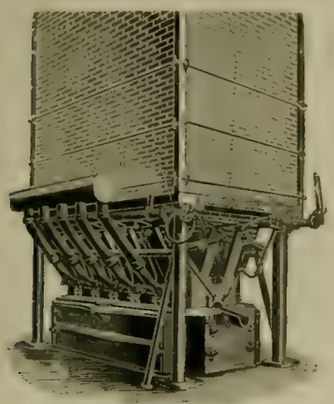
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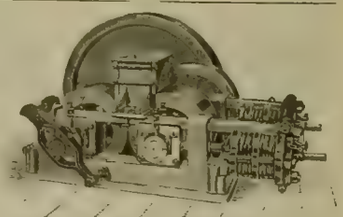
We can furnish on Short Notice MACHINERY and GENERAL EQUIPMENTS for ... .

**Cyanide, Chlorination, Bromine, Concentration and Amalgamation Plants,**

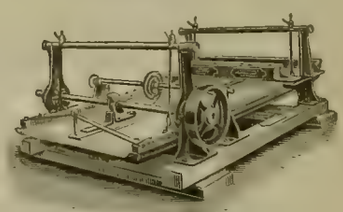
COMPLETE, OR IN PART.

*Catalogues on application.....*

NOTE.—We have a Testing Plant (Mill) on our premises and test ore by Concentration and Amalgamation in ten-ton lots or more, to arrive at best possible method to save values, machinery to be selected accordingly.



CAZIN'S IMPROVED CRUSHING ROLLS.
"Superior to all others."
LARGE CAPACITY. FINE CRUSHING.



PERFECTION CONCENTRATOR.
Capacity 5 to 15 tons in 24 hours. A machine that will do the work.

# UNION IRON WORKS,

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—MANUFACTURERS OF—

## MINING AND MILLING MACHINERY,

Automatic Cut-Off Engines, High-Speed Engines, Hoisting Engines, Quartz Mills
Manty Chili Mills, Rolls and Concentrating Machinery, Dodd Sigmoidal Water Wheel,
PUMPS--Cornish and Other, Copper and Lead Furnaces, All Classes of Marine Work.

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## ALBANY
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TWENTY-SEVEN YEARS' CONTINUOUS SERVICE in the great Mines, Steamships, Railroads and Mills all over the world prove it to be

THE KING OF LUBRICANTS!

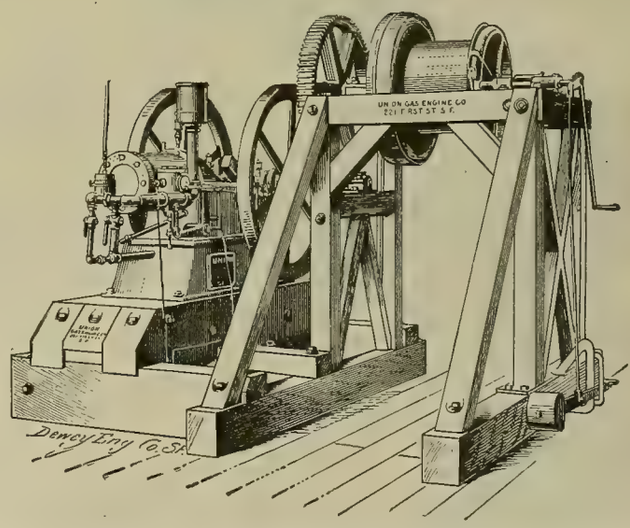
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Have Built the LARGEST GASOLINE ENGINES that have been Built in America.

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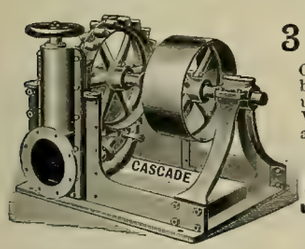
Engines for Stamp Mills, Hoisting and Pumping for Mines a Specialty.

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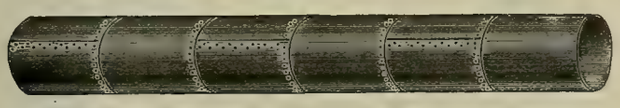

Our experience of 33 YEARS building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

Send for a Pamphlet of either Wheel and write full particulars.




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SPRINGFIELD, OHIO, U. S. A.

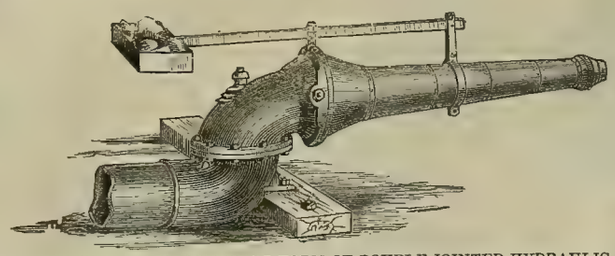
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STEEL OR IRON.—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.
COATING.—We use great care in COATING our pipe with a HOT solution of Double Refined Asphaltum and Maltha.
COMPETITORS.—Our competitors say we have the best appointed Pipe Shop on the Coast.

SCHAW, INGRAM, BATCHER & CO., Hardware Merchants,
SACRAMENTO, CAL.

## IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture, and which are pronounced far superior to the SINGLE-JOINTED style. The latter, however, we furnish when requested. Prices, Discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent upon application.

JOSHUA HENDY MACHINE WORKS, 42 Fremont St., San Francisco.

# The Pelton System of Power

Represents the highest development yet attained in water wheel practice and affords the most simple, efficient and economical means of utilizing water for power purposes.

## Six Thousand Wheels Now Running,

Aggregating over 400,000 horse power. Adaptation made to all conditions and every variety of service.

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PELTON WHEELS are the recognized standard for electrical work and are running a majority of the stations of this character in all parts of the world.

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## Stamp Mills

Of the Latest Improved Design for

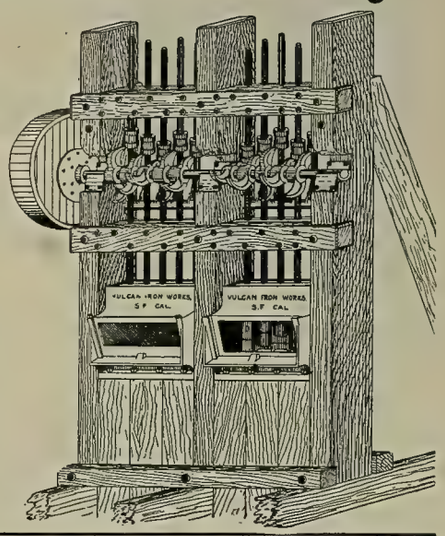
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## VULCAN WIRE ROPEWAYS

For Conveying Ore, Etc.

## Vulcan Iron Works,

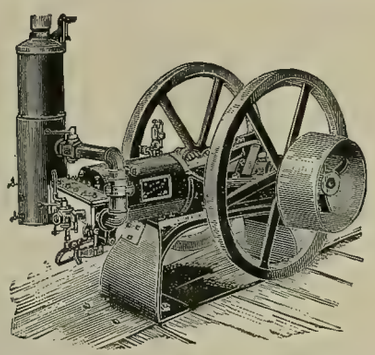
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# CHEAP IRRIGATION!

UP TO DATE!

SAVE MONEY



BY USING

## THE "DANIEL BEST" CRUDE OIL ENGINE FOR POWER.

THIS IS WHAT THEY CAN DO:

**Will furnish power for one-tenth of a cent per horse power per hour. It is the cheapest power ever produced, as shown in the following table, and which is based upon a test of ten hours' run with one of our five-horse power Gasoline Engines,** using gasoline (74°), coal gas, common domestic coal oil, crude petroleum, asphaltum base, crude petroleum, paraffine base, as follows:

| | |
|---|---|
| Coal Gas, ten hours' run, 1000 feet | $2 00 |
| Gasoline (74 deg.), ten hours' run, 8¾ gallons @ 14c. | 1 25 |
| Coal Oil, ten hours' run, 7½ gallons @ 10c. | 75 |
| Crude Petroleum, asphaltum base, 16 gallons @ 3c. | 48 |
| Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c. | 65 |

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon—21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1½c per horse power per hour; and on gasoline, 2½c per horse power per hour.

SEND FOR CIRCULARS AND PRICE LISTS.

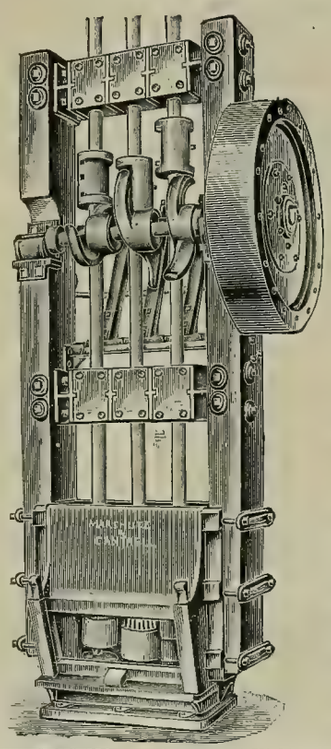
**THE BEST M'F'G CO.,**

San Leandro, Cal.

L. C. MARSHUTZ. T. G. CANTRELL.

# National Iron Works,

*N. W. Cor. Main and Howard Sts., San Francisco, Cal.*



MANUFACTURERS OF

STATIONARY AND COMPOUND

## ENGINES,

FLOUR, SUGAR, SAW AND QUARTZ MILL

## MACHINERY.

AMALGAMATING MACHINES.

## CASTINGS AND FORGINGS

OF EVERY DESCRIPTION.

All work tested and guaranteed.

IMPROVED PORTABLE HOISTING ENGINES.

**Improved Self-Contained Three or Five Stamp Mill,**

Saves bill for heavy timbers, millwright and mechanics' labor, and a large amount of space. The term self-contained means a great deal for the mine owner, and can be readily recognized and appreciated in making an estimate for an ordinary plant when the comparative cost is considered.

FIRST: There is saved a large bill for heavy timbers, in many instances obtained at great expense and loss of time.

SECOND: The saving in millwright and mechanics' labor in framing and erecting.

THIRD: The large amount of space saved.

FOURTH: The great saving of freight,

**Send for Circulars and Price List.**

# ADAMANTINE SHOES AND DIES

—AND—

CHROME CAST STEEL

## Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.



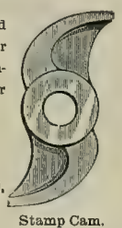
STAMP DIES.

These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

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Special attention given to the purchase of Mine and Mill Supplies.



Stamp Cam.

# Rand Drill Co.



Rock Drilling, Air Compressing, Mining and Quarrying

## Machinery.

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BRANCH OFFICES:

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|---|---|
| Monadnock Building | Chicago |
| Ishpeming | Michigan |
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H. D. MORRIS & CO., Agents, 141 First St., San Francisco, Cal.

# H. D. MORRIS & CO., DEALERS IN MINING MACHINERY AND SUPPLIES.

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MANHATTAN RUBBER BELTING, PACKING AND HOSE,
SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL,

# Westinghouse Electric and Manufacturing Company,

PITTSBURG, PA.

The Largest and Most Completely Equipped Electrical Manufacturing Establishment in the World.

POWER, INCANDESCENT AND ARC LIGHTING, FROM THE SAME CIRCUITS.

We have purchased and are the SOLE OWNERS of the patents issued to Nikola Tesla for the POLYPHASE ALTERNATING SYSTEM, now recognized to be the most successful system for lighting and power purposes.

We furnish complete lines of apparatus for the perfect equipment of ISOLATED PLANTS for Hotels, Office Buildings, Flats and Factories.

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for distribution of light and power in LARGE MANUFACTURING ESTABLISHMENTS, MILLS and MINES.

WESTINGHOUSE ELECTRIC RAILWAY SYSTEM,

the Most Durable, Economical and Efficient on the Market.

SAN FRANCISCO, Mills Building. NEW YORK, 120 Broadway. BOSTON, Exchange Building. CHICAGO, New York Life Building. ✦ TACOMA, WASH., 102 S. 10th Street. PITTSBURG, Westinghouse Building. BUFFALO, Erie County Bank Building. PHILADELPHIA, Girard Building. ✦ ST. LOUIS, American Central Building. CHARLOTTE, N. C., 36-38 College St. SYRACUSE, N. Y., Bastable Building. WASHINGTON, D. C., 1333 F. St. N.

For CANADA, address AHEARN & SOPER, Ottawa, Canada.

# The Edward P. Allis Company, Milwaukee, Wis.

Established 1860.

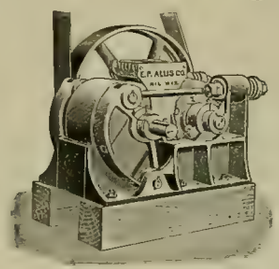
The Reliance Crushing Rolls.

RELIANCE WORKS.

## Mining, Milling and Smelting MACHINERY.

Crushers, Rolls, Jigs, Concentrators, Screens, Stamps, Pumps, Compressors, Hoists, Boilers, Etc., Etc.

REYNOLDS CORLISS ENGINES.



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Chicago, Ill.....509 Home Ins. Building.
Kansas City, Mo.....43 Armour Building.
Pittsburg, Pa.....German National Bank Building.
New York City.....26 Cortlandt Street.
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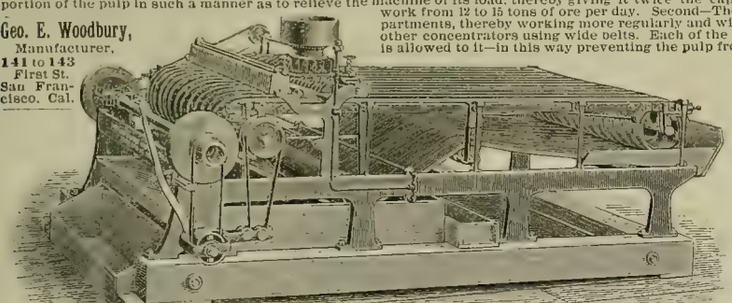
Work the Best! Prices the Lowest! The Best in the World! Write for Our New Catalogue.

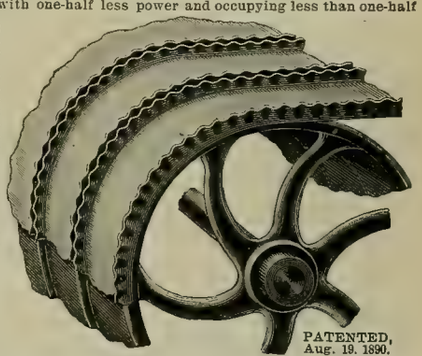
## THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891. MORE THAN DOUBLE THIS CAPACITY with one-half less power and occupying less than one-half the space of any other concentrator. Built of best Steel and Wrought Iron. Strong and durable. Price $575 f. o. b. Send for Catalogue and Testimonials.

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. THE IMPROVED MACHINE HAS THE FOLLOWING MERITS: First—The Improved belts, which consist of seven, are constructed and arranged so as to allow each belt to receive a portion of the pulp in such a manner as to relieve the machine of its load, thereby giving it twice the capacity of other concentrators, and enabling it to work from 12 to 15 tons of ore per day. Second—The machine equalizes the load by several compartments, thereby working more regularly and with much less attention than is necessary to give other concentrators using wide belts. Each of the belts on this machine takes care of the pulp that is allowed to it—in this way preventing the pulp from running to the lower side of it, as is the case when a machine becomes out of level where wide belts are used. Third—The belts run on a perfect line, needing no adjustment to prevent their running from side to side, as in other concentrators. Fourth—The belt surfaces are improved by indentations and corrugations, causing the Concentrator to save fine sulphurets and quicksilver, and perform close work. Fifth—The belts have fluted or corrugated edges, to form an expanded top edge, which effectually prevents from cracking. Sixth—The feed arrangement is perfect. Seventh—The machine is constructed of iron, with steel crank-shaft self-oiling boxes, and everything made in the most thorough manner, enabling it to run with very little attention or wear.

Geo. E. Woodbury, Manufacturer, 141 to 143 First St. San Francisco. Cal.





PATENTED, Aug. 19, 1890.

This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st prize at the World's Columbian Exposition, 1893, and at the San Francisco Midwinter Fair, 1895.

# THE GUTTA PERCHA AND RUBBER M'F'G CO.

30 and 32 FREMONT ST., SAN FRANCISCO.

## Spadone's Concentrator Belts. Patented.

The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman of practical experience.

Illustration (Fig. 1.) shows a cross-section, and (Fig. 2.) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

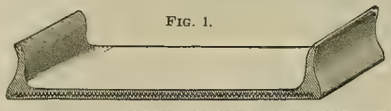


FIG. 1.



FIG. 2.

We shall be pleased to quote you also on Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING and RUBBER PACKING. Correspondence Solicited.

THE GUTTA PERCHA RUBBER AND M'F'G CO.
TELEPHONE, MAIN 1813.

NOTICE TO GOLD MINERS!



## SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

## San Francisco Novelty and Plating Works

Incorporated.

SEND FOR CIRCULARS.

68, 70 and 72 First Street, San Francisco, Cal.

## Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

—DEALER IN—

Assayers' and Mining Material.

—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH.

—AGENT FOR—

Hoskins' Hydro-Carbon Assay Furnaces.

# Market Reports.

## The Markets.

SAN FRANCISCO, April 30, 1896.

With clearing weather general business shows signs of improving. The buying seems to be breaking away from its hand-to-mouth character, for merchants in the mining and lumbering districts are ordering more goods. It is said that those in the mining districts not only buy more each time when ordering, but they order oftener, which indicates a large and increasing consumption. It is also said that they meet their obligations more promptly. Heavy rains in the agricultural districts have done no little in restoring confidence in this direction, but, as yet, jobbers do not seem disposed to enlarge their line of credits, owing to the fickle character of California weather. If the month of May passes favorable, then more chances will be taken and merchants in the rural districts be given more credit. In this city manufacturers report a continued good supply of orders, which admit of running on fairly full time with, in many instances, an increase of hands employed. This is particularly the case with iron workers.

In the local money market the easy tone noted last week not only continues, but the feeling grows that the change for the better is based on substantial grounds. The steady revival in gold mining on this coast is without doubt the main pillar on which rests the belief of far better times. This is supplemented with more cheering news from the lumbering camps, with higher prices ruling for lumber, and also the prospects favorable for a good wheat crop and fair prices, while the outlook for the fruit crop is far from discouraging. Eastern advices are confirmatory that the money markets are working easier and that buyers of paper are increasing, while the supply of the latter is not so large. This change is causing a lower range of interest, which will lead up to an expansion of business and more activity in speculative channels. The supply of foreign capital seems to be increasing, which is quite an important factor at the East. European advices state that there is a plethora of funds and a continued desire to put it out. This has caused quite a strong market for all good bonds and desirable securities.

**New York Silver Prices.**

NEW YORK, April 30.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. |
|---|---|---|
| Friday | 31 | 67¾ |
| Saturday | 31 | 67⅞ |
| Monday | 31⅛ | 68 |
| Tuesday | 31 3-16 | 68¼ |
| Wednesday | 31 1-16 | 68 |
| Thursday | 31 1-16 | 68 |

| | Copper. | Lead. | Iron. | Tin. |
|---|---|---|---|---|
| Friday | 10 75 | 3 05 | 11 00@13 35 | 13 30 |
| Saturday | 10 75 | 3 05 | 11 00@13 35 | 13 30 |
| Monday | 10 75 | 3 05 | 11 00@13 35 | 13 25 |
| Tuesday | 10 75 | 3 05 | 11 00@13 50 | 13 35 |
| Wednesday | 10 75 | 3 07½ | 11 00@13 50 | 13 40 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 7@8 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.86¼ |
| London Merchants | $4.86¼ |
| London Sight Bankers | $4.90 |
| Refined Silver, per oz., 1000 fine | 68c |
| Mexican Dollars | 54@55c |

SILVER.—The market at the East and in London moved up slightly the fore part of the week under review, and then shaded off slightly. The improvement is said to have been due to a better demand from the Orient for new tea crop moving. This only goes to show the sensitive character of the metal, and that the supply is under fair control, while the output of the mines is steadily decreasing. In our market the demand does not show any material change from that heretofore reported. The receipts are only fair, as the bulk is sent eastward.

MEXICAN DOLLARS.—The demand is said to show a slight improvement, but the supply is liberal, both on spot and offerings for shipment. The dealers report the range from 54 to 55 cents.

COPPER.—The market at the East is reported slightly easier but not quotable lower. The American consumption does not show any improvement, causing home buyers to be indifferent, but there is still an active export movement, which keeps the market from going off, notwithstanding the light output by the mines. The opinion at the East seems to be that the foreign demand is somewhat of a speculative character.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ½ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

TIN.—The market for pig shows more strength at the East and in Europe, due to a fairly good demand and stronger holding. It may also be due to a speculative influence. Tinplate is steadier. The demand is light. The East reports a firm market for plate. This probably is due to the advance in steel and iron.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I.C coke, heavy, per box | $4 25 |
| " " " light, " " | 4 10 |

ANTIMONY.—The market is quiet at 9 cents as an outside figure. New York mail advices quote 7⅞@8c for Cookson's, 6¾ for Hallett's and 6¾c for Japanese, from store.

LEAD.—The market at the East is firming up. This strength is not due so much to an improvement in the demand as to lighter offerings. This would seem to indicate that holders believe that with improving business in this country the consumption will enlarge in all directions for paints and all lead products.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—There is nothing new to report.

The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

QUICKSILVER.—The market is reported about the same as last week.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| Distant points up north | 38 00 |
| West coast of Mexico, for export | 34 00 |

POWDER.—There is continued good demand for mining purposes. The market is firmer.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " " | 8½c |

BORAX.—The market is steady, and quoted as follows:

| | |
|---|---|
| Refined, in car lots | 6¼ |
| Refined, in sacks | 5⅞ |
| Powdered, in car lots | 6⅛ |
| Concentrated, " | 5⅝ |

LUMBER.—The redwood lumber combine has made another advance. The market for all kinds is steady to firm with a good demand reported.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 14 00 | @ | 19 00 |
| Spruce | 26 00 | @ | 31 00 |

NAILS.—We advance quotations 15 cents per keg. Jobbers continue to report a good demand. The market is strong.

The market is quoted as follows:

| | |
|---|---|
| Wire, carloads, basis per keg | $3 22½ |
| " jobbing, " " | 3 35 |
| Cut, carloads, " " | 2 97½ |
| " jobbing, " " | 3 10 |

IRON.—The local market, while not quoted higher, is firm in sympathy with the East. At the East it looks as if the late advances will be maintained, although there is some still available at the old price. As this cleans up there will be less difficulty of sustaining the market, owing to a continued free consumption. The demand for structural purposes is quite large, while for railroad purposes it is increasing.

Our market is quoted as follows:

AMERICAN.

| | To Arrive. | Spot. |
|---|---|---|
| Sloso | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |

ENGLISH.

| | | |
|---|---|---|
| Barrow | $21 00 | $23 50 |
| Gartsherrie | 21 50 | 23 50 |

COAL.—The general situation is essentially unchanged. There is a good demand for both steam and household, which has reduced spot stores, but the supply on the way of foreign is said to be quite liberal, while improved crop prospects will send more coal vessels to this port for wheat loading.

SPOT FROM YARD—PER TON.

| | | | |
|---|---|---|---|
| Wellington | $7 50 | @ | 8 00 |
| Greta | 6 00 | @ | 6 50 |
| Nanaimo | 6 50 | @ | 7 00 |
| Gilman | 5 50 | @ | 6 00 |
| Seattle | 5 00 | @ | 5 50 |
| Coos Bay | — | @ | 4 50 |
| Cannel | — | @ | 8 00 |
| Egg, hard | — | @ | 13 00 |
| Wallsend | — | @ | 6 50 |
| Scotch Splint | — | @ | 7 50 |
| Brymbo | — | @ | 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 25 |
| Liverpool Steam | 6 25 |
| Scotch Splint | — — |
| Cardiff | 6 25 |
| Lehigh Lump | 9 00 |
| Cumberland | 13 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 10 00 |
| " in sacks | — — | @ | 10 50 |
| Cumberland | — — | @ | — — |

## Mining Share Market.

SAN FRANCISCO, April 30, 1896.

The market has been fairly active, but transactions as recorded indicate that there is considerable cross-ordering, although professional room-traders are quite a factor in swelling the total sales. So far as surface indications go, there is nothing to warrant that large moneyed men are in the market, but everything points to two or three small pools doing the manipulation. This can be easily done by them, owing to the low range of values, but to promote a respectable-sized deal is beyond their power, for outsiders with money can not be induced to come in and buy unless there are two or three more dividend propositions. The past week has been prolific in reports to excite the cupidity of dealers, but so far without much effect. It is not at all unlikely that these reports may be followed by still higher prices, so as to give color, if possible, to their being correct. If this movement proves a success by letting the persons manipulating the market sell out a fair profit, then the incentive for advancing prices will be gone, after which a lower market can be looked for, entailing losses to those who bought at the advance. This is the history of the mining market in the absence of large ore developments and the right kind of moneyed backing. While the general situation of the Comstock mines is encouraging, yet experience has taught that favorable prospects are oftener more deceptive than otherwise. It is to be hoped that the work which is being done now may lead up to better results than has been witnessed since 1886 in the Con. Virginia deal or in 1888 in the Confidence deal. In both of these deals prices were driven considerably higher than the ore developments warranted, and those who bought were heavy losers. The true market value of shares is only what the ore in sight and prospects justify, yet in a spirit of gambling prices may be forced to a higher range than warranted by the conditions of the mines, and, when this is done, they can not be sustained without a large moneyed backing, which seems to be lacking.

From the Comstock mines, with a few exceptions, our advices are confirmatory of more exploiting than at any time since 1892 and 1893, with the prospects in two or more of quite an encouraging character. Ten or twelve years ago the market would have responded to so favorable a condition in the mines by shares selling at a large advance on prices now ruling. At that time there was large outside buying and selling, besides which several moneyed mining men would have come in the market, but now they can not be brought in, on the same principle that a burnt child dreads the fire. In the Alta group, official letters from Alta report that a few tons of ore are still being extracted while doing exploiting work. In the Gold Hill group official letters do not afford much comfort to the shareholders, yet the work that is being done in these mines may strike sufficient ore to promote quite a move in the market, but even after such a strike has been made it is only reasonable to infer that it will take time and money to show its extent and value. Shrewd and successful operators sell on ore strikes, letting others get the ore or assessments to pay while they get the coin. Seg. Belcher is raising more ore. If the output continues to increase in the near future the mine will come very nearly paying current expenses while doing exploiting work. In Overman, preparations, according to official letters, are under way to commence more active operations on two more levels. From Belcher, there is a total absence of the work that is being done. All that is being given officially is the number of tons of ore raised each week. Official letters from Crown Point report active work on second levels, but no ore of sufficient value to extract. No work is being done, so far as reported, in Kentucky. From Yellow Jacket there is no news which cause many to think that there is a "nigger behind the fence," so suspicious is the average trader. The west cross-drift that is being run by Challenge, Confidence and Con. Imperial got another move on, but the letter says it was extended nine feet, which is one foot faster progress than has been made. In Confidence, exploiting work is being done on the upraise from the 200-level. A few tons of ore are extracted each week. From Alpha official letters report work on the 500-foot level, but private letters also state that work is also being done on one or two other levels. The long west cross-drift from the 850-foot level of Bullion is being pushed slowly ahead. It is now out over 1760 feet. In Potosi, Chollar, Hale & Norcross and Savage active work is being done in different directions and on second levels. It would seem that every promising prospect is followed up in the hopes of its leading to something good. While prosecuting the work, ore is extracted each week, which helps to pay expenses but it is not enough to keep them from drawing on funds raised by assessment. The west cross-drift in Gould & Curry is out over 2200 feet. It ought to be soon far enough out to show practical results. The work in Best & Belcher is deserving of more attention than is given to it, for unless the work in the west cross-drift is stopped, it will be extended far enough within the next few weeks to show what can be expected in that direction. Con. Virginia continues to raise and mill enough ore to pay all expenses while still pushing exploiting work on several levels. From Ophir, Mexican, Union and Sierra Nevada there is nothing new to report outside of a general favorable formation in the material encountered. The work is on the same levels heretofore given by us. In Utah the ore encountered assays from $1 to $2 per ton. This is doubtless enough to have shareholders pay assessments. In Andes work is being done on the 450-foot level.

From the Brunswick lode our advices report that in Occidental they are still in ore, while development work is still being pushed ahead. The assays reported are about as heretofore made public, but the ore seen by the writer looks as if there is some base metal in it, which, if the case, will necessitate it being worked by a process different from that on the Comstock. The work done at other points is both dead work and exploiting, with more favorable indications reported.

From the Bodie district official letters do not report any essential change in the condition of the mines, but private letters are of a more encouraging character. A fire the past week in the Standard mines did some damage, but which can be soon repaired.

The market opened strong and higher this morning, with a good demand for Chollar and Best & Belcher. The former advanced to about 25 per cent over yesterday's prices, and then shaded off. This advance caused the entire list to sell at better figures.

At the 2:30 session to-day, Chollar sold still higher. The advance is said to be due to a report that Prof. Price had gone up to examine and analyze the ore found in this company's ground on the Brunswick lode. It is also said he will test the find in Occidental. The rest of the market, except Crown Point, Confidence, Hale & Norcross and some others were slightly higher in sympathy with the new move in Chollar.

The following illustrates the changes of the week:

| MINES. | Apr. 23. | Apr. 30. |
|---|---|---|
| Alpha | ..... | ..... |
| Alta Consolidated | $ 08 | ..... |
| Andes | 26 | $ 28 |
| Belcher | 43 | 50 |
| Best & Belcher | 49 | 58 |
| Bodie | 48 | 50 |
| Bullion | 13 | 14 |
| Challenge | ..... | 38 |
| Chollar | 39 | 68 |
| Confidence | 69 | ..... |
| Consolidated California and Virginia | 1 70 | 1 75 |
| Consolidated New York | ..... | ..... |
| Crown Point | 28 | 35 |
| Exchequer | ..... | ..... |
| Gould & Curry | 22 | 44 |
| Hale & Norcross | 1 15 | 1 25 |
| Justice | ..... | ..... |
| Mexican | 33 | 35 |
| Ophir | 1 20 | 1 25 |
| Overman | 10 | 13 |
| Potosi | ..... | 37 |
| Savage | 25 | 32 |
| Sierra Nevada | ..... | 63 |
| Union | 48 | 55 |
| Utah | ..... | 04 |
| Yellow Jacket | ..... | 37 |

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied, | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alaska-Willoughby G M Co, Alaska | 1 | 20c | Apr 6 | May 25..June 29 | T Pollard, 22 California |
| Alpha Con M & M Co, Nev | 16 | 5c | Apr 7 | May 12..June 2 | C E Elliot, 309 Montgomery |
| Bodie Con M Co, Cal | 19 | 15c | Mar 7 | Apr 10..May 4 | M E Willis, 309 Montgomery |
| Bullion M Co, Nev | 47 | 10c | Mar 18 | Apr 22..May 14 | R R Grayson, 331 Pine |
| Bur ington G M Co, Cal | 2 | 3c | Apr 23 | May 27..June 17 | W C Ralston, 331 Pine |
| Caledonia S M Co, Nev | 46 | 5c | Apr 1 | May 6..May 27 | A S Groth, 414 California |
| Challenge Con M Co, Nev | 21 | 5c | Mar 27 | Apr 29..May 20 | C L McCoy, Mills Building |
| Crown Point G & S M Co, Nv | 67 | 20c | Apr 2 | May 6..May 26 | J Newlands, Mills Building |
| Gould & Curry S M Co, Nev | 78 | 15c | Mar 25 | Apr 28..May 20 | A K Durbrow, 309 Montgomery |
| Inyo Marble Co, Cal | 28 | 10c | Mar 30 | May 4..June 4 | M A Cahn, Phelan Bldg |
| Mexican G & S M Co, Nev | 54 | 20c | Apr 23 | May 28..June 18 | C E Elliot, 309 Montgomery |
| Occidental Con M Co, Nev | 22 | 10c | Apr 2 | May 6..May 28 | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 2 | 3c | Apr 3 | May 10..May 26 | F L Olmstead, 315 Montgomery |
| Ophir S M Co, Nev | 68 | 25c | Mar 17 | Apr 20..May 11 | E B Holmes, 309 Montgomery |
| Potosi M Co, Nev | 45 | 20c | Apr 9 | May 14..June 4 | C E Elliot, 309 Montgomery |
| Summit G M Co, Cal | 14 | 5c | Mar 17 | Apr 20..May 12 | J E Jacobus, 309 Montgomery |
| Utah Con M Co, Nev | 22 | 5c | Apr 3 | May 6..May 27 | A W Havens, 309 Montgomery |

## ANNUAL MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Jamison M Co, Cal | Sam W Cheyney, 120 Sutter St | May 4 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, April 30, 1896

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 100 Andes | 27 | 300 | 44 |
| 200 Belcher | 49 | 500 H. & N | 1 25 |
| 200 | 50 | 300 Mexican | 34 |
| 350 Best & Belcher | 58 | 200 | 35 |
| 150 | 57 | 350 Ophir | 1 25 |
| 500 Bullion | 14 | 700 Occidental | 1 25 |
| 450 Butwer Con | 30 | 300 | 1 35 |
| 1550 Con Cal & Va | 1 75 | 1200 | 1 30 |
| 300 Crown Point | 33 | 1200 Potosi | 28 |
| 100 | 35 | 100 | 30 |
| 100 | 34 | 300 Savage | 30 |
| 2200 Chollar | 51 | 700 S. B. & M | 16 |
| 900 | 50 | 500 Sierra Nevada | 63 |
| 300 | 53 | 200 Union Con | 54 |
| 300 | 52 | 450 Utah | 04 |
| 300 | 54 | 300 Yellow Jacket | 37 |
| 200 Gould & Curry | 43 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 400 Ophir | 1 25 | 400 | 17 |
| 450 Mexican | 35 | 500 Overman | 13 |
| 300 Gould & Curry | 43 | 200 Union | 55 |
| 750 Best & Belcher | 57 | 300 | 54 |
| 50 | 56 | 700 Savage | 32 |
| 2750 Chollar | 68 | 200 Bullion | 14 |
| 200 | 67 | 200 Challenge | 38 |
| 100 Potosi | 36 | 1600 Occidental | 1 25 |
| 1200 | 37 | 100 Andes | 28 |
| 200 H. & N | 1 25 | 200 Bodie | 50 |
| 100 Belcher | 49 | 600 Bulwer | 31 |
| 100 | 48 | 100 C. C. & Va | 1 75 |
| 500 Sierra Nevada | 63 | 400 Utah | 04 |
| 700 S Belcher | 16 | | |

## Commercial Paragraphs.

FRASER & CHALMERS of Chicago have the contract for furnishing the machinery for the new concentrating mill which Supt. Elling will build at the Easton, Virginia City, Montana, a 10-stamp affair.

THE *Electrical Review* is credibly informed from several sources that the General Electric Company will close its large factories at Schenectady, N. Y., Lynn, Mass., and Harrison, N. J., and will remove its entire manufacturing business to a new and modern plant to be erected for the company near Elizabeth, N. J.

THE South American Light, Power and Traction Company of Lima, Peru, has just placed a contract with the General Electric Company of New York for the installation of a 5000-horse power electrical plant. The dynamos will be erected at the waterfalls, eleven miles from Lima, and the electric power generated will be transmitted to the city, where it will be used to operate the surface railways and electric lights and furnish to the public generally such electric power as may be required. This will be the largest installation of electricity in South America.

**Tours in the Rocky Mountains.**

The "Scenic Line of the World," the Denver & Rio Grande Railroad, offers to tourists in Colorado, Utah and New Mexico the choicest resorts, and to the transcontinental traveler the grandest scenery. The direct line to Cripple Creek, the greatest gold camp on earth. Double daily train service with through Pullman sleepers and tourists' cars between Denver and San Francisco and Los Angeles.

Write S. K. Hooper, G. P. & T. A., Denver, Colorado, for illustrated descriptive pamphlets.

## Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 24 day of April, 1896, an assessment (No. 22) of ten cents (10c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, room No. 63 Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of May, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on THURSDAY, the 28th day of May, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURROW, Secretary.

Office—Room No. 63, Nevada block, No. 309 Montgomery street, San Francisco, California.

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INYO MARBLE COMPANY OF CALIFORNIA. Location of principal place of business, San Francisco, California. Location of Works, Inyo, Inyo county, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 30th day of March, 1896, an assessment No. 28 of ten (10c) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 323, Phelan Building, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 4th day of May, 1896, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on THURSDAY, the 4th day of June, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

M. A. CAHN, Secretary.

Office, Room 323, 5th Floor, Phelan Building, San Francisco, California.

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TO THE STOCKHOLDERS OF THE SOUTH PALOMA GOLD MINING COMPANY, LIMITED:

Notice is hereby given that by resolution of the Board of Directors of the corporation, adopted on the 21st day of March, 1896, a meeting of the stockholders of the corporation was called for the purpose of increasing the capital stock to the amount of two hundred thousand dollars, to be divided into one hundred thousand shares of the par value of two dollars per share, and of determining the disposition to be made of the increased capital stock; and it was resolved that such meeting shall take place at the principal place of business of the corporation, being the same building where the Board of Directors usually meet, to wit: No. 222 Sansome street, room 17, in the City and County of San Francisco, on WEDNESDAY, the 10th day of June, A. D., 1896, at 11 o'clock in the forenoon of that day.

Dated San Francisco, 2nd of April, 1896.

JOHN A. WRIGHT, President.

CHAS. WEBB HOWARD, JR., Secretary.

---


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## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice. There are delinquent upon the following described stock on account of assessment (No. 3) levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| Chas. A. Moore | 102 | 7,222 | $361 10 |
| Chas. A. Moore, Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6,000 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore, Trustee | 130 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 160 | 6,967 | 348 35 |
| N. L. Bell, Trustee | 128 | 250 | 12 50 |
| A. C. Rugg | 16 | 1,000 | 50 00 |
| A. C. Rugg | 67 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 155 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg, Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg, Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 109 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 141 | 1,667 | 83 35 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 133 | 3,195 | 159 75 |
| E. C. Godfrey | 134 | 4,000 | 200 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Nos. 37 and 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

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### POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until SATURDAY, May 9, 1896, at the hour of 2 P. M., at the office of the Company, Room 38 Crocker Building, San Francisco, Cal.

E. C. GODFREY, Secretary.

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### ANNUAL MEETING.

The regular annual meeting of the stockholders of the Jamison Mining Company will be held at the office of the company, Rooms 50 and 54, No. 120 Sutter street, San Francisco, California, on MONDAY, the 4th day of May, 1896, at the hour of 2 P. M., for the purpose of electing a Board of Directors to serve for the ensuing year and the transaction of such other business as may come before the meeting.

SAM W. CHEYNEY, Secretary.

Office—Rooms 50 and 54, 120 Sutter street, San Francisco, California.

---


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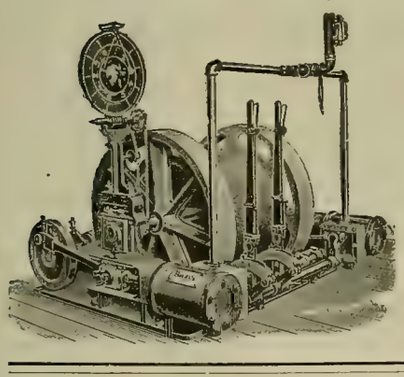
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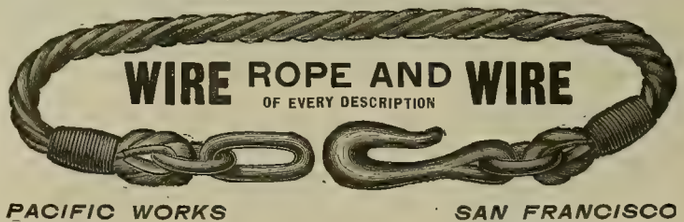
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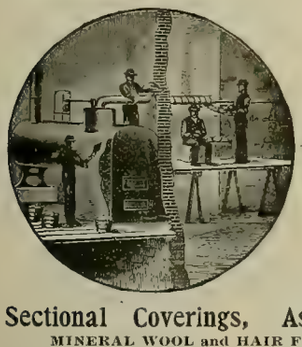
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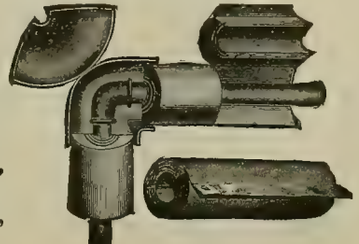
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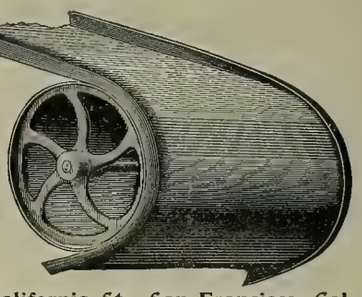
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SAN FRANCISCO, CAL.

## READ WHAT MINERS THINK OF THE BRYAN IMPROVED ROLLER QUARTZ MILL AND JOHNSTON CONCENTRATOR.

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.
The mills require very little attention. At our mill an ordinary peon," earning one dollar per day, has complete charge.
In regard to silming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator, it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec'ty.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK, Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec'ty.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY.
S. BAMBERGER, President and Manager.
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly.
[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO.
C. C. MCIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. MCIVER, President.

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**SLIME CONCENTRATOR,**
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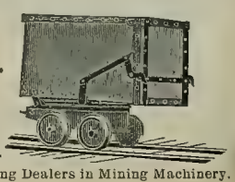


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AND PACIFIC ELECTRICAL REVIEW.

No. 1870.—VOLUME LXXII. Number 19. SAN FRANCISCO, SATURDAY, MAY 9, 1896. THREE DOLLARS PER ANNUM Single Copies, Ten Cents.

## Largest Hoisting Engines in the World.

The illustration on this page depicts a front view of the Modoc, as erected in the shop of the Union Iron Works. On page 377 appear two more illustrations of these massive machines, which will shortly be at work raising loaded 4-deck cages at the rate of 2400 feet per minute.

The two largest hoisting engines in the world are nearing completion at the Union Iron Works in this city. They are intended for the Anaconda Mining Company, and in a few days will be taken apart and shipped to their destination. These mammoth pieces of machinery are named the Modoc and the Aztec Each consists of one left-hand and one right-hand compound beam engine, connected with the reel shaft by disc cranks, the crank-pins being set at right angles. The cylinders are vertical and inverted. There is one high-pressure, 26-inch diameter, and one low-pressure, 46-inch diameter, for each engine. The pistons are connected with the opposite end of the beams by piston rods, cross-head and reach-rods or links. At the top, or king post, of each beam one of the main connecting rods takes hold, while the opposite end of the rod is attached to the crank-pin, which at all times will give a positive stroke of 72 inches to the pistons.

The high-pressure cylinder is located in front of the low-pressure cylinder, with a reheater between them. Both are steam-jacketed. The condensed water will be automatically carried off from the jackets by steam traps discharging into feed tanks or condensers. The cut-off valve gear mechanism on the low-pressure cylinders is adjustable by a hand lever or governor, as desired, while the cut-off valve gear mechanism of the high-pressure cylinders is controlled by a governor and by a hand lever on a working platform. The cylinders of each engine are supported by a cast iron frame, consisting of four vertical and four diagonal columns, resting on a heavy bed-plate and securely bolted to it. They are handsomely covered with teak wood lagging, with highly finished metal covers at the top end.

The main valves of each engine are of the Corliss type, and are worked by a wrist-plate, which derives its motion from an eccentric on the reel shaft and a crank on the beam-pin. The motion is a modification of the Walseheart valve gear. The reversing gear is operated by a separate engine and an hydraulic-controlling cylinder. The beam center bearings are cast in and form part of the main sole plates. The same is also true of the main bearings for the crank shaft. All are substantially fitted, and provision is made for adjustment in case of the wearing away of the moving parts. On each crank shaft there will be two reels, each of the capacity of about a mile of flat wire rope. They will be operated independently, or in balance, as may be desired. Each reel will be provided with a patent friction-band clutch, applied by an entirely separate engine, and hydraulic controlling-cylinders. The reel breaks are of the Post pattern, with beams of heavy cast iron securely braced with steel rods, bound together at top and bottom, each operated by a special engine and also controlled by hydraulic cylinders. The auxiliary engines for working the reel brakes, reel clutches, reversing gear and disc brakes are operated by hand-levers, all conveniently grouped on the operator's platform, which is located between the engines and forms part of the main engine gallery. Each reel is provided with an ingenious arrangement for indicating the position of the cages in the shafts and the speed at which they are moving. To the end of the rope on each reel will be secured a four-deck cage, which, when loaded and in full motion, will travel at a velocity of forty feet a second, or nearly half a mile a minute. A governor, fitted to each pair of engines, entirely controls them, giving a uniform speed to the cages, and regulating the valve gear tripping mechanism, so as to cut off at the most desirable portion of the stroke. By this means an economical distribution of the steam is secured in the cylinders and saving is made in the fuel consumed.

One main, central winding stairway leads to the upper gallery, or operator's platform, and there are numerous smaller platforms winding their way around those parts of the engine requiring constant attention or adjustment The platforms are provided with brass-capped iron stanchions and with brass hand-railings, neatly designed and highly polished. Only brass piping is used around the engines and brass drip-pans are placed to catch the waste oil from the journals.

To work one pair of these engines in all of their requirements, the operator has one foot and seven hand levers to handle, while in front of him are located the two indicators, which will require his constant attention while the machinery is in motion.

Each pair of hoisting engines has seven separate subordinate engines, and each pair weighs about 400 tons.




THE MODOC—ONE OF THE TWO LARGEST HOISTING ENGINES IN THE WORLD.

## Another Gold Extraction Process.

Many are the processes for gold extraction, and in no case is "the survival of the fittest" more manifest. M. de Rigaud brings to public notice a process wherein he treats gold ores with tetra-chloride of sulphur, at a cost, he claims, of $1.80 per ton. He has two methods, a "rapid" and a "slow" process. In the former the ore and chloride of sulphur are placed in a leaded cast-iron drum, supported horizontally with a shaft in its axis carrying blades that stir the mass as it revolves. When the chemical reaction is complete the cylinder is given an almost perpendicular position, and the chloride of gold run off. This, he says, occupies from four to five hours. In the "slow" process M. de Rigaud uses a set of reaction tanks, a pump and exhaust chamber. The tanks stand vertical and permit of inversion. The ore, ground to a slime, is placed therein with chloride of sulphur, then covered, and the resultant chlorine drawn by the pump through the mass, the destructive action of the chlorine on the pump being neutralized in the exhaust chamber by being drawn through a siphon tube into milk of lime in the upper part of the chamber. The chloride of gold is run into precipitating tanks, sulphate of iron added. The claim is made that the tailings are barren of gold, that complete works capable of treating 100 tons daily can be erected for from $20,000 to $60,000. The Total Gold Extraction Co., on the Tancarville Canal, Havre, France, is now completing a plant for gold extraction by this process.

M. de Rigaud furnishes figures which estimate the cost of treatment at eighty cents per ton, purchase of tailings at sixty cents per ton and "redemption of capital" forty cents, making, according to his calculations, the total cost of treatment $1.80 per ton. He says the tailings on which the company will operate will give a profit of $4.20 per ton, and claims that considerable resultant profit can be secured, alleging "the entire and absolutely complete extraction of all the gold," and that the solvent can be furnished at a price not to exceed six cents per ton treated, according to a paper read by him before the French Society of Civil Engineers, February 28th.

# MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

San Francisco, May 9, 1896.


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## A Supreme Court Decision.

The following, of some interest to California miners, is published by request. It is a recent decision by the Supreme Court of this State as to the liability of a County Recorder and his bondsmen for money paid by miners for recording notices of locations of mining claims. The case in question was on appeal from the Superior Court of San Bernardino county:

Filed April 11, 1896.

IN BANK.

*County of San Bernardino, Plaintiff and Appellant, vs. Alonzo S. Davidson et al., Defendants and Respondents.* | No. 19,419.

This is an action on the official bond of defendant Davidson as county recorder of the county of San Bernardino. A general demurrer to the complaint was sustained by the Court below, and plaintiff declining to amend, judgment was rendered for defendants. Plaintiff appeals from the judgment.

The demurrer was properly sustained and the judgment is right. By this action it is sought to hold Davidson and his bondsmen liable to the county for certain money paid to him during his term of office by miners for recording certain notices of locations of mining claims. But the statute concerning county recorders makes no provision for the recording of notices of locations of mining claims, and such record is not within the purview of his official duties *as county recorder*. In certain mining districts there is a custom which requires a notice of location to be recorded with some one selected as a mining recorder; and in some of these districts the County Recorder is so selected. The purpose of the recording is to show a compliance with the mining customs; but this purpose, and the whole scheme, is entirely distinct from the statutory system of recordation by which parties are permitted to have transfers of property and certain other written instruments recorded in the County Recorder's office so as to give constructive notice thereof, and the County Recorder is *required* to record the same when presented properly acknowledged or authenticated as provided by statute—each kind of instrument to be recorded in a book to be kept for that purpose. A notice of a mining location in a Recorder's book is "the original notice, not a record or copy of an independent original." Pralus vs. P. G. & D. M. Co.; 35 Cal. 36. A statutory County Recorder could no more be required to record a miner's notice of location than he could be required to furnish a miner with a pick or shovel. If he chooses to do so he may transcribe such notice of location in a book, or collection of sheets of paper, which he has procured for that purpose; but if he do so he does it not as a County Recorder elected by the people, but as a person selected by the miners to do an act not provided for by the recordation laws of the State, and any moneys which they may pay him for such services are not fees for which he and his bondsmen are accountable to the county. The cases of Placer county vs. Austin, 8 Cal.; 304, McKee vs. Monterey county, 51 Cal.; 275, and People vs. Bunker, 70 Cal.; 215, are not in point. In the first of those cases a tax collector undertook to retain money, which he had received as such tax collector, upon the ground that the taxes had been illegally levied: in the second case the defendant as treasurer of Monterey county had received certain moneys by the allowance of the controller and sought to retain them upon the ground that the controller had exceeded his authority in making the allowance, and in the third case it was held that a commissioner of irrigation "having assumed to act *under a statute of the State*, and having collected moneys according to the letter of that statute, cannot be heard to say that the statute, was in conflict with the Constitution of the United States," and that therefore he was not bound to pay them over. In those cases the officers received the money as agents of the State or county upon the assumption that it was money belonging to the State or county; and they were decided upon the principle that one to whom money has been paid by another for the use of a third person cannot, as against the third person, set up any illegality in the payment. But such was not the fact in the case at bar. The respondent did not receive the money upon the pretense that he was collecting it as the official agent of the county. He was not *ex-officio* mining recorder; for there is no such officer created by the statute. And it is quite clear that the demurrer fully presents the question under review. The averment of the complaint is that during Davidson's term of office "there existed a general custom and rule amongst the miners of said county, to file for record with the recorder of said county. Notices of Location of Mining Claims," and that he knew of such custom. This presents the whole question: and the averment that he received the fees "as such recorder" does not change either the fact or the law.

The judgment is affirmed,

McFARLAND, J.

We concur:

GAROUTTE, J.
VAN FLEET, J.
HARRISON, J.
HENSHAW, J.
TEMPLE, J.

## California's Mineral Product for 1895.

The following was received from the State Mining Bureau last Tuesday and is of considerable value. Apart from its unquestionable accuracy its timeliness is also noticeable, it being months in advance of the date at which such compilations are ordinarily available, reflecting credit on the Bureau and all connected therewith.

Bulletin No. 8 of the California State Mining Bureau, J. J. Crawford, State Mineralogist, showing by counties the mineral productions of California for the year 1895 has just been issued. It was compiled by Charles G. Yale, statistician, from direct returns by producers. The total valuation of the mineral substances produced last year was $22,844,664.29, as compared with $20,203,294.44 in 1894, an increase of $2,641,369.85 for the year. Of this increase $1,411,035.80 was in gold and $302,458.15 in silver. The precious metals, therefore, are accountable for $1,713,493.95 of the total increase named.

According to Mr. Yale's figures the value of the mineral products of the two years was divided as follows:

| | *1895.* | *1894.* |
|---|---|---|
| Precious Minerals | $15,934,107 39 | $14,220,613 44 |
| Other Metallic Substances | 1,444,200 90 | 1,202,718 00 |
| Non-Metallic Substances | 1,348,280 00 | 1,331,351 00 |
| Hydrocarbons and Gases | 1,404,321 00 | 1,492,586 00 |
| Structural Materials | 2,713,755 00 | 2,056,026 00 |
| Totals | $22,844,664 29 | $20,203,294 44 |

These figures show a growing mineral industry in California, outside of gold and silver. The details of amount and value of each substance, as shown in the Bulletin referred to, are as follows:

**Amount and Value of Mineral Products in California in 1895.**

| | |
|---|---|
| Antimony, 33 tons | $ 1,485 00 |
| Asbestos, 25 tons | 1,000 00 |
| Asphaltum, 25,525 tons | 170,500 00 |
| Bituminous Rock, 38,921 tons | 121,586 00 |
| Borax, 5,959 tons | 595,500 00 |
| Cement, 16,283 barrels | 32,556 00 |
| Chrome, 1,740 tons | 16,795 00 |
| Clays—Bricks, 131,772 M. $672,360 00; Pottery Uses, 37,660 tons 39,685 00 | 712,045 00 |
| Coal, 79,858 tons | 193,790 00 |
| Copper, 225,650 lbs | 21,900 00 |
| Gold | 15,334,317 00 |
| Granite, 288,449 cubic feet | 224,329 00 |
| Gypsum, 5,158 tons | 51,014 00 |
| Lead, 1,592,400 lbs | 49,364 00 |
| Limestone—Lime, 394,764 barrels $386,094 00; Lime Rock, 71,355 tons 71,640 00 | 457,734 00 |
| Macadam, 840,650 tons | 700,987 00 |
| Magnesite, 2200 tons | 17,000 00 |
| Manganese, 880 tons | 8,200 00 |
| Marble, 14,864 cubic feet | 56,566 00 |
| Mineral Paints—Copper, 250 tons $2,250 00; Iron, 225 tons 3,375 00; Ocher, 375 tons 2,800 00 | 8,425 00 |
| Mineral Waters, 701,397 gallons | 291,500 00 |
| Natural Gas—Carbonic Acid $ 12,000 00; Fuel Gas 100,000 00 | 112,000 00 |
| Onyx, 1,200 cubic feet | 112,000 00 |
| Paving Blocks, 2,232 M. | 12,000 00 |
| Petroleum, 1,245,339 barrels | 1,000,235 00 |
| Platinum, 15 oz. | 900 00 |
| Quicksilver, 36,104 flasks | 1,337,131 00 |
| Rubble Rock, 414,038 tons | 394,952 00 |
| Salt, 53,031 tons | 150,576 00 |
| Sandstone, 55,242 cubic feet | 35,373 00 |
| Serpentine, 4,000 super. feet | 4,000 00 |
| Silver | 599,789 70 |
| Slate, 1,350 squares | 9,450 00 |
| Soapstone, 25 tons | 375 00 |
| Soda, 19,000 tons | 47,500 00 |

The Bulletin is in the form of a large table, so arranged that the total amount and value of each substance is shown, as well as the amount and value produced in each county in the State. The lower footings show how much of each substance was mined and its value. The side footings show the value of the entire mineral product of each county, gold, silver and everything else. In this way a record is kept of the progress of the mineral industry of the respective counties, as well as that of the whole. The figures are made up from direct returns from producers, except those of gold and silver, for which the U. S. Mint figures are accepted. In no case is the identity of any mine or company revealed; so that, while no private business is made public, the table shows one entire mineral product with a degree of accuracy far beyond what could be attained by new estimates.

The total value of the mineral products of the different counties of the State during the years 1894 and 1895 are given in the bulletin as follows:

**Total Product of Counties.**

| *Counties.* | *1895. Value.* | *1894. Value.* |
|---|---|---|
| Alameda | $ 274,647 00 | $ 242,050 00 |
| Amador | 1,443,504 40 | 1,394,042 81 |
| Butte | 706,196 38 | 473,672 65 |
| Calaveras | 1,734,918 14 | 2,192,029 47 |
| Colusa | 440 00 | 7,500 00 |
| Contra Costa | 139,655 00 | 94,000 00 |
| Del Norte | 8,250 00 | 8,000 00 |
| El Dorado | 738,498 99 | 386,763 67 |
| Fresno | 52,049 00 | 12,902 00 |
| Humboldt | 356,221 20 | 247,779 86 |
| Inyo | 464,409 51 | 327,076 91 |
| Kern | 342,078 59 | 587,960 91 |
| Lake | 507,074 00 | 382,954 00 |
| Lassen | 25,000 00 | 35,283 00 |
| Los Angeles | 1,076,717 00 | 716,705 00 |
| Madera | 211,985 74 | 199,465 60 |
| Marin | 157,790 00 | 189,350 00 |
| Mariposa | 216,629 46 | 153,746 26 |
| Mendocino | 150 00 | ..... |
| Merced | 1,500 00 | 762 50 |
| Mono | 648,527 31 | 371,873 58 |
| Monterey | ..... | 9,500 00 |
| Napa | 489,200 00 | 351,527 00 |
| Nevada | 1,795,391 16 | 1,843,965 31 |
| Orange | 4,144 00 | 6,000 00 |
| Placer | 1,677,527 32 | 1,946,578 89 |
| Plumas | 603,222 57 | 499,358 83 |
| Riverside | 378,153 00 | 160,956 50 |
| Sacramento | 211,497 75 | 126,576 00 |
| San Benito | 104,250 00 | 86,285 00 |
| San Bernardino | 1,114,863 30 | 1,099,643 67 |
| San Diego | 386,407 57 | 323,222 33 |
| San Francisco | 379,696 00 | 296,889 00 |
| San Joaquin | 102,800 00 | 75,893 00 |
| San Luis Obispo | 81,320 00 | 72,685 00 |
| San Mateo | 5,000 00 | ..... |
| Santa Barbara | 158,678 00 | 92,800 00 |
| Santa Clara | 445,950 00 | 363,533 00 |
| Santa Cruz | 254,776 00 | 223,505 00 |
| Shasta | 811,233 52 | 715,768 99 |
| Sierra | 694,576 63 | 604,721 54 |
| Siskiyou | 1,030,983 73 | 761,381 83 |
| Solano | 24,285 00 | 8,225 00 |
| Sonoma | 177,840 00 | 62,756 00 |
| Stanislaus | 30,081 50 | 28,678 50 |
| Tehama | 11,525 00 | 12,680 00 |
| Trinity | 1,305,412 41 | 1,017,990 84 |
| Tuolumne | 667,066 77 | 548,520 22 |
| Tulare | 18,820 00 | 10,000 00 |
| Ventura | 264,624 00 | 372,622 00 |
| Yolo | 1,873 00 | 1,000 00 |
| Yuba | 111,482 34 | 107,480 20 |
| Unapportioned | 395,340 00 | 348,632 57 |
| Totals | $22,844,664 29 | $20,203,294 44 |

REGARDING some editorial statements in last week's issue concerning the time allowed a delinquent co-owner of an unpatented mining claim to contribute his proportion of the required amount of labor or improvements thereon, the following, which is a copy of section 6, General Circular Instructions of October 31, 1881, (Land Office Regulations), may be added, in a supplementary way: "Upon the failure of any one of several co-owners of a vein, lode or ledge, which has not been entered, to contribute his proportion of the expenditures necessary to hold the claim or claims so held in ownership in common, the co-owners, who have performed the labor, or made the improvements, as required by said Revised Statutes, may, at the expiration of the year, give such delinquent co-owners personal notice in writing, or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days; and, if upon the expiration of ninety days after such notice in writing, or upon the expiration of 180 days after the first newspaper publication of notice, the delinquent co-owner shall have failed to contribute his proportion to meet such expenditures or improvements, his interest in the claim by law passes to his co-owners, who have made the expenditures or improvements as aforesaid. Where a claimant alleges ownership of a forfeited interest under the foregoing provision, the sworn statement of the publisher as to facts of publication, giving dates and a printed copy of the notice published, should be furnished, and the claimant must swear that the delinquent co-owner failed to contribute his proper proportion within the period fixed by the statute."

## Concentrates.

"THE rush to Alaska is over." 'Twas about time.

SPOKANE, WASH., is going to form a mining brokers' exchange.

THE mill at the Brunswick mine, Nevada Co., has resumed operations.

OREGON'S bullion yield for '95 is placed at $1,852,874. 'Twill be greater in '96.

THE Witwatersrand, South Africa, gold output for March was 173,952 ounces.

PORTLAND, OR., mining men suggest the formation there of a mining exchange.

NEVADA Co. last week collected $210 more for the California Miners' Association.

THE Mammoth, Utah, mine expects to resume payment of dividends next month.

FIFTY-FIVE MINERS have gone from Pennsylvania to the Coos Bay, Or., coal mines.

THE trustees of the Montana School of Mines propose to build an $80,000 structure at Butte.

ONTARIO is offering a bounty of $1 to every one producing sufficient ore to make one ton of iron.

CRANE & LORING of Spokane, Wash., have bought the Monte Cristo claim, Trail Creek, B. C., for $25,000 cash.

THE new mill at the De Lamar, Nevada, has started up, and that property now has a daily milling capacity of 300 tons.

GENERAL MANAGER MAGNER of the Gold Dust Mining Co., Red Rock, Mont., will build a twenty-stamp mill this summer.

IT is reported from Sierra that the mill at the Alaska mine, Pike City, was totally destroyed by fire last Monday night.

A LANDSLIDE at the North Bloomfield gravel mine, at Malakoff, Cal., last Sunday killed A. Martins and wounded two others.

THE San Andreas, Calaveras Co., *Citizen*, a carefully edited and reliable paper, has begun the twenty-sixth year of publication.

HOISTING works and a 10-stamp mill are to be put on the Hedrick gravel mine, two miles southeast of San Andreas, Calaveras county.

THE superintendent of the North Pole Co., Baker City, Or., is locally credited with intention to increase the number of stamps in the mill to 80.

CRIPPLE CREEK pluckily announces that she is able to take care of the fire sufferers and that the offers of relief from outside are unnecessary.

THE Patterson mill in Gold Basin, Arizona, was destroyed by fire on April 30th. There was no insurance on the property. The mill was built last summer.

THE Calumet & Hecla, which has the deepest shaft of the kind in the world—the Red Jacket, 4900 feet—in its latest dividend aggregates a total of $45,350,000.

AT Burke, Idaho, the Poorman-Tiger people are clearing the ground for the new concentrator. Nearly $100,000 will be expended for new machinery this summer.

THE report of the Argentum Juniata mine, Aspen, Colorado, published elsewhere, shows that silver is produced there at current rates at a profit of 20½ cents per ounce.

D. E. LUTES, Juneau, Alaska, has examined a group of six claims at Berners Bay, and has sixty days' option and a $60,000 bond. The *News* says he will erect a ten-stamp mill.

THE Rossland, B. C., *Miner* patriotically predicts that inside of twelve months Rossland mining stocks will have displaced Kaffirs and Westralians in the London market.

THE Kootenai (Idaho) Water Supply Co. have their hydraulic plant in operation. It is the intention of the company to put in works to furnish electric power to the different mining camps.

THE Gold Cross Mining and Milling Co., Hedges, Cal., which has the largest number of stamps in operation under one roof in the State, reports that in April the returns were more than double the expenses.

A ROSSLAND, B. C., paper of the 2nd inst. comes squarely out with figures and states that its issue of the previous week had a "paid in advance" circulation of 301, which appears to be an honest statement.

THE Golden Reward Mining and Milling Co., Deadwood, S. D., will double their milling capacity and consolidate all their interests in one large corporation. Harris Franklin is president and general manager.

OF ALL places on earth a mining paper has been started, or rather resuscitated, in Philadelphia. It is called the *Bullion Miner*, and, considering its surroundings, is excellent. It certainly need fear no competition.

THE Treasury statement on the 1st gives all the kinds of money in circulation at $1,540,007,082, or $30,000,000 less than May 1, 1895. The per capita circulation, based on a population of 71,136,000, is stated at $21 65.

THE Pueblo, Victor and Cripple Creek Railroad Company has organized to build a belt line around Pueblo, thence to Victor, and another belt road to Cripple Creek, and via Gillett, Grassey, Altmand and Goldfield back to Victor.

THIS city will be honored this month by the American Society of Civil Engineers, which will hold its annual convention here during the week beginning May 30th. The society numbers nearly 1800, and at least one-half will attend.

LOS ANGELES PAPERS think that the new gold strikes reported from Mojave to Yuma and along the Colorado river justify the belief that "within a year from ten thousand to twenty thousand men" will be working in that region: Hardly.

THE Blue Bird Mining and Milling Co. of Spokane, Wash., owners of the Blue Bird claim, say they will put in a stamp mill soon on their property in the Blackfoot, Wash., district. They have a 40-foot shaft and the vein has widened from two to three feet.

THE *Oasis* says that, owing to the scarcity of laboring men in the State of Sonora, Supt. George Bent of the National Mexican Mining and Developing Co. has been compelled to send to Guanajuato for a gang of sixty men to work the company's mine at El Plomo.

UTAH is a land of marvels. It has furnished silver in sand, gold in coal, and now from Oasis, Utah, comes report of a ptyschaporia kingi, or prehistoric crab, covered with silver and Capt. Richards says that at the Emigration canyon lime quarries "the lime which finds a market at the smelters contains an average of $5 a ton in silver, and that this paid all costs of production and transportation, leaving the value of the lime a clear earning."

THE seventy-first meeting of the American Institute of Mining Engineers will be held in Colorado, beginning at Denver on September 21st. The sessions and excursions of this meeting will include Pueblo, Cripple Creek, Creede, Leadville, Aspen and other points.

THE British Columbia Mining Association is taking steps to test the validity of the recently passed assessment act, as far as it relates to the taxation of mines. The ground of the objection is that it discriminates against quartz gold mining and is in favor of placer gold mining.

MANAGER RIEBER, of the Golden King Mining Co., Dixie Mining district, Elmore Co., Idaho, is drawing plans for a mill of 100 tons capacity. He estimates that he has 75,000 tons of ore in sight, that will average $14. The company has thirteen claims, eight of which are patented.

DURING 1895 the imports of gold into England were the largest on record, amounting to $179,000,000, of which $57,250,000 went from the United States, $41,000,000 from South Africa, $31,250,000 from Australia and $16,500,000 from India and China. The exports amounted to $102,000,000.

SHOULD the President veto the bill containing the proposed $250,000 appropriation, it is believed that Congress will pass it over his veto by the necessary two-thirds vote. It is expected that in the event of a Presidential veto of the California Mineral Land bill the same result could be assured.

The Johannesberg, South Africa, *Standard and Diggers' News* of the 6th, claims authority for stating that the sentences imposed upon the convicted members of the reform committee will be reduced to nominal fines, that part of the sentences prescribing imprisonment and subsequent banishment being revoked.

THE long-delayed distribution of the Columbian Exposition medals and diplomas is at last begun and the MINING AND SCIENTIFIC PRESS expects to receive the medal awarded to it for its reliability and the general value of its contents—a distinction, so far as known, not accorded to any other American class journal.

THE deepest bore-hole—that at Paruschowitz, in upper Silesia—has reached a depth of 6570 feet and penetrates eighty coal seams, with a combined thickness of 293 feet. The temperature has increased one centigrade degree for every 111 feet. The rod, tools, etc., weigh fourteen tons, and have bored sixteen feet per day.

IN Union Square, in this city, last Tuesday, a cannon was fired by electric power generated and sent from Niagara Falls, N. Y., the occasion being the opening in New York City of an electrical exposition. This ordinary occurrence, accepted as a matter of course, is far ahead of the most fantastic of any Oriental tale of magic.

STORIES of the finding of "lost mines" are usually prevalent, and in some cases, whether "lost" or not, the fact is evident that diligent prospecting is resulting in valuable finds. Marked copies of papers from every corner of the west half of America contain reports of finds that in many instances will result in a valuable prospect.

AT the Bald Eagle mine, Sum Dum, Alaska, thirty-five men are at work. A tunnel 5x7 feet has been driven into the mountain a distance of 1400 feet, and it is estimated that a further drive of 900 feet will tap the ledge at a depth of 500 feet, when, it is understood, the present capacity of the mill will be increased to forty stamps.

IT is again locally asserted that Supt. Babcock of the Golden Scepter mine at Quigley, Montana, eight miles from Bonita, a station twenty-five miles east of Missoula, is going to put in a 100-stamp mill. Considerable work is being done there, a flume 6x9 feet, seven miles long, is building, and an electric road of similar length is to be constructed.

JOHN J. JENKINS of the Cwmfelin Tin Plate Company, Limited, at Swansea, Wales, has issued a circular announcing the permanent closing of the concern. He states that the depression, coupled with the action of the men in stopping work after only twenty-four hours' notice, has led him to the conclusion that the best course will be to discontinue operations.

THE Secretary of the Interior has decided that the official survey of a mining claim must be in accordance with the recorded notice of location as of record at the time of the order authorizing the survey. In the absence of an organized mining district the record of a mineral location should be made in the recorder's office of the county in which the land is situated.

THE Governor of Chihuahua, Mexico, sent a regiment of troops to Mina Vejo to compel the peons to obey and rescue the miners. He had the police gather all the unemployed men in the city streets and march them to the mine to work. Of sixty-one entombed, fifty were taken out dead. The disaster was caused by encroaching for ore on the pillars supporting the roof.

THE Mineral Land Bill passed the Senate last Tuesday with an amendment including the State of Oregon in its provisions. It now goes back to the House of Representatives, as amended. It passed that branch of Congress in its original form, and may be acceptable to a majority of the members. Should it pass as amended, it only needs the President's signature to become a law.

THE future of the copper market hinges largely on the ability of Europe to absorb the heavy shipments of American copper. Production here is more than twice as great as the home consumption, and Europe should count on having to take care of fully 100,000 tons of fine copper from this country in 1896. More than 34,000 tons have been shipped abroad since January 1st, and fresh orders are again reported from foreign buyers this week.

THE sale of the Yellow Jacket gold mine of Yellow Jacket, Lemhi county, Idaho, to a New York syndicate representing $5,000,000 has finally been consummated. The cash transfer is $1,000,000. The former owners still retain a large interest in the property. The property consists of thirty-six lode claims, six placer claims, three mill sites and in all 800 acres. A townsite is being laid out on the placer claims. Government patents covering the entire property have recently been issued.

THE De Lamar, Idaho, Miners' Union organized with 140 members on the 1st inst. On the 2d the miners went out on a strike for an increase of 50 cents a day in wages and a reduction from $36.50 to $30 a month for board and hospital dues. Manager Plummer could not accede to the demand without authority from the home office in London, and the works were shut down pending the receipt of instructions. There has been no trouble, and none seems to be anticipated. The rate that has been paid for miners is $3, and for carmen $2.50 per day.

THE B. C. provincial parliament has adjourned. Among other mining legislation the following is important in that province: "Upon any dispute as to title to any mineral claim, no irregularity happening previous to the date of the record of the last certificate of work shall affect the title thereto; and it shall be assumed that up to that date the title to such claim was perfect, except upon suit by the attorney-general based upon fraud." According to that, the prospector need now only do $100 worth of improvement on his claim and record it.

DURING the week ending the 7th inst. six new mining papers have been received at this office. Nothing more strikingly illustrates the activity in mining than the great number of new publications devoted to mining matters. The MINING AND SCIENTIFIC PRESS welcomes these new recruits, wherever published, and, without the slightest jealousy, takes cordial pleasure in noting their advent. It extends greeting to all its contemporaries, whatever their age, and wants the only rivalry to be to see which can best aid the great mining industry of this country.

WITH pleasure this paper receives a multitude of commendations for the list of California mines and miners now appearing, and numerous additions and emendations from mining managers, superintendents and others. Any information will be gladly received regarding the name, location, character, etc., of any California mine, the name and postoffice address of the owner, agent or superintendent, for it is realized that no amount of individual care or research in preparing such a list can produce a result satisfactory or correct. Several such statements have been received from different parts of the State during the week and are gratefully acknowledged.

G. LANSELL'S No. 180 mine, at Bendigo, Victoria, is believed to be the deepest sole gold mine in the world. At a depth of 2,640 feet a diamond drill bore-hole was put down 500 feet perpendicularly below that, making 3,140 feet, when a thermal spring was cut. A further 210 feet makes the present depth, 3,350 feet. Crosscuts are being run at the 3,310 and the 3,200 levels. The "180" has 180 yards north and south on the New Chum and Victoria main line of reef. At the bottom of the shaft the rock is the hardest in the district. The water is very great and supplies the New Chum and Victoria crushing works, with more to spare. The cost of working this mine averages $5,000 per month.

SOME residents of Wahkiakum Co., Wash., have discovered what they think to be gold on the patented Northern Pacific Railroad lands in that county. They have located mining claims and recorded the same in the county auditor's office, and have now asked the Commissioner of the General Land Office if such claims can be held against the railroad company. The Interior Department holds that when land has been patented it is out of the jurisdiction of the Government, and that the patents can only be set aside in the courts. However, it is a settled question that mineral lands cannot be patented to the railroad company as a part of its grant, and if it could be clearly shown that the railroad company had obtained patents to mineral lands the patent would undoubtedly be set aside by order of the court.

THE Sonora *Democrat* editorially complains at some length that in the report of the gold output by counties for '95 Tuolumne is only credited with $650,000, and claims that interviews with leading gold producers of that county since the appearance of these figures justifies the statement that Tuolumne Co. in '95 produced in gold $1,300,000, one mine alone in that county shipping over $600,000 during ten months of '95 to San Francisco that did not go through Wells, Fargo & Co. Very likely. 'Tis probable that the recent figures were below the actual yield in a good many other counties as well as in Tuolumne: it is probable that the fifteen and one-third millions should have been eighteen to approximate California's gold yield last year, but no statistician, no Government report, no publication, can secure figures or facts that mine owners decline to give, and so long as gold producers neglect to furnish statistics, so long will the aggregate be underrated.

At the Republican Convention of this State which met at Sacramento during the week, to select delegates to the National Convention and formulate a party platform the following was made, next to the protection plank, the foremost piece of timber in the platform: THE MINES OF CALIFORNIA, WITH THEIR ANNUAL OUTPUT OF MANY MILLIONS OF DOLLARS, HAVE BEEN OUR FINANCIAL BULWARK IN TIMES OF ADVERSITY; THEY MAINTAINED THE NATIONAL CREDIT DURING THE DARK DAYS OF THE REBELLION, AND THEY FORM THE BASIS UPON WHICH THIS GRANDEST OF COMMONWEALTHS, CALIFORNIA, HAS BEEN REARED. THE MINING INDUSTRY OF OUR STATE SHOULD RECEIVE SUCH AID AND PROTECTION AS WILL INSURE ITS PERMANENCE AND PROSPERITY, AND FOR THAT PURPOSE WE FAVOR SUCH AID AND PROTECTION AS WILL RELIEVE THE MINER FROM UNNECESSARY BURDENS, ENABLE HIM TO OBTAIN AND DEVELOP HIS MINING PROPERTY, AND WILL PROMOTE AND ENCOURAGE THE BUSINESS OF ALL KINDS OF MINING, INCLUDING THAT KNOWN AS "HYDRAULIC MINING," WHENEVER AND WHEREVER THE SAME CAN BE CARRIED ON WITHOUT INJURY TO THE OTHER INTERESTS IN THE STATE.

TIREY L. FORD, who has been representing the miners' cause at Washington, D. C., since Feb. 18th, will return to this city next Monday. On the eve of his departure from Washington, last Tuesday, he said to an Associated Press representative: "The miners of California certainly have much cause for rejoicing over the splendid treatment they have received at the hands of the Fifty-fourth Congress. A bill to segregate and classify mineral lands within railroad land grants in California has passed both houses, and an appropriation of a quarter of a million dollars for the construction of restraining works has been incorporated in the River and Harbor bill and has successfully passed two committees and one branch of Congress, and nothing short of injudicious conduct on the part of its friends can dislodge it from the advantageous position it occupies. Other mining measures favored by our association at home have not reached so favorable a stage, for the reason that they have not been so urgently pressed. I am highly gratified at the progress made by the two principal measures to which I have alluded. Our successes have not only been gratifying, but in some degree, have surpassed our hopes." Secretary Sonntag last Wednesday wired Mr. Ford that the legislation was satisfactory to the California Miners' Association.

## Matte Smelting.

NUMBER IV.

Written for the MINING AND SCIENTIFIC PRESS by W. L. AUSTIN, Ph. D., Denver, Colorado.

The broad subject of patents and the intricate laws regulating their issue, use, and infringement is not usually matter for discussion in metallurgical handbooks. Wise men consult the lawyer and not the metallurgist when legal points are involved. Mr. Lang has strayed from his announced purpose,—"an essay which is professedly of a practical nature" (see page 75)—when he attempts the elucidation of matters relating to patents; and as this subject is of considerable interest to many, it might be well to test the correctness of his views on patent law in the light of the Statutes and of the decisions of the courts.

On page 49 of his book will be found the following: "the only patented features of any process being solely those novel mechanical principles which distinguish the different processes."

Now Section 4886 Revised Statutes of the United States, relating to the grant of patents, reads as follows: "Any person who has invented or discovered any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned, may upon payment of the fees required by law, and other due proceedings had, obtain a patent therefor."

In treating of this subject Simonds (*) states as follows: "An art, as the word is used in the patent statutes, means a mode or method or manner of accomplishing some certain result, in distinction from such result, and also in *distinction from the instrumentalities made use of* (**) in accomplishing that result. In some cases an art is a 'process' (Dolbear v. Tel. Co., 8 Sup. Ct. Rep., 778). 'A process' has been defined by the United States Supreme Court as follows: 'A process may be patentable, *irrespective of the particular form of the instrumentalities used.*' 'A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing. If new and useful, it is *just as patentable as a piece of machinery.* In the language of the patent law, it is an art. The *machinery* pointed out as suitable to perform the process may or *may not be new and patentable;* whilst *the process itself may be altogether new, and produce an entirely new result.* The process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence.' (Cochrane v. Deener, 94 U. S., 780). * * * The law not only makes patentable an art, a machine, a manufacture, and a composition of matter, but it also makes patentable any 'improvement thereof.' It is important that this is so, for it is very rare to find a patented thing which is a new thing in all its parts, and which is not simply an improvement on something which had prior existence. * * * That is not the way and manner in which invention commonly proceeds. It proceeds step by step; these steps follow one after the other in rapid succession and along the whole line of human activity, so that a short time suffices to advance that line over a wide interval; still the advance is step by step."

But Mr. Lang appears to differ from the authorities just quoted when he records *his* opinions that the only patentable feature of an art is "its novel mechanical principles." Quoting again from Simonds: "It is quite a common thing to hear persons speak of the 'principle' upon which a machine operates and even to speak of patenting such principle. Users of the word in this connection generally have no distinct and accurate idea of what they mean by such use, and because of the vagueness and mistiness which hang around the word, lawyers in patent practice and mechanical experts rarely use it."

To illustrate the absurdity of Mr. Lang's position relative to patentable things, the cases of a number of patented processes could be taken at random; for instance, the Harvey process for hardening the surface of nickel-steel plates, the Mond process or process for producing nickel carbonyl, or some that are perhaps better known in the West, as for instance the Russell process or the MacArthur-Forrest process. In the latter process (which is selected as an example simply because it is so widely known, and without any intention on the part of the writer to enter into any controversy which may exist between the patentees and those using the process) is instanced a valuable metallurgical advance, the introduction of cyanide of potassium for dissolving the precious metals out of their ores. Before its introduction by the patentees (at a heavy expense to themselves) the world was (to all intents and purposes) wholly ignorant of the great value of that reagent for the purposes to which the MacArthur-Forrest people have applied it. Now, the fact that cyanide of potassium would dissolve gold, etc., was nothing new, and certainly the rolls, tubs, launders, and other contrivances used in carrying out the process could not be brought under the caption, "novel mechanical principles;" but the adaptation of cyanide of potassium to the extraction of the precious metals from their ores upon a commercial scale was new and the world at large was materially benefited by the introduction of this *process* irrespective of the mechanical appliances by which the operations were carried out. By utilizing the so-called selective action of cyanide of potassium in treating auriferous material of various kinds it became possible to handle very low grade substances and the wealth and comfort of mankind were thereby increased and the object for which the patent laws were created has been attained in this instance at least. Therefore, without going into the legal merits of the case, the patentees are entitled in equity to some return for the benefit others are deriving from their work. This, however, Mr. Lang would deny them, since according to the views he has expressed—"the only patented features of any process being solely those novel mechanical principles which distinguish the different processes"—these patentees have nothing patentable.

Men who want to avail themselves of the work of others without making any return therefor, are attacking the MacArthur-Forrest patents both in this country and abroad; but it is a pleasure to note that they are not meeting with success, and that in the majority of instances those using the process prefer to consider the case as one calling for common honesty, and are paying a royalty to the patentees for the use of their invention.

Doubtless it would very convenient to Mr. Lang if he could induce others to accept his interpretation of the patent laws of this country, and doubtless also some unwise or selfishly interested persons will accept his statements, and in so doing will become liable to much unnecessary trouble; for they will find both the letter and the spirit of the law diametrically opposed to them.

Quoting again from Simonds: "The patent law does not exist for the benefit of inventors. It exists for the benefit of the public. The enlightened public selfishness which called that act into being was expressed in the organic law—in the Constitution of the United States—when Congress was therein authorized to secure 'for limited times to authors and inventors the exclusive right to their respective writings and discoveries,' in order 'to promote the progress of science and useful arts.' Thoughtful students of our national life have not rarely said that no other feature of our institutions has played so great a part in the development of the splendid material prosperity of the nation as our wise patent laws and *their kindly construction by the courts.*"

The disposition of so many men to avoid legal recognition of patents which in the end must conduce to the general welfare, is a serious impediment to metallurgical advance, because too often nowadays when a discovery or invention of importance is made, every effort is also made to keep the matter a secret, and the world at large is therefore debarred from its use. It is becoming more and more difficult to gain admission to metallurgical establishments because the managers of such works prefer to keep the results of their experience (which as a rule have been dearly purchased) as secrets, rather than trust to the protection of patents. They dislike to part with these secrets, because, no matter how good the claim to patent rights may be, some interested individual (usually with more ingenuity than principle) is pretty sure to declare it worthless both legally and practically,—and then proceed to use it without paying for it. If the metallurgical engineer on his travels is refused entrance to the works he desires to visit, or is hurriedly shown through unimportant parts of them, he is mainly indebted for his disappointment to this class who may be justly designated the sharks of the profession.

Mr. Lang's position, that only the novel mechanical principles of a process are patentable, is clearly an untenable one, and it is to be hoped that other statements in his work have a better foundation in fact. This may be further discussed by the writer in future articles; but one case will be noticed now in which his statement is more than doubtful, as witness the following quotation from page 49:—"I need hardly add that the methods of heating the blast are in no case distinctive of any process of pyritic smelting; and I may say further that the application of the hot blast to this form of smelting has not been patented to any person," etc. The evident intention of Mr. Lang is to convey the idea that the application of the hot-blast to that method of smelting sulphides in which the iron and sulphur furnish the greater part, practically all, of the heat used, is not distinctive of *any* process of *pyritic* smelting.

It is difficult to understand how he can reconcile such a statement with the claims set forth in the specifications of U. S. patent No. 453,529 (application filed February 28, 1889). Claim 1 (see page 3 of said specifications) reads as follows: "Having thus described my invention, what I claim is—1. As an improvement in the art of smelting pyrites, blende, sulphurets, or sulphides, the method of securing continued combustion and smelting without the necessity of continued use of carbonaceous fuel, which consists in first heating the lower part of the charge containing one or more of the substances or compounds up to a point where combustion can take place *and then subjecting the charge to the action of a hot air blast* and continuously drawing the molten products as formed away from the path of the blast, substantially as and for the purpose specified."

From the wording of this claim it is evident that it was the purpose of the inventor to smelt sulphide ores, etc., without the "continued use of carbonaceous fuel" in his furnace. Now, to keep up a smelting operation by the fuel qualities of sulphides in place of coke or charcoal, in other words, to produce commercial results by such a method as is described in the claim quoted, is an utter impossibility without the use of the hot-blast, and its use is the main factor of the claim. Of this fact anyone can easily satisfy himself by experiment. Therefore, as the claim referred to is a patented claim, and as the use of the hot-blast is an essential feature of the process—in fact, a *sine qua non*—its use for the purpose specified is necessarily a part of the specification. That this is the case is all the more apparent if the hot-blast feature is cut out of the claim, for then the claim becomes an absurdity and the process a metallurgical impossibility. The use of *the hot-blast is the essential feature of the process described* and its employment for the purpose indicated is clearly intended to be granted by the said letters patent to the patentee. For this process differs from all other pyritic smelting methods suggested previously; and the word "suggested" is used advisedly because until this process was introduced there never was a practical way found for utilizing the fuel qualities of pyrites for smelting purposes. All the various ideas suggested from time to time were wholly unproductive of commercial results. Therefore, the hot-blast *is* distinctive of, and inseparable from, *one* process of pyritic smelting, Mr. Lang to the contrary notwithstanding; furthermore, the application of the hot-blast to this one process of smelting is covered by U. S. patent; and, lastly, this is the only process that has produced commercial results up to the present time, and has proved itself to be not only "professedly" but *really* of a "practical nature."

It goes without saying that any person using this patented process without the consent of the owners is amenable to the laws of this country. The employment of small amounts of coke, or other carbonaceous fuel, in a furnace charge consisting essentially of raw sulphides,—either because the apparatus used is not suitable for their combustion, or for the purpose of evading the patent, does not evade the penalties of infringement. "Imperfect production of the proper result of a patented machine does not avoid infringement." (Mach. Co. v. Binney, 5 Fish. P. C., 166). "An inventor is entitled to all the legitimate results of the invention covered by his patents, including even those which were not foreseen by him." (Thomas Meter Co. v. National Meter Co., 65 Fed. Rep., 427). "A thing infringes a patent if it infringes any claim of a patent, and patents sometimes have many claims, so that each claim is to be considered by itself on this question of infringement."

Mr. Lang evidently considers that his statement regarding the patentability of things definitely disposes of the whole matter, for he not only appropriates the hot-blast to his own requirements in what he is pleased to denominate "the Gradual Reduction Methods—Hot Blast. (b) (Hypothetical)," but he invites others to share with him the benefits to be derived from its free and unrestricted employment. His invitation is issued in the following form: "Metallurgists, therefore, are not debarred from the employment of the heated blast as a means of pyritic smelting." But it would be well for Mr. Lang, before engaging in any extensive reduction of ores by that method, to produce stronger proof than any he has yet shown, that the hot-blast when applied to the smelting of raw sulphide ores, producing thereby commercial results that cannot be realized in any other manner, was not a patentable novelty previous to Feb. 28, 1889; and it would also be wise to remember that "Officers of a corporation who have participated in an infringement are per-

(*)A condensed treatise on the law of patents for useful inventions, by W. E. Simonds, Ex-Commissioner of Patents, author of "Digest of Patent Cases," etc.

(**)These and all other italics in this paper are the writer's.

sonally liable." (Car Brake Co., v. M'f'g. Co., 19 Fed. Rep., 514).

The Hollway process has been referred to in connection with the method of smelting set forth in U. S. patent specifications No. 453,529. These two processes are entirely distinct as will become apparent to any unprejudiced investigator upon the examination of the claims set up in each case. The following table is given in order to indicate in a convenient form the differences between the two processes:

COMPARISON OF PYRITIC SMELTING PROCESSES.

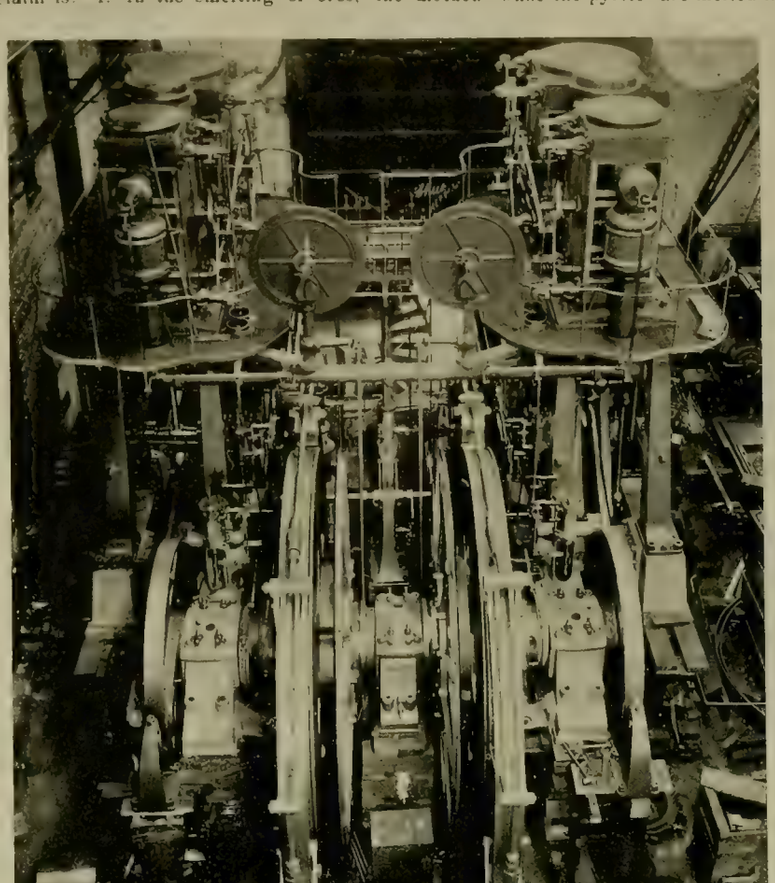
| | Hollway's Process | Process Described in U. S. Pat. Spec. No. 453,529. |
|---|---|---|
| Style of apparatus in which the process must of necessity be carried out. | Converter. | Blast-furnace. |
| Use of bath of molten sulphides as a heat generator. | A necessity. | Not used for purpose specified. Can be omitted. |
| Method of heating the air-blast. | By blowing into and through a bath of molten sulphides. | By combustion of fuel in suitable apparatus outside of furnace. |
| Use of the hot-blast. | Optional—not a necessity and not set forth in the patented claims. | A necessity when no fuel is used in the furnace. |
| Results obtained. | NIL | A pronounced success—large quantities of material being treated under this patent in the United States alone. |
| Action of silica. | Of secondary importance—takes up the iron - protoxide on the edges or top of the bath. | Assists in the decomposition of the sulphide and by being distributed throughout the charge prevents the formation of ferric oxide to a great extent. |

To carry out the Hollway process a bath of molten sulphides must be provided and no combustion of the pyrites is attempted until after they have been fused and are collected in such a bath. To burn the sulphides, air is forced into and through this bath, and it becomes heated by contact with the same in its passage through the fused mass. In all of Mr. Hollway's work, and wherever he introduced the process, he used the molten bath as a heat generator and employed furnaces constructed upon the converter principle.

With all respect to Mr. Hollway, whose experimental work along the lines of pyritic smelting is worthy of the highest praise, it must be said that wherever his process was introduced the results were disappointing, and the technical periodicals of those years in which Mr. Hollway was actively engaged upon this work contain many references to these failures, and to the ultimate abandonment of the project. These failures, however, throw no discredit upon Mr. Hollway but were the unfortunate result of his adoption of furnaces with converter hearths. Had he employed the blast-furnace with proper modifications instead of the converter, and had he in addition preheated his air-blast, and, most important of all, had he operated direct upon the pyrites themselves instead of upon a bath of fused sulphides, his success would have been fully equal to his anticipations. But even as it was, the description of his experiments published in the Journal of the Society of Arts, is by far the best treatise upon the subject of pyritic smelting which has yet appeared; in fact, it is the only truly scientific essay upon this subject. It is written by a scientific man for the purpose of imparting information and is replete with useful experimental data.*

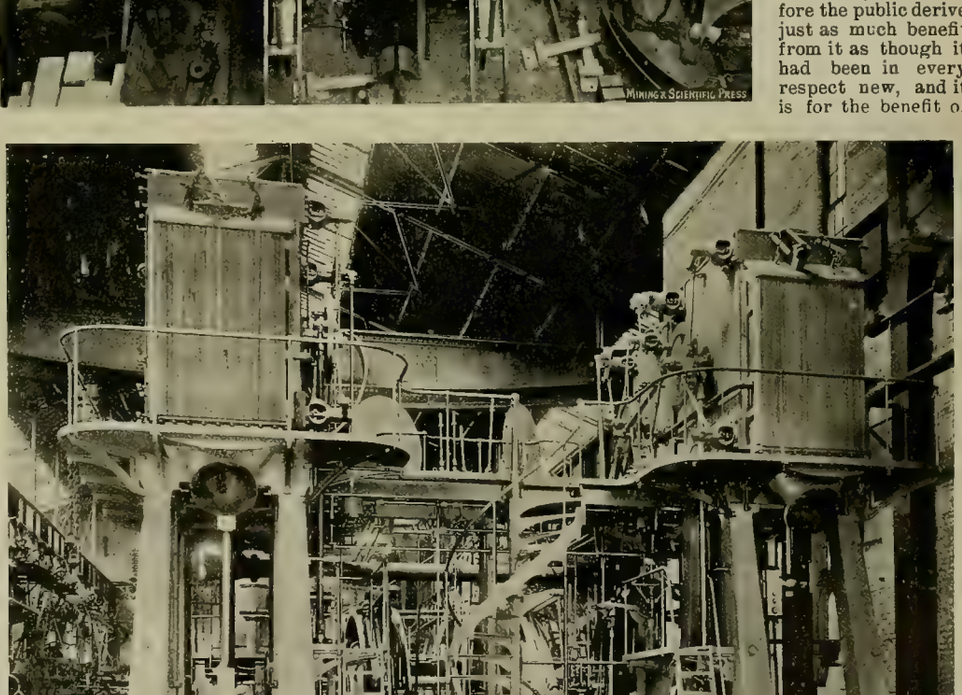
The complete failure of the process introduced by Mr. Hollway, and the success attained in the same field by the process described in U. S. patent No. 453,529 emphasizes the radical difference existing between those two methods of reduction in the most practical manner; for where one method fails and another succeeds, there must be a radical difference between them. Should anyone doubt that there *is* such a difference, it is only necessary to try the process described by Mr. Hollway and then compare the results produced with those which can be, and are obtained by following the specifications of U. S. patent No. 453,529 and he will convince himself in a thoroughly conclusive though perhaps uncomfortably expensive manner.

That Mr. Hollway considered the use of a molten bath of sulphides as essential to his operations is evident from the following clauses taken from his patent specifications: "When commencing the operation I smelt a quantity of pyrites by means of carbonaceous fuel until a bath of molten sulphides has collected or formed on the hearth. * * * I employ furnaces of sufficient depth or height, so that the free oxygen of the air blown in, neither comes into contact with the pyrites nor with the sulphur liberated." From the use of this language it is perfectly clear that Mr. Hollway purposely avoided blowing air into or upon the pyrites themselves, but regulated the depth of the bath of molten sulphides, and the pressure of his blast, so that *all* of the oxygen of the latter should be consumed in passing through the bath and therefore *none could reach the pyrites*. But if there is any doubt upon this matter reference to the claims of the patentee sets it at rest. "Having now described my invention, what I claim is: 1. In the smelting of ores, the method herein described * * *, *which method consists in forcing a blast of air or other oxidizing gas through the molten mass.* * * * * * * 4. In the extraction of copper and other metals, as also sulphur, from pyrites, the continuous process hereinbefore described, which consists *in first forming a bath of molten sulphide* of iron, as set forth, *then passing an oxidizing gaseous agent*, such as a blast of air, or air and steam, *through the liquid*, and gradually introducing the pyrites, or the pyrites and other metalliferous or slag-producing substances, into it, whereby part of the sulphur is distilled by the heat of the bath while the pyrites are melted in said bath of sulphide under the action of said blast of air, or air and steam, and part of the remaining sulphur is obtained in the form of sulphurous acid or sulphureted hydrogen, while the metals less oxidizable than iron originally contained in the pyrites and other substances employed are obtained as a regulus and the combustion is maintained by the oxidization of the pyrites introduced, and the latter is thus utilized in lieu of carbonaceous fuel, as set forth."




But assuming for the sake of argument that U.S. patent No. 453,529 is only an improvement upon the process described in Mr. Hollway's patent specifications, still (as has been already shown) an improvement in an art is patentable under the United States Revised Statutes, and an "improvement" which makes a practical method of ore reduction out of an impractical one, has all the essential virtues sought in a new invention, and therefore the public derive just as much benefit from it as though it had been in every respect new, and it is for the benefit of the public that the patent law exists. To quote the words of a celebrated metallurgist: "I hold that the true author of a process is the one who, seizing an idea, often well known, studies it, and by his labor succeeds in transforming it into a practical method, yielding good results and realizing an important economical progress." W. L. AUSTIN.

Denver, March 14, 1896.




THE MODOC AND THE AZTEC, THE LARGEST HOISTING ENGINES IN THE WORLD.

(See page 373.)

*This subject is also very competently handled, in a popular style, by Mr. Philip Argall, in the Engineering Magazine of April, 1894.

# Electrical Progress.

## On Apparatus for Cathography.

By NIKOLA TESLA.

In order to produce the most intense effects, we have first to consider that, whatever their nature, they depend necessarily on the intensity of the cathode streams. Then, again, being dependent on the magnitude of the potential, it follows that the highest attainable electrical pressure is desirable.

To obtain high potentials we may avail ourselves of an ordinary induction coil, or of a static machine, or preferably of a disruptive discharge coil. If we put two electrodes in a bulb, or use one inside and another outside electrode, we limit the potential, for the presence not only of the anode, but of any conducting object, has the effect of reducing the practicable potential on the cathode. Thus, to secure the result aimed at, one is driven to the acceptance of a single electrode bulb, the other terminal being as far remote as possible.

Having selected the induction apparatus and type of bulb, the next important consideration is the vacuum. On this subject I am able to make known a fact with which I have long been acquainted, and of which I have taken advantage in the production of vacuum jackets and incandescent bulbs, and which I subsequently found to be of the utmost importance, not to say essential, for the production of intense Roentgen shadows. I refer to a method of rarefaction by electrical means to any degree desirable, far beyond that obtainable by mechanical appliances.

Though this result can be reached by the use of a static machine, as well as of an ordinary induction coil giving a sufficiently high potential, I have found that by far the most suitable apparatus, and one which secures the quickest action, is a disruptive coil. It is best to proceed in this way: The bulb is first exhausted by means of an ordinary vacuum pump to a rather high degree, though my experiences have shown that this is not absolutely necessary, as I have also found it possible to rarefy, beginning from low pressure. After being taken down from the pump, the bulb is attached to the terminal of the disruptive coil, preferably of high frequency of vibration, and usually the following phenomena are noted: First, there is a milky light spreading through the bulb, or possibly for a moment the glass becomes phosphorescent, if the bulb has been exhausted to a high degree. At any rate, the phosphorescence generally subsides quickly and the white light settles around the electrode, whereupon a dark space forms at some distance from the latter. Shortly afterwards the light assumes a reddish color and the terminal grows very hot. This heating, however, is observed only with powerful apparatus. It is well to watch the bulb carefully and regulate the potential at this stage, as the electrode might be quickly consumed.

After some time the reddish light subsides, the streams becoming again white, whereupon they get weaker and weaker, wavering around the electrode until they finally disappear. Meanwhile, the phosphorescence of the glass grows more and more intense, and the spot where the stream strikes the wall becomes very hot, while the phosphorescence around the electrode ceases and the latter cools down to such an extent that the glass near it may be actually ice-cold to the touch. The gas in the bulb has then reached the required degree of rarefaction. The process may be hastened by repeated heating and cooling and by the employment of a small electrode.

I may state here that the experimenter need not be deterred from using a glass bulb, as I believe the opacity of glass, as well as the transparency of aluminum, are somewhat exaggerated, inasmuch as I have found that a very thin aluminum sheet throws a marked shadow, while, on the other hand, I have obtained impressions through a thick glass plate.

The above method is not only valuable as a means of obtaining the high vacua desired, but it is still more important, because the phenomena observed throw a light on the results obtained by Lenard and Roentgen.

Though the phenomenon of rarefaction under above conditions admits of different interpretations, the chief interest centers on one of them, to which I adhere—that is, on the actual expulsion of the particles through the walls of the bulb. I have lately observed that the latter commences to act properly upon the sensitive plate only from the point when the exhaustion begins to be noticeable, and the effects produced are the strongest when the process of exhaustion is most rapid, even though the phosphorescence might not appear particularly bright. Evidently, then, the two effects are closely connected, and I am getting more and more convinced that we have to deal with a stream of material particles, which strike the sensitive plate with great velocities. Taking as a basis the estimate of Lord Kelvin on the speed of projected particles in a Crookes' bulb, we arrive easily by the employment of very high potentials to speeds of as much as a hundred kilometers a second.

It may not be known that even an ordinary streamer, breaking out suddenly and under great pressure from the terminal of a disruptive coil, passes through a thick glass plate as though the latter were not present. Unquestionably, with such coils pressures are practicable which will project the particles in straight lines even under atmospheric pressure. I have obtained distinct impressions in free air, not by streamers, as some experimenters have done, using static machines or induction coils, but by actual projection, the formation of streamers being absolutely prevented by careful static screening.

A valuable evidence of the nature of the radiations and progress in the direction of obtaining strong impressions on the plate might be arrived at by perfecting plates especially sensitive to mechanical shock or impact. There are chemicals suitable for this, and the development in this direction may lead to the abandonment of the present plate. Furthermore, if we have to deal with streams of material particles, it seems not impossible to project upon the plate a suitable substance to insure the best chemical action.

By exposing the head to a powerful radiation strange effects have been noted. For instance, I find that there is a tendency to sleep and the time seems to pass away quickly. There is a general soothing effect, and I have felt a sensation of warmth in the upper part of the head. An assistant independently confirmed the tendency to sleep and a quick lapse of time. Should these remarkable effects be verified by men with keener sense of observation, I shall still more firmly believe in the existence of material streams penetrating the skull. Thus it may be possible to project a suitable chemical into any part of the body.

Since my above-mentioned discoveries I have made considerable progress, and can presently announce one more result of importance. I have lately obtained shadows by reflected rays only, thus demonstrating beyond doubt that the Roentgen rays possess this property. One of the experiments may be cited here. A thick copper tube, about a foot long, was taken and one of its ends tightly closed by the plate-holder containing a sensitive plate, protected by a fiber cover as usual. Near the open end of the copper tube was placed a thick plate glass at an angle of 45° to the axis of the tube. A single terminal bulb was then suspended above the glass plate at a distance of about eight inches, so that the bundle of rays fell upon the latter at an angle of 45°, and supposedly reflected rays passed along the axis of the copper tube. An exposure of forty-five minutes gave a clear and sharp shadow of a metallic object. This shadow was produced by the reflected rays, as the direct action was absolutely excluded, it having been demonstrated that, even under the severest tests with much stronger actions, no impression whatever could be produced upon the film through a thickness of copper equal to that of the tube. Concluding from the intensity of the action by comparison with an equivalent effect due to the direct rays, I find that approximately two per cent of the latter were reflected from the glass plate in this experiment.

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EDISON has often been accused of a proclivity for "talking to the gallery," and much of the recent newspaper description of his work on the X rays, ostensibly based on conversations with him, would tend to encourage this idea. For all that, Edison is just now doing scientific work which no amount of newspaper perversion can belittle, and which is of value to the world. Roentgen made public his X rays, and Salvioni forthwith found in the cryptoscope a method by means of which hidden objects could be made visible, and the time and trouble of taking photographic plates saved. Edison at once set himself to work to make this scientific device of practical use. This he has done. His fluoroscope, used in conjunction with the X rays, shows bones and other hidden objects so distinctly that doctors can now see the nature and extent of fractures to be treated, and need no longer depend upon touch alone. The fluoroscope consists of a flaring box, curved at one end to fit over the forehead and eyes, like the stereoscope. The end of the box is closed by a pasteboard cover, on the inside of which is spread a layer of tungstate of calcium, which material Edison reports he has found to possess six times the fluorescing power under the influence of the X rays of the barium platino-cyanide used with the cryptoscope. Without a vivid fluorescence of the substance upon which was thrown the shadow of the object to be seen, such an instrument as this would be of little real service. The amount of experimentation which had to be done in finding a material six times as sensitive to fluorescence as barium platinocyanide, can hardly be realized by any one unacquainted with Edison's extraordinary industry and capacity for work. While this special series of experiments were going on, a visitor to the laboratory found Edison holding in his hand the box which ultimately became the framework of the first fluoroscope. In front of him were a number of slides containing rows of discs of different materials. These slides were one by one being slipped into the broad end of the box, and examined by Edison as the Roentgen rays played upon them. The degree of the fluorescence of the respective discs was noted and a record of any distinctive characteristics was made by an attendant for future reference. Five hundred different materials were being tested at that time, and before them no less than 1,800 distinct substances had been critically examined by Edison, as they were passed under the Roentgen rays. Even this incident gives but a faint idea of the laborious investigation which is often necessary before a scientific toy can be made of real service to mankind.

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AN electric furnace for the reduction of iron ores has been devised by Herr Unbanitzky. It is made large enough for the action to be continuous and on the necessary large scale, the carbons entering from the top and being supported from a disk that can be revolved around a vertical axis. Such a furnace has important advantages for obtaining very pure iron. Only one man is necessary, and with 500-horse power about 220 pounds of pure iron can be produced in twenty-four hours.

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IN the wire industry electricity is now used to anneal rods. Bending a wire rod while subjected to red heat causes slag scale, and oxidated particles adhering to it to drop at and near the bend. To this observation the invention owes its origin. The heat is to be applied by electric current. The rod is reeled off the coil without previous subjection to the acid bath, and on its way is brought in contact with the electric current, which, owing to the resistance offered by the rod, causes it to be heated to a degree controlled by the usual means of regulation through voltage. Passing on its way from this point the red hot rod is fed to a set of suitable rollers, by means of which every portion of it is bent, which loosens and removes the scale. The rod is then further passed through wire brushes and other appropriate cleaning apparatus, issuing from these as a pure, soft wire rod ready for drawing. After the current of electricity has given it the red heat the rod may be passed through rollers to reduce its diameter, thus further saving labor and expense. This process can, of course, be repeated whenever through the application of the drawing block the rod has become too brittle.

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F. N. DELANCY, representing the Fort Wayne Company, says he will put in an extensive electric light plant in Alameda, Cal., to furnish electricity for cooking, heating and lighting, complete in every detail and at a low rate. The company is to be incorporated with a capital of $100,000.

# Scientific Progress.

## Man's Chemical Composition.

It is interesting to consider the human being from a purely chemical standpoint, figuring on how many ounces and pounds of the various minerals and metals there are in the make-up of the average genus homo, as well as the number of feet of gas, etc., his body contains. Pope declares that the proper study of mankind is man, and Huxley says there is no more fascinating page in the bypaths of science than that which tells of what man is composed. Huxley's table on the "Chemical composition of man of the average weight of 154 pounds" was for years the standard by which all scientists gauged the mineral and metal worth of men who were worthless otherwise. Huxley's table was formerly standard, but has recently been superseded by a new one compiled by the Paris Academy of Sciences. The table is appended:

CHEMICAL ELEMENTS IN MAN.

| *Elements.* | *Pounds.* | *Ounces.* | *Grains.* |
|---|---|---|---|
| Oxygen | 111 | 8 | 0 |
| Hydrogen | 21 | 6 | 0 |
| Carbon | 21 | 0 | 0 |
| Nitrogen | 3 | 10 | 0 |
| Phosphorus | 1 | 2 | 88 |
| Calcium | 2 | 0 | 0 |
| Sulphur | 0 | 0 | 219 |
| Chlorine | 0 | 2 | 47 |
| Sodium (salt) | 0 | 2 | 116 |
| Iron | 0 | 0 | 100 |
| Potassium | 0 | 0 | 290 |
| Magnesium | 0 | 0 | 12 |
| Silica | 0 | 0 | 2 |
| Totals | 154 | 0 | 0 |

## Carbide of Calcium — Acetylene Gas.

The *Progressive Age* presents the report of a commission which that journal recently sent to Spray, N. C., to investigate acetylene. The decision of the commissioners is thus set forth:

| | |
|---|---|
| Materials per day and per ton of gross carbide | $14.39 |
| Labor per day and per ton of gross carbide. | 11.00 |
| Water power, 1,229 5-365 | 3.37 |
| Petty stores, waste, etc., $150 per annum | .41 |
| Taxes at $100 per annum | .274 |
| Interest on investment at 5 per cent, $11,955. | 1.638 |
| Depreciation and repairs, 5 per cent on electric plant and turbine | 1.218 |
| Six per cent on countershafting, building, rolls and crusher | .446 |
| Twenty per cent on furnaces | .021 |
| Total | $32.767 |

Its estimate of the cost of producing calcium carbide at Spray—by working the furnaces 365 days a year and 24 hours a day, yielding on the average one ton of 2,000 pounds gross carbide a day—is thus $32.767 per ton. Of this amount $14.39 is for material. The freight charges on lime and coke are heavy at Spray and add materially to the cost.

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A DELEGATION of scientific men headed by Professor Mendenhall, ex-superintendent of the Coast and Geodetic Survey, were recently given a hearing by the sub-committee of the Senate Committee on Finance, in advocacy of Senator Cannon's bill for the

adoption of the metric system by this country. They based their advocacy of the change upon the theory that the system would be far more satisfactory than the present system, and said the longer the change was postponed the more difficult it would be to make it. Senator Sherman, as chairman of the sub-committee, said it was too late to give the measure consideration at the present session.

ONE of the most persistent superstitions associated in the popular mind with electricity is that this science "is only in its infancy." This apothegm has lately been indignantly and completely confuted by Professor Crocker of the well-known Franklin Institute, Philadelphia. An observation recently published in relation to the science of electricity to the following effect—"that in a department of knowledge whose principles are yet obscure, any moment may give birth to a discovery revolutionary in its consequences"—was regarded by Professor Crocker as a libel on the profession of electrical engineering. Professor Crocker maintained that electricity as a science is one of the most exact of the known sciences, and second only to astronomy. The most important test of the exactitude of a science, Professor Crocker contended, is the power of prediction. In this, electricity is maintained to stand pre-eminent, because the economy of a dynamo or motor can to-day be calculated from the drawings before the machine is built with a precision not attainable by any other form of mechanism.—Industries and Iron.

## Mechanical Progress.

### Government Engineering Contracts in England.

One very excellent reason why Government contracts in England, at least those pertaining to naval construction, are not popular with, nor specially sought after by, some of the foremost engineering firms of that country, has been furnished by the experience that Messrs. Yarrow & Co., the well-known torpedo-boat builders, have more recently gone through with the British Admiralty, and which is about as unique as it is condemnable. Messrs. Yarrow & Co., as is pretty generally known, were the first, several years ago, to turn out vessels of the torpedo-boat destroyer type. The success attained by these was remarkable at the time, and more recently, therefore, it was determined by the Admiralty to order a large number of them, of the latest and still further improved Yarrow design, and to extend the orders for them to builders of larger vessels in the northern shipbuilding districts, who, it is admitted, did not then have much experience with craft of this kind. Instead, however, of inviting these newer firms to submit designs of their own, the Admiralty, with, no doubt, laudable intentions so far as the good of the Department and of the country was concerned, but with entirely unwarrantable freedom with some one else's property, proceeded to have Messrs. Yarrow's drawings—which had been confidentially submitted—traced and distributed among those other establishments. It is not to be wondered at that Messrs. Yarrow have most emphatically protested against this strange proceeding, which may well put other builders of original machinery on their guard when dealing with the Government. Had the latter acquired property rights in the drawings there might have been no question as to its privilege to make any use of them that it thought proper. As it is, however, the Admiralty used documents confidingly submitted to them as though they were their own. Certainly, no argument seems necessary in this case to convict them of having been guilty of a practice which every right-thinking contractor will condemn, even though he may have profited by it. What the Admiralty has done in this instance appears to be but a sample of other similar methods followed by it for years, less seriously aggravating, perhaps, but none the less unworthy of a great Government. The result is already apparent by the preference which is shown by some of the prominent English contractors for the work of other Governments, and this preference may be expected to increase largely if the universal distribution system of one contractor's drawings among his competitors is to be followed in future.—Cassier's Magazine for May.

A FRENCH physician has a plan whereby every one may become, as he will, his own life preserver in case of an accident at sea. The inventor does away with all artificial belts and other floating appliances, and proposes to inflate the cellular texture beneath the human skin on the breast, which, if filled with air, forms a natural pneumatic belt, by the aid of which one can not only float oneself, but even support another body; that a man weighing about 160 pounds needs only about 200 cubic inches of air within his body in order to float with his head above water. This amount of air is easily inserted into the hollow space beneath the skin by means of an aseptic syringe. Simpler still is the use of a hollow needle and a thin rubber hose 18 inches long, into which this needle is inserted. A little aseptic cotton placed in the open end of the rubber hose is all that is required. The skin is raised, the hollow needle introduced into it, and then the other end of the rubber tube taken into the mouth, and the man's own breath blown into it. Two deep respirations which are blown into each side of the breast would, he thinks, be sufficient to float a man however heavy.

NAVAL ENGINEERS are interested in the results of a forthcoming experiment at the Brooklyn navy yard of a machine designed to send a vessel through the water without the aid of propellers. The test is to be made by order of Secretary Herbert, and the device will, by election of the inventor, be fitted into a 28-foot boat, although the Department would prefer the use of a 104-foot boat, which is now at the yard. By burning oil, gas is generated, which enters into a cylinder. There it is ignited by means of an electric spark. The force of repeated explosions drives the piston up and down. As the result of the explosion a jet of air is blown out of a tube in the stern of the vessel and the resistance of the water causes the boat to move forward. The engineering experts say that the invention, which has been tried privately, does not give much promise of usefulness in naval warfare, but the inventor claims that it will be of great service in torpedo boats and that, with his device, they can be driven noiselessly and at a phenomenal rate of speed.

## Practical Information.

PROF. THOMPSON believes that all planets will eventually come to a standstill, that a day will arrive when the great system of worlds will cease to revolve upon their axes and to make their regular periodical revolutions around the sun. When that time comes, if it ever should, all motion will cease and the universe will be at rest. Our finite minds cannot comprehend such a state of affairs, but scientists furnish evidence that such an era is approaching. Primarily the case interests us only so far as it applies to the motion of our own little world, but we have been told that whatever affects the other spokes of the great wheel will surely affect us sooner or later. So it is with our world as respects the others. If there is a retarding medium in space that is causing a gradual slowing up of the earth's movements, as astronomers declare, that same medium is at work slowly but surely decreasing the axial and other motions of the sun and his whole vast systems of worlds. Newton's mind conceived the idea that the friction of the tides and other forces calculated to retard motion were having their effect on the earth's axial as well as its annual revolutions, but the majority of thinkers of his time and the last hundred years have argued that such motion will continue forever. Within the past decade, however, there has been a change of sentiment on that score. It now appears certain, from calculations made by Astronomers Ball and Hutchins of England and Prof. Adams of the United States Observatory, that the earth is now losing speed at the rate of one hour every 16,000 years. When the loss is so slight it appears that it can be of no particular moment to us. At best we will only live a tithe of the period which it takes to lose that hour, and the whole of the twenty-four hours must be lost before motion entirely ceases. But all should have an interest in the ultimate fate of the old world and of the universe in general; therefore it is interesting to know that there is as much as a minute lost in the course of even 100,000 years. Whatever the loss is, it eventually means a cessation of motion and a general standstill. If this period of planetary rest should ever come, what will be the result? Will the great worlds and suns hang in space—the planets freezing on one side and burning up on the other—or will they fall down, down, down, forever? But let us see: In such a case gravitation would cease to exert its influence. Then there would be no "up" or "down."

THE influence of the direction in which the human body reclines in sleep, though often discussed, is doubtless generally regarded as a very trivial question. So eminent a medical man as Sir B. W. Richardson has taken up the matter, however, and declares that the effect of the earth's rotation has not been properly investigated, and that it is probably of much importance, especially to invalids, feeble and sleepless people. The rapid motion of the earth tends to affect the circulation. The blood is inclined toward the head or away from it, according as the head is placed toward the east or the west, and Dr. Richardson finds he sleeps most comfortably, and awakens more readily, with the head in the westerly direction. Another curious fact connected with the earth's rotation is the temporary uneasiness of animals about an hour before dawn, no matter at what hour this occurs. Children turn and moan, elderly people awaken and turn over for another sleep, cocks crow, dogs become uneasy, and horses and cattle move about for a short period, when stillness returns for a time. What is the cause? Are the animals, it is asked, affected by some magnetic wave which precedes sunrise an hour or so, or is the habit one of heredity, passed down through numberless generations from an original wild state, when an alertness just before daylight was necessary for protection from enemies?

WITHIN the twenty-four hours which elapse from one sunrise to another the astronomers of the world have not less than 20,000,000 stars within the range of their powerful telescopes, which today point out in all directions towards the blue canopy which overhangs the earth. These bright, shining, silvery disks are each a burning central sun, surrouuded with its own colony of planets, each of these 20,000,000 communities of the skies having its allotted part to perform in the economy of nature. When we consider that the nearest of these is 250,000 times as far away from us as our own light and life giver, and that each of those planetary colonies is from 10,000,000 to 500,000,000 miles from some other family of swinging worlds, we begin to get some light conception of the grandeur and magnificence of the universe. Another thought in this connection: Each of these 20,000,000 suns is known to be moving somewhere through illimitable space, taking its brood of worlds with it, some of them traveling upwards of 200,000 miles an hour. It is such stupendous facts as these that have caused the writer to often remark that no brain can conceive of what is meant by "space," "universe" or "eternity,"

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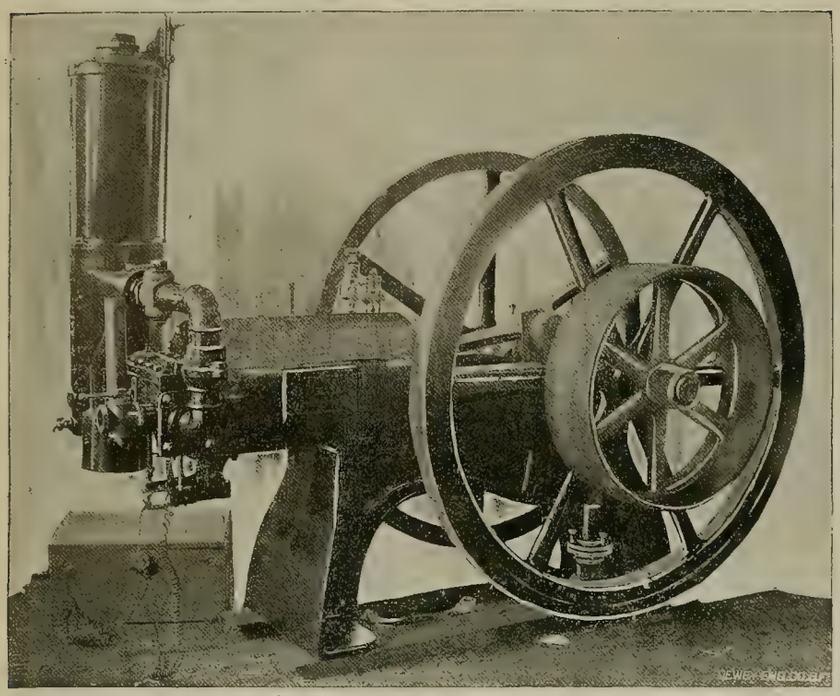
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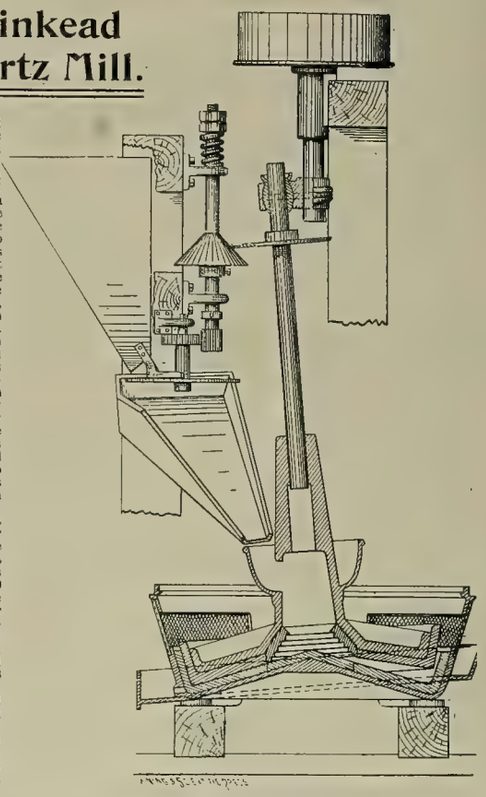


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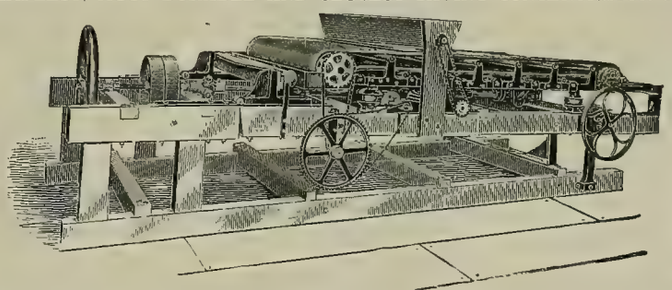
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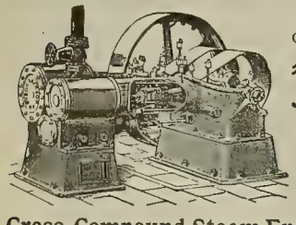
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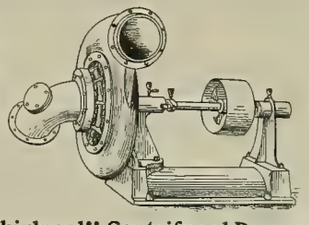
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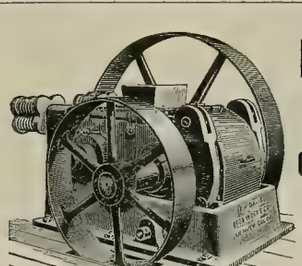


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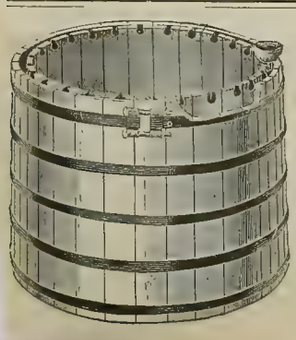
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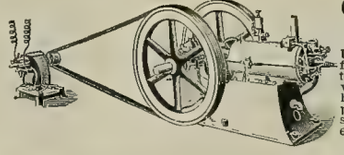
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## Coast Industrial Notes.

—The *Investor* reports that for the first fifteen weeks of 1896 San Diego city has taken out $301,000 of building permits.

—Northern California hears that the State division of the S. P. road is to be incorporated with the Oregon part of the road, under the management of R. Kohler.

—The A. T. & S. F. is credited with intention to build from Magdalena, rather than pay $15,000 a mile for the Atlantic & Pacific road, to be sold under foreclosure early in July.

—The Victor, San Bernardino Co., reservoir project has received recent impetus. The company proposes to impound 185,000,000,000 gallons of water from the Mojave river for irrigation purposes.

—This year's fair at the Mechanics' Pavilion in this city is to be held jointly by the Mechanics' Institute and the Manufacturers' and Producers' Association and none but Pacific coast exhibits will be made.

—Some months ago the MINING AND SCIENTIFIC PRESS had an account of a French civil engineer who had, it was claimed, solidified crude petroleum for fuel purposes. The Riverside, Cal., *Press* states that a man in that city has been experimenting that way and succeeded in turning out some sample bricks that will double in fuel value the same bulk of coal, and that it can be produced so as to be sold at $5 a ton.

—The World's Proctor Memorial Association has announced that it will erect the largest observatory in the world on the summit of Mount San Miguel, near San Diego, Cal., as a memorial to the astronomer and author, Richard A. Proctor. The association was organized some years ago in this State, but it is proposed to make the observatory of an international character, and secure, if possible, the co-operation of the leading Governments of the world. The intention is to equip the institution with the largest telescopes constructed on the sectional lens principle invented by Prof. Gathman of Chicago. Mount San Miguel comprises about 12,000 acres and has an elevation of 3600 feet.

—The Atchison and the St. Louis and San Francisco roads are to be operated independently of each other. Under the Atchison reorganization plan part of the new securities was reserved for the acquirement of the St. Louis and San Francisco. No arrangement could be made satisfactory to both parties and now the latter road has a reorganization plan of its own. The result of the adoption of this plan will be the wiping out of the St. Louis and San Francisco stock held by the Atchison, the cancellation of the claims of the latter company for advances, and the abandonment of the joint guarantee of the Atlantic and Pacific bonds. The Atchison is about to sell its St. Louis and San Francisco consolidated bonds for 35 per cent.

—This week a circular was issued signed by the Southern Pacific and connecting lines to Pueblo, Col., reducing the rate on iron articles from Pueblo to San Francisco 25 per cent, in pursuance of an order of the Interstate Commerce Commission to the effect that rates from Pueblo must not exceed 75 per cent of the rates from the Missouri river. The order was the outcome of the case brought some time ago by the Colorado Fuel and Iron Co. against the Colorado lines and connections, including the Southern Pacific, before the Commission, and decided in favor of the shippers. Heretofore the rates from Pueblo to San Francisco have been the same as from the Missouri river, although there was a difference of about 500 miles in the haul.

—Work, it is reported, will shortly begin on a railroad from Nampa, Idaho, to the Snake river, an outlet for the gold mines in the Owyhee mountains. Its length is 17 miles and the intention is to extend it to Silver City, a distance of 63 miles. Another extension will be made north from Nampa to the heavily timbered region of Idaho. A large force is at work on the road, which is being built by A. B. Hammond from the point where the Northern Pacific crosses the Columbia river to Oregon. It is expected that the road will be in operation by July 1st, and when finished it will be one of the most important feeders of the Northern Pacific. Another road is planned from Helena, Mont., to the Castle silver mines. The capital has been secured and the work will soon begin. It will be 70 miles in length.

—L. R. Mead, secretary of the Manufacturers' and Producers' Association of California, has sent the following to the Pacific coast Congressional delegation: "It having been brought to the attention of this association that Senate bill 293, authorizing the appointment of a non-partisan commission to collate information and to consider and recommend legislation to meet the problems presented by labor, agriculture and capital, as received from Mr. Perkins from the committee on education and labor, report No. 575, recommending the passage of the bill. The board of directors of this association at their meeting yesterday afternoon discussed the matter, and it was ordered that, inasmuch as the passage of said bill is of particular interest to California and the Pacific coast, the members of Congress from the Pacific coast be requested by this association to lend their earnest support to the same."

### Tours in the Rocky Mountains.

The "Scenic Line of the World," the Denver & Rio Grande Railroad, offers to tourists in Colorado, Utah and New Mexico the choicest resorts, and to the transcontinental traveler the grandest scenery. The direct line to Cripple Creek, the greatest gold camp on earth. Double daily train service with through Pullman sleepers and tourists' cars between Denver and San Francisco and Los Angeles.

Write S. K. Hooper, G. P. & T. A., Denver, Colorado, for illustrated descriptive pamphlets.

## Personal.

J. A. EDMAN will return to Plumas county next week.

E. K. STEVENOT has moved from Sonoma county to this city.

TIREY L. FORD is expected to return from Washington, D. C., next week.

JNO. MCMURRAY of Weaverville is looking at placer property in southern Oregon.

JOHN HOWELL is prospecting the Mount Costigan and Peelwood silver mines, N. S. W.

PRINCE PONIATOWSKI has reached London, where he will work in the interest of the California Exploration Co.

ARTHUR THOMAS, lately of Grub Gulch, Madera county, goes on a year's prospecting tour through Sinaloa and Oaxaca, Mexico.

SUPT. J. C. ADAMS of the Hidden Treasure, Phillipsburg, Montana, is considering an offer of $10,000 per annum from a South African mining company.

CHAS. J. PRICE of Deadwood, S. D., has accepted an offer of the superintendency of a Johannesburg, S. A., mine, at a salary of $10,000 a year for two years.

WM. IRELAN, JR., ex-State Mineralogist, who received serious personal injury in a wreck of an S. P. train near Ione, about sixteen months ago, has compromised a suit for damages against the company by the acceptance of $11,000.

THE directors of the British South Africa Company asked for the resignations of Cecil Rhodes and A. Beit, by reason of their now evident connection with the project to overthrow the Transvaal Government, but upon their request being acceded to the company declined to accept the resignations.

E. B. PRESTON, of the State Mining Bureau, is in El Dorado Co.; W. H Storms is in the southern part of the State and W. H. Watts is examining Los Angeles oil interests. Capt. R. L. Ogden, so long in charge of the desk in the office on Fourth street, has been relieved by the appointment of Mr. Jacobson.

C. G. WARNFOR LOCK, Superintendent Wentworth Goldfields Proprietary mine, Lucknow, N. S. W., reports March 12th: Five weeks' crushing, 900 tons, gave 380 ounces of gold bullion, 18 tons concentrates carrying 1,400 ounces fine gold; and 11 tons crude ore, carrying 500 ounces fine gold, shipped to London.

GENERAL MANAGER COUCH of the Merced G. M. Co., Mariposa county, Cal., and Boston and Montana, of Butte, is said to have under advisement an offer at the usual large salary from a South African mining concern. The unsatisfactory nature of the present situation to prominent American miners may, however, serve as an encourager of hesitancy.

IT is with more than ordinary pleasure the MINING AND SCIENTIFIC PRESS learns that Land Commissioner Lamoureux will start, June 1st, on a visit to this coast. Such action betokens a willingness of mind on his part to learn something, for to the joys of a sojourn in California cannot wholly be ascribed his determination. Doubtless he realizes the possibility that some of his recent rulings have been, to put it mildly, a little one-sided. It is believed that, with the Mineral Land bill a law, the visit of Mr. Lamoureux may be of mutual advantage to himself and the California miner.

RECENTLY word was received from Capt. Thos. Mein, manager Robinson G. M. Co., Johannesburg, S. A., that he had resigned, and would leave there for Oakland, Cal., his home. It is now learned that the Pretoria Court has ordered that he be fined $10,000, imprisoned two years and then be banished from the Transvaal for three years. The Captain's offense seems to be that he hails from California. He certainly attended strictly to business, but his wealth has probably incited cupidity and his success jealousy, as in the case of some others. 'Tis reported that V. B. Clement and J. S. Curtis have been given the same harsh sentence. It is believed, however, that sober second thought on the part of the Boer authorities will result in remitting the severer portions of the sentence.

RECENTLY in this column was chronicled the demise of one of California's most prominent miners—Reuben Rickard, of Oakland, who died while in discharge of his professional duties as a mining engineer, in charge of properties in the Coolgardie District, West Australia. The report published was from his brother, Alfred Rickard, a gentleman of almost equal prominence in the mining world. And now comes the sad news of the death of that brother at Albany, on the West Australian coast, whither he had gone to meet his brother Reuben and take charge of a New Zealand mining property. The brothers came of a race of miners, were uncles of T. A. Rickard, the State Geologist of Colorado, and were held in high esteem wherever known.


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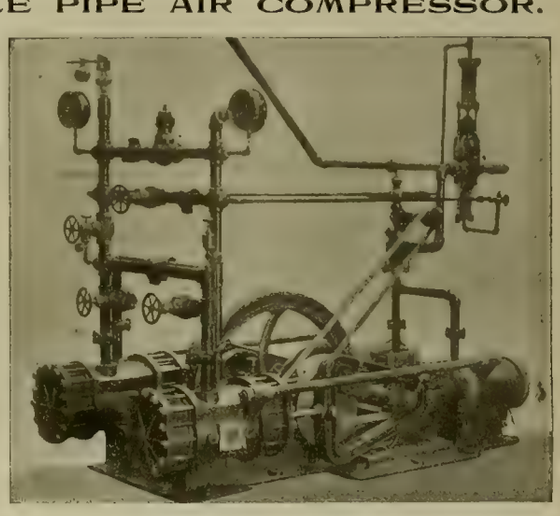
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# Mining Summary.

## CALIFORNIA.

### Butte.

At Forbestown, Henry Vail has five men at work in the gravel mine he is opening at the Buckeye. The tunnel is run under the Walker plains on the line between Butte and Plumas.

The Golden Butterfly mine near Oroville has been closed down. G. H. Evans, the manager of the English company, will operate the Big Betsey and the extension Uncle Sam.

Roger Johnson has brought suit against N. D. Rideout to recover $75,000 with interest from October 23, 1894. He claims to have owned a 10 per cent interest in the Magalia mine, which was sold to the Magalia Mining Company, the consideration being 10,000 shares of stock said to be worth $100 a share, and claims that $75,000 is the value of that stock. He made a demand on defendant for that sum and was refused.

### Calaveras.

The *Prospect* hears the Herrold mine near Big Bar, which had been closed down about eight months, will soon be started up again. S. H. Lucas, the superintendent, is putting the mill in repair.

The boring process has been suspended at the Gwin and sinking is being prosecuted.

Six men are at work at the North Star mine in Happy Valley near Mokelumne Hill.

Grading is going on at the Esperanza preparatory to adding twenty stamps to the mill and erecting larger hoisting works.

At the El Encino in Chili Gulch six men are at work sinking.

Twenty stamps more are to be added to the mill on the Roanoke mine.

C. M. Burleson is surveying for a ditch from the Foote & Thompson mine near Rich Gulch, four miles to Sandy Bar near Mokelumne Hill, where the proposed electric plant is to be built.

AROUND SAN ANDREAS AND ITS MINES.—(Special Correspondence)—On the Ford mine, three-quarters of a mile east of here, two shafts have been sunk, one to a depth of 200 feet, at which level a crosscut has been run for over 60 feet.

At the Fellowcraft mine, one-half mile from San Andreas, under the new management of the incorporated company development has been made in sinking, crosscutting and drifting.

The owners of the Culbertson mine have run a tunnel about 300 feet to date. In the crosscut they struck a 14-foot ledge of low grade ore. They continue, as they have about 100 feet more to tap the Ford ledge.

The Leonard mine, owing to a lack of economy and confidence, was closed down. The milling ore is similar to that of the mother lode mines.

The Donnallan mine, two miles northwest of the town, on the Mokelumne Hill road, the only producer in the district, is supplied with a 15-stamp mill, crushing forty to seventy-five tons a day of twenty-four hours, according to the character of ore. There is plenty of pay ore to keep the mill in operation. Free water is obtained from the Calaveras river under a head of 50 feet.

The Edna mine, on the east side, like other properties, is now idle. It will be started again soon under the direction of J. S. White, one of the owners.

Across the serpentine system, which is about one-quarter of a mile wide, is the Gottschalk mine, on the west side of the mother lode, on a ridge between the north fork of the Calaveras river and Murry creek. It has been prospected through two shafts, one being 110 and the other 195 feet deep. The latter was sunk by Mr. De Golyer of Utah under a bond, but since his bond ran out it has diverted to its original owner, C. V. Gottschalk.

The Everlasting mine, about one-half mile south of the town, is on the west side and is in the serpentine formation, although some slate occurs there. Several shafts have been sunk. The owner recently bonded it for $25,000. A new shaft was commenced last November for a depth of 40 feet, but water coming in from old workings it was abandoned for a new and large double compartment shaft. As soon as depth requires machinery will be put in for hoisting and pumping.

Still south is the Holland mine, whose lead prospects well in free gold, but is still idle.

Turning west is the Chief Pioneer mine, which is on the footwall of the mother lode. Three shafts have been sunk from 100 to 300 feet, but it is still idle.

East the Kentucky House mine is on a great ridge and is considered to be a valuable property. It is owned by Beals & Sciefford. It is a fact that it differs from any mine in the district in strike and dip. It strikes northeast and dips southeast. A chute cutting the mother lode is between well-defined walls in the porphyry formation. Twenty-two assays made show an average of $60 a ton. There is considerable ore in sight.

The Coulter group of mines, two miles southeast of the town, is owned by Coulter & Co. They are on the west side of the mother lode. The Coulter mine has been prospected to a depth of 30 feet. At the bottom the vein is 6 feet wide and heavily sulphuretted below water level. No "colors" could be obtained, but gold only came from the sulphurets, which often went as high as $1000 a ton. The owners are going to sink 100 feet. Chimneys have been found by them within the limits of their claim, and rich gold float within these.

### El Dorado.

(Special Correspondence.)—S. A. Laine in the Brownsville district, 25 miles eastward, is reopening the old Stillwagon mine, famous in its day for rich ore and operated by an arrastra. Mr. Laine has started a five-stamp mill. The ore body, though not very large at present, yields $30 and over.

Bangs & Rentgraf, near Sweet Water P. O., 18 miles southwest of here, are prospecting on three ledges of ore that is free milling and runs at $14, with $40 sulphurets. The prospects for a mill to be erected are good. The claims are on the Zantgraf land.

Sacramento people are negotiating for lease and bond with W. H. Meyers for the Etzel claims in Jay Hawk district, west of town.

The erection of machinery on the Salisbury was interfered with by the heavy rains. The work is moving methodically and on a large scale. Monroe Salisbury is giving his personal attention to the management of the work.

H. E. Pickett, part owner and manager of the Grand Victory, east of town, and likewise manager and part owner in the Two Channel Mining Company, near Georgetown, is taking much interest in forwarding the advantages and resources of mining in El Dorado county.

L. Thurwachter, treasurer of the Baltic Company, operating near Sly Park P. O., reports a tunnel 240 feet in depth, with north and south drifts, on a 3½-foot ledge of $10 ore.

The Lone Star, four miles east of Placerville, owned by General Wagner of San Francisco, is driving drifts and crosscuts on both ledge and gravel. This property has a ten-stamp mill ready for operation. The claim is on the Rupely farm.

The Old Judge mine, famous at one time of shallow mining, was purchased under bond this week and a company organized to effectually work both gravel and quartz. The parties are C. C. Shepardson, of Los Angeles; F. M. Husted, H. Otersen, W. W. Boughton, of San Francisco, and F. W. Beardslee, of Alameda. This property is eight miles northeast, in the Kelsey district.

Thomas Clark, manager and principal owner of the Franklin mine, near town, has just returned from New York. The Franklin is a gravel mine of large area, has a ten-stamp mill always in operation and is a reliable bullion producer.

### Kern.

Since the last strike at Randsburg the *Eyrie* says the hills have been alive with prospectors. New buildings are constantly being erected and there must now be at least two hundred residents, prospectors and miners.

### Mariposa.

Messrs. Bigelow and Nelson have returned from California says the Boston News Bureau.

At Merced there has been only one mill run of about 1,000 tons from ore taken from the openings at the end of the Potosi tunnel, from the 200 to the 400-foot levels. This was a disappointment to Captain Couch, but it has not yet been determined if it be necessary to report results immediately to the stockholders.

On the second run taken largely from the 400-foot level (the mine seems to improve in depth) the plates are looking better and higher results are expected.

On the first mill run more than $1 per ton went off in the tailings, whereas not more than 50c per ton spould be lost.

The Potosi tunnel is about 2,000 feet long, and the first mill run was on rock taken mostly from the Dillon claim at the end of the tunnel.

The company has more than a dozen claims and 4½ miles on the lode, so that it is believed that no fair test of the property can be made under many months, but it is thought that results will gradually improve.

*Miner*: Men are at work on the road from Coulterville to the Virginia mine, four miles. Lumber will be hauled and new buildings put up. J. J. Dolan has charge, and will put men to work next week.

### Mono.

*Index:* Don't come to Bodie unless you have money in your clothes. There is no opening for the penniless man, no matter how good he may be. There is no work to be had. We have all the floating population that we can sustain. So, don't come.

### Nevada.

*Tidings*: The suit that was commenced some time ago by the Polar Star Mining Co. against the Harvey Gold Mining Co., to quiet title to what is known as the old Harvey mine, was decided yesterday by Judge Caldwell in favor of the Polar Star Co. The Harvey ground adjoins the North Star on the southwest and is a valuable property, having produced at a superficial depth $200,000. The Polar Star Co. is composed of some of the wealthiest mining men in the State, and they propose to thoroughly develop this property. W. W. Byrne will put a force of men on this week and sink the incline shaft 300 feet deeper.

*Transcript:* At the Live Yankee drift gravel mine near Graniteville the main tunnel has been run about 1000 feet altogether, but they followed the channel in a round course. Now they are running straight across and expect to reach the heavy gravel under the lava-capped mountain in about 1000 feet more. There has been a prospect all the way, but the main channel has not been struck.

### Plumas.

The Shenandoah Mining Co. has elected a new Board of Directors, C. H. Smith is president, C. K. King secretary.

### Riverside.

Day & French are pushing work in the drift of the Golden Chariot mine near Perris at a depth of 300 feet.

### San Bernardino.

The *Sun* says the Altura Mining Company will commence operations again after an idleness of some time. James Ryan of Los Angeles is superintendent and a quarter owner in the stock. He is at Victor with 12 men.

At the Eagle Cliff mine, in the Colorado desert, ore which, in a milling test of a ton turned out $125, has been struck. Originally the shaft went down on a fairly good vein of ore, a vein of talc running with the ore. At a depth of twenty-five feet the ore petered out, but the owners continued to follow the talc until a depth of eighty feet was reached. Last week the talc again opened into a vein eighteen inches wide. At the Desert Queen mine, a mile away from the Eagle Cliff, ore has been struck in the tunnel, the vein being four feet thick. Gold can be readily horned out. The tailings are being worked over and are netting $48 per ton.

### Shasta.

The old Spanish mine in Lower Springs district has closed down temporarily.

### Siskiyou.

*Journal:* The Blue Gravel mine at Greenhorn creek, is paying rich again.

The Black Lead claim on Greenhorn, above Austin & Co., worked by Elliott & Co., is also paying well.

H. B. Warren is putting up a five-stamp mill at Cherry creek.

George Kniest, now engaged in mining on Hamburg Gulch, succeeded in taking out $20 one day last week—a nugget in the form of a $20-piece. It was dated in 1857, and was, no doubt, lost by some prospector while at work in that claim.

The Blue Gravel claim at Greenhorn, just south of Yreka, has been paying rich lately. The clean-up from one riffle last Saturday yielded 7¼ ounces, and a full clean-up would have realized one-half as much more, or not less than 10 ounces. A general clean-up of the sluices will probably show an average of 10 ounces a day.

Herr & Fairchild are putting up a 2-stamp mill on Yreka Flats to prospect coment known to contain considerable gold. It is found under the gravel, and may extend deep down, with possibility of gravel underneath, the same as at the Blue Gravel mine, on Greenhorn.

The Columbia quartz mine in ridge between Oak Bar and Scott Bar is now being worked with energy in getting out quartz to keep a 5-stamp mill in steady operation.

A new strike has been made at the Empire quartz mine, on Empire creek, Klamath river, near Honolulu. It is a 6½-foot ledge of free-milling ore, a contact vein. One man's work can almost supply the 12-stamp mill for a day and night's run.

*Journal:* The five-stamp quartz mill now being put up at Cherry Creek will crush rock principally for the Nebraska mine, owned by Bohnart & Warren, but will do custom work also for others having rock to be crushed.

### Trinity.

*Journal:* At Minersville F. Gillardy, has bonded from C. Van Meter Hayward's Flat, aggregating 470 acres. The first payment on the bond is to be made on the 4th of August. The above group of mines adjoin those of the Minersville Hydraulic Gold Mining Co. on the east and comprise an ancient channel. The gravel bank is about 50 feet in depth and prospects twenty cents to the cubic yard.

### Tuolumne.

*Independent:* Machinery is on the way to the Golden Gate mine from the Demarest & Fullen foundry at Altaville.

The Old Soulsby mine had a very favorable crushing this week.

At the Mountain Bell mine at the last cleanup, the sum of $1275 was secured. The mine is situated on the Soulsby ranch, to the north of the Soulsby mine, of which vein it is a continuance. J. W. Ball and party have leased the property. The mine is run by water power.

A new corporation will take possession of the mines formerly held by the Sonora Extended Mining Co.

The old Duffield mine, in the Arrastraville district, is being opened up by the Scanavino Bros.

The North Fork mine is being vigorously worked by Soulsby & Son. A new shaft is being sunk to intersect the ore chute encountered in the old shaft.

W. W. Sharwood will shortly open up the old Grizzly mine.

The Spring Gulch mine, south of Summersville, is being opened up by Essenburgher & Co.

A three-stamp mill has been put up on the Chimney mine on Knight's creek.

The Tibbits & Green mine, above Columbia, is taking out ore which averages $100 per ton.

## NEVADA.

### LANDER COUNTY.

At Austin, the Austin Mining Company has increased its force at the Chifton tunnel, which is now being driven back nearly a mile under Lander hill. This tunnel, when completed, will drain all the mines on the hill, tapping them at a depth of 300 or 350 feet below the water level.

The Tenaba Mill & Mining Company, with a capital stock of $1,500,000 has filed articles of incorporation with the Recorder of Lander county. This new company proposes to operate the Cortez mines on an extensive scale. Work will begin at once.

Considerable machinery has arrived at Austin for the New Pass mines, which will be developed this season.

### LINCOLN COUNTY.

The DeLamar *Lode* says the construction of the April Fool mill nears completion and that its stamps will be dropping May 10th.

### LYON COUNTY.

Work has been resumed in the Silver City property of the Isis Mill and Mining Company, formerly the Independent mine. The property is now owned by Messrs. Lacrouts, Gignoux and Dazet.

### STOREY COUNTY.

An important strike is reported on the Brunswick lode, which means much to the Comstock. Supt. Kervin reports as follows:

Shaft No. 1 has been sunk 14 feet on the incline, passing through clay, porphyry and quartz, and showing some value; total depth, 425 feet.

200 level—The south drift, which was started from the end of east crosscut No. 1, has been advanced 16 feet; total lenght, 188 feet. At a point 6 feet from the face ore was encountered showing a width of 2½ feet, assaying $75 per ton. The face now shows 3 feet of ore of an average value of $63 75, gold predominating.

The north drift started from the station (H. & N.) has been extended 15 feet; total length, 167 feet; face in porphyry and a streak of quartz, which assays about $16 per ton.

Shaft No. 2—The north drift started from west crosscut No. 1, 25 feet from main south drift has been extended 20 feet, passing through porphyry, clay and quartz; total length, 29 feet.

Gould & Curry Company's Tunnel—The main north drift has been advanced 14 feet; total length, 722 feet; face in porphyry. At a point in this drift 700 feet from the mouth we ran a west crosscut for a distance of 12 feet to the footwall, cutting through a body of quartz 2½ feet wide of an assay value of $6 per ton.

### WHITE PINE COUNTY.

Ely *News:* About 4 feet of ore has been uncovered in the Emma mine which assays 61 per cent lead, 61 ounces of silver and $8 26 in gold.

## OREGON.

### JOSEPHINE COUNTY.

W. H. Taylor, of the Victory placer mines near Glendale, reports work progressing satisfactorily at the Victory with three nozzles.

The *Observer* says an $85 nugget was picked up recently at the old Baltimore mine on Williams creek. On Coyote creek the Ruble mine has produced about $12,000 during the past winter. They are still piping, using two giants.

J. S. Howard is locating the new ditch enterprise, which is to take water out of Rogue river, above Gold Hill. As laid out, it will be about 25 feet across the bottom, 29 feet across the top and 6 feet in depth. The first objective point of the ditch is said to be Galls creek, a distance of five miles from where the water is taken out of Rogue river, three miles above Gold Hill. It is estimated that the first mile of the ditch, which will include a large amount of fluming as well as rock excavation, will cost $10,000, and the rest of it will cost several thousand dollars per mile. J. W. Northup, president of the company, says that the breaking of ground on the ditch will be celebrated on May 11th at the head of the canal, three miles south of Gold Hill.

## BRITISH COLUMBIA.

Nelson *Tribune:* The lower tunnel on the Silver King mine is being advanced 6 feet a day; machine drills are used. One hundred men are now employed at the mine.

Within the next month, says the Ashcroft *Journal*, reports should be in from not less than six dredging outfits in the districts of Cariboo and Lillooet, four of them to be in operation on the Fraser and two on the Quesnelle river. On Quesnelle river the Fader dredger is now in operation. The Underwood dredger, built at a cost of $30,000, will be in operation in about two weeks, and within four weeks the Pittsburgh dredger, Mr. Young in charge, should be at work. This last named will cost between $15,000 and $20,000. The bucket dredge of Fader's has cost, plant complete, about $15,000, or in all from $60,000 to $70,000 at this point alone invested. The Dominion Gold Dredging Co., whose machinery has lain so long at Drynock, is on its way to Lillooet, where they have secured a lease to five miles of the river bed, and the two dredgers near Mormon bar, making the six complete plants, it is safe to say, nearly or quite equal $150,000.

## IDAHO.

Lewiston reports that it is filling up with prospectors and other mining men headed for Florence and interior camps. Flattering reports come from Florence, Elk and Pierce of quartz developments.

Superintendent Stanton of the Lucky Boy Mining Company's property in Custer county, says that work on the property will be resumed on May 20th, and that it will then continue steadily throughout the summer, the Miners' Union permitting. Mr. Stanton says the Lucky Boy is now productive of about $25,000 per month, and that with developments progressing steadily, it should increase to double that amount the present season. The only other mine now working in the camp is the Black, whose mill is dropping 10 stamps, with satisfactory results. The camp, since the closing down of the Luck Boy, which was employing 120 miners, says Supt. Stanton, is practically deserted.

The lessees on the Poorman-Tiger have decided not to operate the granite mill at Gem, but will sort their ore, shipping the best and holding the poorer on the dump until the new mill at Burke is ready to work it.

## UTAH.

The *Tribune* bears that at the Dalton and Lark, Bingham, a new scale of wages has gone into effect, and that the new law prohibiting the employment of miners longer than eight hours is witnessing its first test. The management of the Dalton and Lark, it is said, has notified the miners that hereafter 25 cents an hour will be paid, and with shifts limited to eight hours under the new law, this means but $2 a day with which the miner and his family must sustain themselves. Many of those who have been working at the Dalton and Lark, have signified their intention of quitting, and trouble is feared in the next few weeks.

## SOUTH DAKOTA.

The Kildonan mill runs regularly. The average amount of ore treated is 100 tons every twenty-four hours, the ore will average $20 per ton. The syndicate that owns the mill also owns the control of the stock of the Horseshoe and associate companies.

*Times*: The owners of the Sunnyside mine situated near Hill City, have purchased for $2000 the new and complete 5-stamp mill shipped in here some months ago by the Mil-

waukee parties who purchased the group of claims on Crow Peak on representations made by Expert Smith.

Prof. Jenny, formerly of the United States Geological Survey, in Denver, returned from the Black Hills, reports a remarkable gold discovery—"a blanket formation, similar to that of the Mercur district, extending over an unknown area, between lime and porphyry several feet thick, carrying values running from $15 to $500 per ton."

### MONTANA.

A group of copper properties at Copperopolis, near White Sulphur Springs, have been bonded for $50,000 to Barton Sewell, president of the United Smelting Company of Chicago.

### COLORADO.

Returns from a number of the mining counties of the State, says the Victor *News*, shows that with few exceptions a greater tonnage has been shipped to the smelters for the first three months of 1896 than for the corresponding period of 1895, and that the grade is generally higher. There is also a notable increase in the number of men employed in the various districts of the State, and an increase is reported in the number of men working for wages all along the line.

Boulder reports an increase of 1,526,395 pounds of ore shipped to the smelter, with a large number of men at work

Fifteen hundred men are employed in Pitkin against 1,300 last year, while the ore output of Aspen camp is 58,000 tons against 50,000 a year ago, with an increased value.

Cripple Creek produced $1,100,000 more gold for the first quarter of this year than last, and gives work to 1,500 more miners than was the case a year ago.

Hinsdale county comes to the front with an increase of $457,000 more in values than a year ago, and gives work to 300 more men.

Lower Clear Creek county, about Idaho Springs, shows an increase of 144.6 per cent in the shipment of smelting ores, and 75.1 per cent in mill dirt. The value is about double that of the shipments of one year ago in each case. The district gives employment to about 1400 more men than it did last year.

Gunnison has nearly doubled the number of men at work.

Ouray has shipped 15,000 tons so far this year. The big shipments from the Red Mountain mines are yet to come, the heavy producers being tied up on account of snow. The values of ores sent to smelters from this district is close to $750,000. The snow-bound properties will soon commence sending their product to market. Ouray will round out the year with at least 6,000 carloads to her credit, and as development work is in progress all over the country, it will become one of the greatest gold-producing sections of the State.

The mines about Rico have shipped less, and do not employ as many men, owing to the advance in smelter charges the first of the year, which closed a number of the silver mines of the district. There are fewer men employed at Creede than was the case a year ago.

The drills used in the Newhouse tunnel at Idaho Springs are twelve feet in length, and nine holes are drilled in the breast of the tunnel for every charge. The charge of powder required for each blast is 400 pounds of Giant. The charge is fired from a battery in a recess a quarter of a mile distant. Nearly 200 tons of rock are broken down at every discharge, and half a day is required to clear away the debris after the shots are fired. The tunnel is 12 feet square and it has not deen found necessary to do any timbering since solid formation was reached. The gases from the explosion are directed into the drainage trough and carried off in the water, so that there is the least possible delay in the work. There are thirty men employed.

The cyanide process is to be used on the low-grade ores of Leadville. It is the property of the MacArthur-Forrest Syndicate and has been leased by a Leadville company. J. C. Mitchell of Denver, secretary and treasurer. There are large bodies of this low-grade ore there that it is expected can be successfully handled. They have fitted up a plant at the Arkansas Valley Smelting Company's works and expect to begin handling about 50 tons a day. Their first operation will be on the dump of the Ibex mine.

The Cripple Creek *Times* says that the Independence mine is closed down, some men were laid off and in the development work now being performed only such ore is hoisted as has to be in continuing the work. Machinery is being put in place for operating the mine more extensively. The shaft is being sunk from the 600-foot level and will be driven to a depth of 1,000 feet. Mr. Stratton stated some time ago that he would not take out any more for shipment, but would treat the ore at his mill as soon as it is completed.

The life of a good mine is illustrated in the Seaton mine at Idaho Springs. It was located in 1860 or '61, and has been worked continuously since its location, sometimes by a few men under lease and sometimes by the owners with a high priced superintendent and a large force of miners. It had over 400 feet of tunnels twenty-five years ago. It was sold a few days ago to Denver parties for $500,000. A few years ago one of the claims was allowed to be sold for taxes, but since then a large body of mineral has been cut near the surface and the lessees have made good wages for almost one year.

### NEW MEXICO.

At Pinos Altos the Mina Grande mine has been idle for ten years and caved in. Bell & Stephens have reopened the property. They started two shafts and have struck a bonanza. The lead ore assays from $15 to $17 in gold and 40 to 120 ounces in silver per ton. The copper pyrites average $17 gold, 15 ounces silver per ton, and will run from 10 to 15 per cent in copper.

### ARIZONA.

The El Oro Gold Mining Company at Phœnix, has been organized with a capital of $1,250,000. The company owns several mines in Yavapai county.

The Kusser G. M. Co., Geronimo, Arizona, have received forty-five tons pipe, and other supplies and have started their stamp mill.

The "1896" mine at Walnut Grove, near Phœnix, has been bought by a Chicago syndicate for $75,000. The ore is said to pay $40 to the ton.

### LOWER CALIFORNIA.

The Paramide Mining Company, composed of Los Angeles and Riverside county men, has secured what the promoters believe is a rich tract of placer ground on the Lower California peninsula, fifty miles south of the line. Hydraulic machinery to a value of $5000 has been ordered, and active work is expected to begin within sixty days.

### MEXICO.

The new hoist for the Creston mine, at Prietas, has been received at Torres for the new three compartment shaft, which is to go down 2,000 feet.

A. Brixen of Salt Lake City, and Wilcox and Reddy of this city have a project to work over tailings on the Guanajuato river in Mexico and propose to erect a 500-ton mill. Mr. Brixen who has a concession to work the bar says: "Mining in that locality began in the seventeenth century, and following a chapter of rich strikes was the erection of 72 mills upon the banks of the Guanajuato river. Into the bed of the stream the tailings from this veritable avenue of mills were permitted to pour, and the result is the deposition of almost countless tons of them. Those engaged in mining during all these years in that locality made no effort to save the auriferous contents of the ore, and they were passed off into the channel, the bottom of which has risen higher and higher as the tailings flowed in, until at places they are 80 feet above the original bed."

### SOUTH AFRICA.

The following letter was received last week: it is from a prominent English mining engineer, and though not written for publication gives general views on current matters of interest.

GOLD FIELDS HOTEL,
JOHANNESBURG, S. A. R., 29th March, 1896.

I intended to have started north to-day for Buluwayo and Gevelo—660 miles from Pretoria by wagon—but the Matabeles have risen and they are murdering every one they can get at. So I am waiting over for a week to see if there is a chance to get through. We are sadly hampered by a variety of plagues:

First—Rinderpest has broken out between the Zambesi and here and the cattle dying by thousands, and no chance of getting machinery, etc., up for God knows how long. What we shall do for food I can scarcely say.

Second—A plague of locusts for hundreds of miles, and they have eaten up all the grass on the plains.

Third—A water famine. I pay a shilling for a bucket of water to bathe in, and then it's muddy.

Fourth—The Matabele rising.

Fifth—This place is like sitting on a volcano and expecting an eruption at any moment—the Boers are so troublesome. They despise Englishmen. We are insulted on all sides. The arms have all been taken from us and they are providing Germans (2000 Lee-Metford rifles with cartridges and bayonets just delivered this morning to Germans and Boers—my man saw the men take them away one by one) and others with the best English repeating rifles—the Lee-Metford—and a war may break out at any moment. The Dutch and Boers (all one race) are combining all over South Africa, and unless the Home Government puts down their foot we shall lose the whole of South Africa.

The mines are good, but really only a low grade proposition. Coal close to the mines, Kaffir labor and a fair amount of water, combined with the ores being clean—only iron oxide and pyrite—and the weak cyanide solution dissolving the gold, makes the place all right. The veins are regular in their yield, but small—2 to 3 feet, a big vein.

I have seen Jno. Hays Hammond. He's in a sad mess—a prisoner and with £40,000 bail and property interdicted—and I am afraid, unless he runs away, that something serious may happen to him.

Four other men besides Hammond are in a similar mess. Any moment we may get news from London and then we will know what we have to look forward to. If I move north I have a Matabele war; if I stay here, a revolution or a big war. My two rifles and cartridges had to be sent by another route to Buluwayo, as I could not get them through the Transvaal and I am now left with only the old revolver (which I smuggled through) and my hunting knife. Without arms in this country a man is powerless. It's almost the very worst place I have been in. My colleague is at Mafeking, about 200 miles from here, in English territory, and we have three big wagons there loaded with canned provisions, flour, etc. He is worried about the cattle trouble, and at last he has bought a lot of donkeys to pull the wagons—about eighty, I should think, for each wagon. He expects to get through about the middle of June, and in the meantime I must do the best I can for self and men.

On the mines we have not even a cabin of any sort, and we are forty miles from Gevelo, a small telegraph station. This country is made up of deserts and rocks and a railway, the only way to tackle it. This place is all right on the hills where the private residences are, but the town is full of typhoid and dysentery and fearful smells. No drainage; no water supply proper. Closets used; no ashes or soil employed, but iron buckets. Iron carts come around day and night, and empty the iron buckets, and the mules trot off with the carts, upsetting the stuff everywhere, and finally dumping it into an open pit, a mile or so from the town, and letting it dry up and blow away.

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# CALIFORNIA MINES AND MINERS.*

## Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

### DEL NORTE COUNTY—Continued.

| NAME OF MINE. | Character of Mine | No. of Men Employed. | Location | Name of Superintendent or Agent. | Address |
|---|---|---|---|---|---|
| Garrison Claim | Gold. | 2 | 12 m S E of Crescent City | Wm. Garrison, Owner | Crescent City |
| Haynes Flat | " | | 20 m S E of Crescent City | Edwin Yates et al, O'n | Crescent City |
| Huenriche Claim | " | 4 | 8 m S W of Gasquet | Ben Huenriche, Own. | Crescent City |
| Kelly Claim | " | 2 | 9 m E of Gasquet. | P. Kelly, Own. | Gasquet |
| Kans Claim | " | 1 | 8 m S W of Gasquet. | A. Kans, Own | Gasquet |
| Lambert Claim | " | 2 | 25 m S E of Crescent City | Jno Lambert, Own. | Crescent City |
| Larsen Claim | " | 1 | 7 m W of Gasquet | Chas Larsen, Own. | Gasquet |
| Mayne Claim | " | 2 | 25 m S E of Crescent City | John Mayne, Own | Crescent City |
| Orama | " | | 12 m S E of Crescent City | Edwin Yates et al, O'n | Crescent City |
| Occidental | " | 5 | 10 m E Smith Riv. Corners | Jno. Murray et al, Own | Crescent City |
| Rice Claim | " | 1 | 5 m S E of Crescent City | H. Rice, Own. | Crescent City |
| Rice & Murray | " | 2 | 11 m S E of Crescent City | D. Rice, Own | Crescent City |
| Torrejan Claim | " | 2 | 3 m S of Gasquet | Jose Torrejan, Own. | Gasquet |
| Union | Copper | 7 | 10 m E Smith Riv. Corners | J. A. Murphy et al, Own | Crescent City |
| Vinsch Claim | Gold. | 2 | 3 m S of Gasquet | Raymond Vinsch Own | Gasquet |
| Wagoner's Claim | " | 2 | 7 m W of Gasquet | Chas. Wagoner, Own. | Gasquet |
| Whitney Claim | " | 2 | 3 m S of Gasquet. | Ed. Whitney, Own | Gasquet |
| Washington Claim | " | 2 | 15 m E of Gasquet | G. H. Washington, O'n | Gasquet |

### EL DORADO COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Adams Gulch | Gold quartz. | | Nashville | J. E. Heald | Nashville |
| Armstrong & Roberts | " | 1 | Grizzly Flat | W. T. Armstrong & Roberts. | Grizzly Flat |
| Aultman, The | " | | Georgetown | John Smith | Greenwood |
| Barnes | " | | Mud Springs M. Dist. | J. Robinson | Placerville |
| Baldwin 2 Mine | " | 7 | Nashville | E. J. Baldwin, Own. | S. F. |
| Beattie & Parsons | Placer. | 4 | Georgetown Dist | Beattie & Parsons | Georgetown |
| Big Canyon | Gold quartz. | 19 | Shingle Springs | A. Hayward & Lane. | 227 Cal. St., S. F. |
| Big Sandy | " | | Kelsey | J. Kelly | Kelsey P. O. |
| Bind & Co | Marble | 2 | 5 m from Placerville. | Ed. Bind | Placerville |
| Bidstrup | Gold quartz. | 1 | Logtown | F. T. Bidstrup | Mud Springs |
| Bitters Claim | " | 3 | Missouri Canyon. | W. Kinney & Morgan. | Georgetown |
| Blue Rock | " | 2 | Georgia Slide | | |
| Board | " | 1 | Georgetown M. Dist. | William Board | Greenwood |
| Bonesett | " | 1 | Green Valley M. Dist., near Shingle Springs. | M. E. Gates. | Freight Office, Sacramento |
| Bright Hopes | " | | Georgetown | W. W. Halbert | Georgetown P. O. |
| Buckeye Hill | Placer. | 2 | Buckeye Hill | J. J. Hora | Georgetown P. O. |
| Burt Abbey | " | 4 | Volcanoville | Form & Smeder | Georgetown P. O. |
| Canyon Creek | " | | Near Georgetown | J. W. Simpers | Greenwood |
| Carrie Hale | Gold quartz. | 1 | Grizzly Flat | H. C. Roberts; J. H. Bradley, Own. | Placerville |
| Cederberg | " | 1 | Greenwood | C. W. Hulford | 1458 8th St., Oakl'd |
| Cement Hill | Gravel. | 2 | Georgetown | N. Dow | Georgetown |
| Church | Gold quartz. | 25 | 2½ m from El Dorado | C. C. Harvey, Sec'y. | Nev. blk, R 4, S. F. |
| Charles (Edner) | " | 4 | Fairplay | Charles Edner | Omo Ranche P. O. |
| Chili Bar | Slate. | 10 | 3 m from Placerville | G. J. Neathersole | Placerville |
| Cincinnati | Gold quartz. | | Placerville | D. J. Knighton | Diamond Springs |
| Cock Robin | " | 5 | Volcano | T. W. Waters | Georgetown |
| Cousin Jack | " | | Grizzly Flat | Mrs. M. Jeffrey | Grizzly Flat |
| Collins & Patterson | " | 2 | Georgetown | Collins & Patterson M. Co. | Georgetown |
| Crown Point | " | | Diamond Springs | J. Richards & A. Koch | Mud Springs |
| Crystal | " | | Grizzly Flat | L. L. Alexander, Own | Omo Ranche |
| Crystal Mine | " | | Shingle Springs | G. Phelps & R. T. Morrison. | Mud Springs |
| Davidson | " | | Mud Springs | — Davidson | Shingle Springs |
| Dalmatia | " | | Kelsey | C. G. Pearson | Kelsey P. O. |
| Daley | " | | Grizzly Flat | Daly et al | Grizzly Flat |
| Dividend | " | 7 | Near Shingle Springs | A. Pelton et al | Shingle Springs |
| Donozo | " | 1 | Greenwood M. Dist. | Juan Donozo | Greenwood |
| Eagle | Gold quartz. | 1 | Near Grizzly Flat | J. Melton | Grizzly Flat |
| Elliott | " | 1 | Near Placerville | John Elliott | Placerville |
| El Dorado | Gold & slate. | 1 | Placerville | H. S. Morey | G. W. Campbell, Sec, Placerville |
| Equator | Gold quartz. | 1 | Near Diamond Springs. | Capt. T. Buckley | S. F. |
| Eureka | " | 1 | Georgetown | E. B. Lee | Union Club, N. Y. |
| Fairbanks | Hydraulic | 1 | Buckeye Hill | | |
| Fairchild | " | 3 | Volcanoville M. Dist. | Barkley Estate; Stanton & Hinkley. | Georgetown |
| Fort Yuma | Gold quartz. | | 7 m from Shingle Springs | — Hale | Omo Ranche |
| French | " | | Volcanoville | Heirs Joseph French. | N. Y. State |
| French Hill | " | 7 | Near Greenwood | A. J. Johnson et al | Greenwood P. O. |
| French Claim (Seam) | " | 2 | Greenwood | Louis LeChance | Greenwood P. O. |
| Garfield | " | | Grizzly Flat Canyon | E. W. Chapman | Greenwood |
| Garfield & Excelsior | " | 1 | Greenwood | T. G. Biltz | Greenwood |
| Garibaldi | " | | Greenwood | J. Wolf & Mrs. Lee | Greenwood |
| Gentle Annie | " | 5 | Placerville | John Melton & B. G. Portlow. | Placerville |
| Golden State | " | 3 | Georgetown | Barklage et al | Georgetown |
| Gopher Boulder | " | | Kelsey | C. G. Pearson | Kelsey |
| Grand Victory | " | 6 | 7 m from Placerville | S. B. Clarke, Sec'y. | 430 Mont., S. F. |
| Gray Eagle Cliff | " | 1 | Volcanoville | D. C. Webster | Georgetown |
| Greenstone | " | | Shingle Springs | H. Barnes & L. L. Robinson. | Shingle Springs |
| Griffith & Bryant | " | | Diamond Springs | C. F. Bryant | Diamond Springs |
| Grizzly Gravel Drift | " | 3 | Volcanoville | G. H. Bartlage | Georgetown |
| Grizzly Flat | Gravel. | | Volcanoville | Bartlage Estate | Georgetown |
| Grouse Gulch | Gold quartz. | | Grizzly Flat | Mrs. K. Hoskins, Own | Grizzly Flat |
| Ibid | " | | Grizzly Flat | C. N. Wall & T. D. Crocker. | Palace Hotel, S. F., and Cleveland, O. |
| Idlewild | " | 75 | Greenwood | E. W. Chapman | Georgetown |
| Indian Creek M & L Co | " | 6 | 2½ m from El Dorado | Saml. E. Mills, Sec'y. | Mills Bldg, S. F. |
| Inez, or Central | " | | 3 m from El Dorado | Inez G. M. Co. | 32 Liberty St, N.Y. |
| Jerusalem | Placer gold. | 3 | Placerville | T. Alderson | Placerville |
| Josephine | Gold quartz. | | Volcanoville | J. W. McCall et al | Nevada City |
| Kates | Gravel. | 6 | Volcanoville | S. P. Kates | Georgetown |
| Kentucky Flat, Drift | " | | 9 m E of Georgetown | A. J. Wilton | Georgetown |
| La Moille | Gold quartz. | | Logtown | H. Sutliff | Mud Springs |
| Linden | Drift. | 23 | Placerville | Linden M. Co | 17 East St, Boston |
| Little Chief | Placer. | 2 | Georgetown | Beattie Bros | Georgetown |
| Log Cabin | Gold quartz | 1 | 5 m from Shingle Springs | J. Darrow | Shingle Springs |
| Lone Star | " | | Nashville | J. C. Heald, Own. | Nashville |
| Lone Star | " | | Diamond Springs | A. Latownetle & J. B. Lawton. | Diamond Springs |
| Lookout | " | | Volcanoville | William Carey | Georgetown |
| Mathines Creek | " | 4 | Diamond Springs | R. T. Morrison | El Dorado |
| McNulty | " | | 3½ m from El Dorado | J. B. Drury | Cotton Exchange, St. Louis, Mo. |
| McCall | Gravel. | 4 | 3 m N E of Volcanoville | Thos. McCall | Michigan Bluffs, Placer Co. |
| Melton | Gold quartz. | 15 | Grizzly Flat | L. L. Lombard | Grizzly Flat |
| Mississippi, Drift | Gravel. | 2 | Volcanoville | C. F Lloyd | Georgetown |
| Montezuma | Gold quartz. | 3 | Nashville | J. C. Heald | Nashville |
| Morey | " | 1 | Grizzly Flat | E. R. Morey, Own | Grizzly Flat |
| Mount Pleasant | " | 4 | Grizzly Flat | J. Hague, Prest. | 16 Wall St, N. Y. |
| Mt. Hope | Drift. | | Gregory Hill | Hinkel Bros. | Georgetown |
| Murzo (Brass' Claim) | " | 3 | Volcanoville | A. E. Brass | Georgetown |
| Nashville | Gold quartz. | 1 | Nashville | Joshua Hendy & Co., Own. | S. F. |

( To Be Continued. )

—* Begun in issue of April 25, '96.

## List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

558,919.—GATE GOVERNOR—A. L. Adams, Astoria, Or.
559,051.—PHOTOGRAPHING COLORS—M. Anderson, Northport, Wash.
559,024.—SHOULDER BRACE—T. Bessing, Los Angeles, Cal.
559,119.—INVALID CHAIR—D S Carrick, Oakland, Cal.
559,073.—SOLDERING MACHINE—J B Clot, S. F.
559,074.—SOLDERING MACHINE—J. B. Clot, S. F.
559,098.—WINDOW SHADE ATTACHMENT—P. Davies, Oakland, Cal.
559,270.—EXERCISING APPARATUS—G. C. Edwards, Oakland, Cal.
559,099.—BANK CHECKS—M. Feintuch, S. F.
559,170.—ROLLER MILL—N. Fossati, Smith's Flat, Cal.
559,059.—CENTRIFUGAL MACHINE—A. Heberer, Alameda, Cal.
559,101.—UMBRELLA DRIP—F. HINDES, S. F.
559,102.—BICYCLE—L. Julig, S. F.
559,103.—CURTAIN FIXTURE—W H. Kirkman, Berkeley, Cal.
559,104.—ADVERTISING DEVICE—A. C. Morrison, S. F.
558,979.—HOT WATER IRRIGATOR—J. A. Noble, S. F.
559,341.—CARBURETER—Parr & Avery, S. F.
559,297.—STOVE—Rasmusson & Oliver, Tacoma, Wash.
558,986.—FIRE LADDER—N. Z. Room, Oakland, Cal.
559,107.—WAVE POWER—W. E. P. Rose, Angel Island, Cal.
558,999.—PRESSURE GOVERNOR—J. & P. St. Mary, Portland, Or.
559,233.—HARNESS SNAP—J. D. Tucker, Sierra Madre, Cal.
559,235.—CAR COUPLING—Van Dorn & Seaman, Spokane, Wash.
559,092.—MOP—H. A. Wolf, Sacramento, Cal.
559,093.—MOP WRINGER—H. A. Wolf, Sacramento, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

EXERCISING APPARATUS.—George C. Edwards, Oakland, Cal. No. 559,270. Dated April 28, 1896. This device belongs to that class of exercising apparatus which involves the use of a suitable head-stall adapted to fit the head and connected with a resistant device, such as a weighted cord or an elastic strap, whereby, through the movements of the head, the muscles of the neck particularly are exercised and strengthened. The particular object of the invention is to provide, by reason of the connection with the head-stall at the top of the head, for the exercising or movement of the head in every possible direction without danger or liability of disarranging the head-stall, which remains firm and in perfect position under all circumstances. The head-stall comprises an upper latitudinal band enircling the upper portion of the head, a lower latitudinal band encircling the front of the chin and back of the neck, a side longitudinal band passing under the chin and over the top of the head, a front longitudinal band passing over the head at right angles to the said longitudinal band and secured at its ends to the lower latitudinal band, the latter, together with the side longitudinal bands, having severed ends and fastening means to readily adjust and to remove the head-stall to and from the head.

INVALID CHAIR.—David S. Carrick, Oakland, Cal. No. 559,119. Dated April 28, 1896. The object of this invention is to provide a chair in which the invalid by his own efforts can adjust it to such positions that he can recline, sit up or be supported erect, and can also propel himself. The chair, generally speaking, consists of a frame or body and a seat portion, a back portion and a foot rest hinged together and supported by the frame or body of the chair, and uprights rising from said frame or body and suitable devices and connections suspended from the uprights at a point above the occupant of the chair and connected with the hinged back portion, whereby he may lift the back seat and foot rest into line to enable him to assume an erect posture. There are in connection with the chair many other devices to carry out its objects.

STREET RAILROAD CAR ADVERTISING DEVICE.—Albert C. Morrisson, San Francisco, Cal. No. 559,104. Dated April 28, 1896. This device belongs to those in which an intermittently moving drum or reel has secured to its periphery a number of advertising or display cards which by its movement it successively presents for exhibition behind or within a sight aperture. The apparatus is especially adapted, by reason of its easy connection with the bell cord, rope or strap of a car, to be used in a railroad car. It consists generally of a case having a sight aperture, a reel mounted within the case and having a series of advertising cards pivoted to its periphery, retaining spring arms projecting from each side and overlapping the path of the cards whereby each is temporarily restrained from falling, and a means for moving said reel.

CURTAIN FIXTURE.—Wm. H. Kirkham, Berkeley, Cal. No. 559,103. Dated April 28, 1896. This fixture is one of those in which the spring-actuated roller and the curtain which it carries are connected with a hanger suspended by a cord passing over a pulley at the top of the window frame or casing whereby it is adapted to be raised or lowered and the curtain itself to be rolled up from the bottom or the top in order to expose or to cover all or any portion of the window desired. The device consists of many novel details of improvement in a curtain fixture of this class, the objects of said improvements being generally to render the whole device practically efficient, durable and easily operated. The hanger consists of a cross bar and a suspending wire secured at its extremities at or near the ends of the cross bar and having the suspending cord attached to said wire at its middle.

BICYCLE.—Leopold Julig, San Francisco, Cal. No. 559,102. Dated April 28, 1896. The object of this invention is the transmission of power from the hands of the rider to assist that derived from his feet. The power transmitting mechanism consists of a pivoted lever at the head of the machine, connecting devices between said lever and the pedal crank, a handle bar mounted in the head of the machine and adapted to be turned axially, and connections normally out of engagement with said lever and adapted to be brought into contact therewith whereby the axial movement of the handle bar operates the pivoted lever.

WAVE POWER.—Wm. E. P. Rose, Angel Island, Cal. No. 559,107. Dated April 28, 1896. In this device a float is employed and suitable transmitting mechanism to convey the power of said float due to its rise and fall in the waves to operate a shaft adapted to be connected with suitable machinery. The object of the invention is to provide a simple and effective wave power, with suitable adjustments by which it may be made to operate under all conditions, especially those occasioned by waves of different and unusual heights, and also under those occasioned by the rise and fall of the tide. The device consists of a suitably restrained float, a rod extending therefrom and having teeth, a shaft having a ratchet wheel, a lever having a pawl engaging said wheel, a sleeve freely slidable upon the rod of the float and to which the lever is connected, a pawl in the upper portion of the sleeve adapted to normally engage the teeth of the rod, an arm connected with said pawl, a fixed stop above in the path of said arm whereby when the sleeve rises to its limit its pawl is disengaged, a pawl in the lower portion of the sleeve adapted to engage with the teeth of the rod, an arm connected with said pawl and a fixed stop below with which said arm comes in contact on the downward movement of the sleeve whereby the rod is freed and the float allowed to descend.

MOP.—Hermann A. Wolff, Sacramento, Cal. No. 559,092. Dated April 28, 1896. The object of this invention is to provide a mop, the frame of which is adapted to receive and to hold the mop material to the best advantage, enabling it to yield properly for the purpose of reaching corners, and similar inaccessible places, and to provide a handle for said mop adapted to be adjusted with relation thereto, and of a length sufficient to enable the operation to be carried on without stooping. The mop frame consists of standards having a toothed base, a series of toothed cross bars fitted and adapted to slide upon said standards and between which the material of the mop is wound and a means above to hold said bars to place.

MOP WRINGER.—Herrmann A. Wolff, Sacramento. No. 559,093. Dated April 26, 1896. This invention has for its object the provision of a wringing device adapted to be attached to the bucket and to receive the mop, and by the engagement therewith of the mop handle to be caused to squeeze said mop and relieve it of its excess of moisture. It consists of a perforated or foraminous vessel, composed of telescopic sections, whereby the capacity of the vessel may be increased to receive the mop and decreased to compress it and means actuated by the handle of the mop for causing one of said sections to slide within the other.

WINDOW-SHADE ATTACHMENT.—Percy Davies, Oakland, Cal, assignor of one-half to Sol Kahn, same place. No. 59,098. Dated April 28, 1896. This invention relates to an attachment for that class of window-shades which is actuated by a spring in the roller by which the shade is rolled up. It consists of a supplemental drum fixed to the end of the shade roller adapted to receive a band or cord, which winds or unwinds upon it simultaneously and in the same direction with a shade and in conjunction therewith of guides by which the band or cord may be led to a point distant from the window, so that the shade may be operated from said distant point. It is especially useful in large show windows, where the goods are displayed in such a manner that it is difficult to reach the ordinary shade.

DEVICE AND SAFETY ATTACHMENT FOR BANK CHECKS.—Morris Feintuch, San Francisco, Cal. No. 559,099. Dated April 28, 1896. This invention relates to an attachment for bank checks and drafts and similar papers, and is designed to protect those issuing such checks from loss by alteration or forgery. It consists essentially of a check or draft, having the stub at the left end, upon which the amount of the check is entered, and having at the other end a thickened or reinforce card, or extention, with a line of perforations whereby it may be readily separated from the check, said extension having imprinted upon it a corresponding amount, date and number with the check, together with the name of the bank or person upon which it is drawn, and having upon its opposite face the address to which it is sent.

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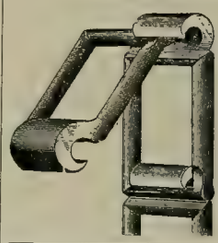
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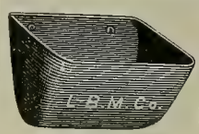
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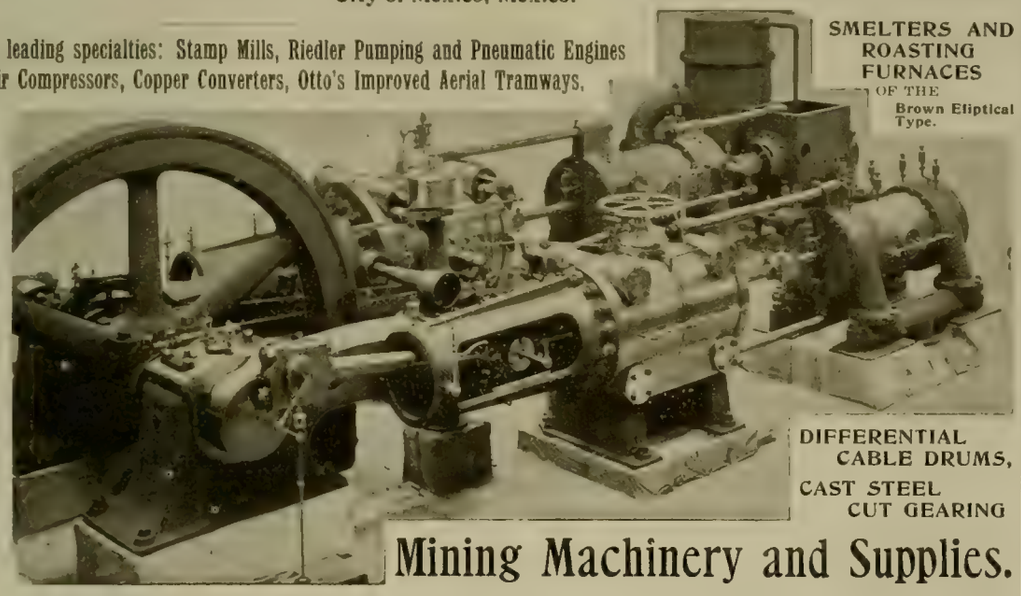
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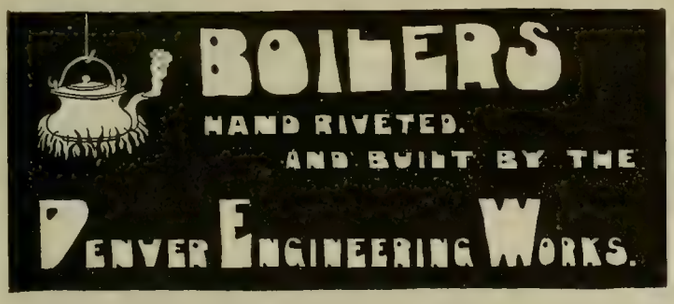


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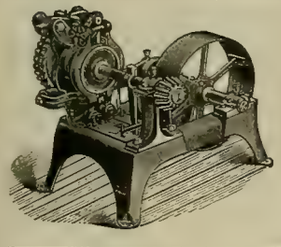

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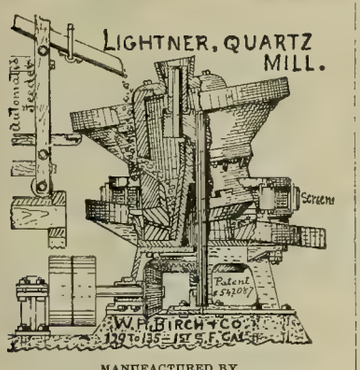


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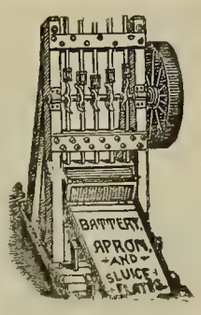
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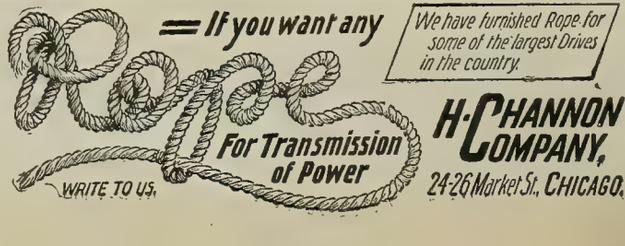
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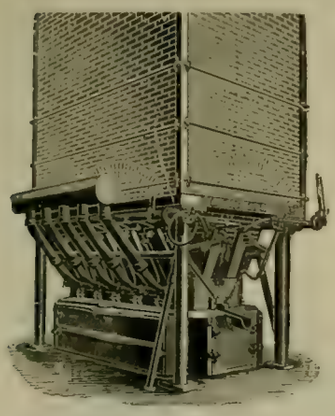
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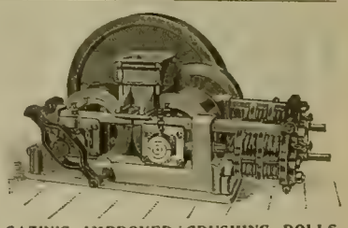
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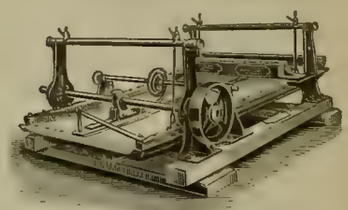
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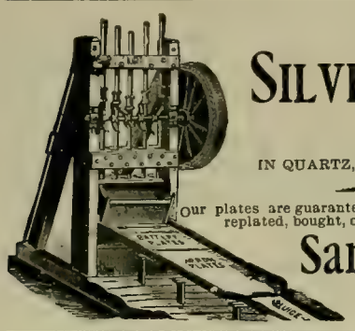
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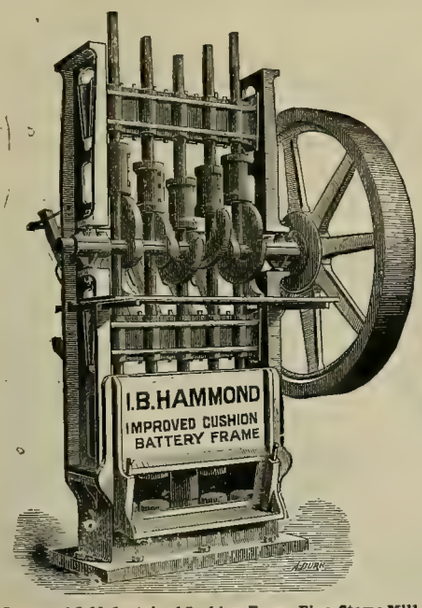
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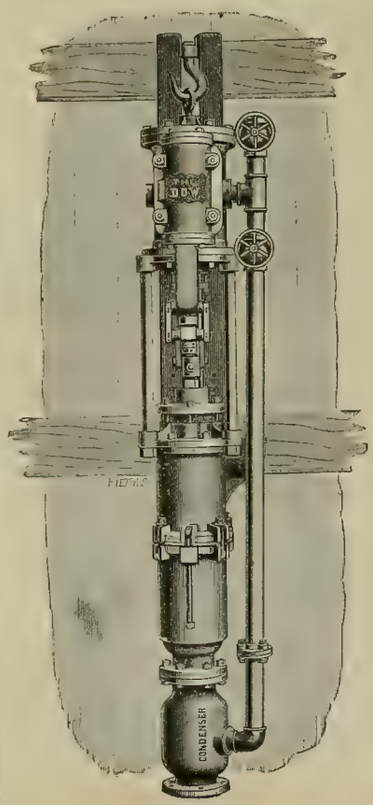
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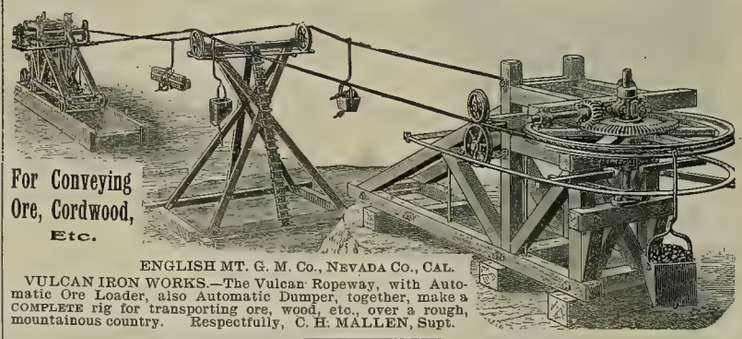
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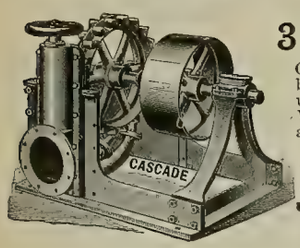
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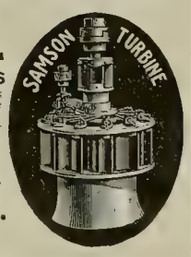
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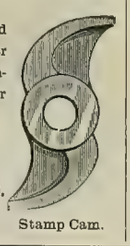
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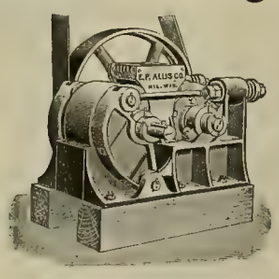
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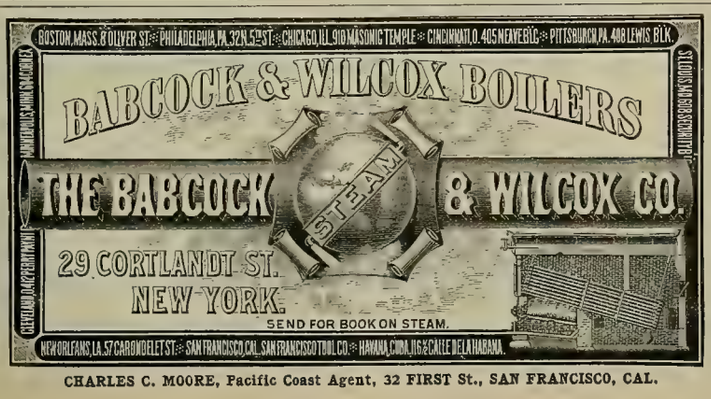
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# Market Reports.

## The Markets.

SAN FRANCISCO, May 7, 1896.

While there are still a few pessimistic merchants, yet the large majority speak quite hopeful of the general situation. The latter even go so far as to affirm that the coming Presidential election will not have that unfavorable effect as in years gone by. For fully three years we have been passing through a severe depression, during which time weak firms have been forced to the wall, leaving the remainder in better position. The improved crop prospects are a decided factor in creating a better feeling, although fears are entertained that unfavorable weather may set in before harvest. The outlook for about every kind of farm product favors the assertion that better average prices will rule this year than in 1895. The manufacturing interest, particularly with iron workers, seems to have entered on an era of much better times. The growth in gold mining has been phenomenal. This finds confirmation in the sales of dynamite powders for mining purposes. Manufacturers say that their sales in 1895 footed up the largest in their history, while so far this year they show an increase of over 25 per cent over that during the corresponding time last year.

In the local money market there is an increasing disposition to buy commercial and other good paper, with, in some instances, a slight shading in the rate of interest or discount. There can be no question that more outside money is coming in, while there seems to be a falling off in the call for accommodation. With merchants, as is usual at this season of the year, collections are poor in agricultural districts, but from the mining sections more general ease is reported. Our advices from New York are confirmatory of lower rates of interest, with money accumulating available for placing. This ease is making itself felt in business and manufacturing circles, which, if not checked by some unforeseen unfavorable event, will lead up to a large expansion of business throughout the country, particularly with labor troubles settled. It will also cause better prices. This is already being favorably felt with the iron and coal industries, which is spreading to other industries in close connection with them.

**New York Silver Prices.**

NEW YORK, May 7.—Following are the closing prices for the week:

| | London. | N. Y. |
|---|---|---|
| Friday | 31 1-16 | 68 |
| Saturday | 31 1-16 | 68 |
| Monday | 31 1-16 | 68 |
| Tuesday | 31⅛ | 68⅛ |
| Wednesday | 31⅛ | 68⅛ |
| Thursday | 31 | 67⅞ |

| | Copper. | Lead. | Iron. | Tin. |
|---|---|---|---|---|
| Friday | 10 75 | 3 05 | ..... | 13 30 |
| Saturday | 10 75 | 3 05 | ..... | 13 30 |
| Monday | 10 75 | 3 05 | 11 50@12 50 | 13 30 |
| Tuesday | 10 75 | 3 02½ | 11 50@12 50 | 13 35 |
| Wednesday | 10 75 | 3 05 | 11 50@12 50 | 13 35 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 6@7 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | par |
| New York Telegraphic Transfer | par |
| London Bankers' 60 days | $4.88¼ |
| London Merchants | $4.86¼ |
| London Sight Bankers | $4.90 |
| Refined Silver, per oz., 1000 fine | 68c |
| Mexican Dollars | 53¾@54½c |

SILVER.—The last steamer for the Orient did not take out any silver, which is something unusual, and shows the exceptional small demand from Japan and China. Bankers having close connection with those countries profess ignorance as to the absence of shipments, further than stating that their orders cannot be filled at quoted rates for the white metal. Eastern mail advices are to the effect that there has been, so far this year, only a moderate export movement, with the immediate future somewhat unsettled. It looks as if lower prices were trying to be secured.

MEXICAN DOLLARS.—The last steamer for China took out only 11,010 dollars, which is the lightest shipment on record. Another singular feature is that no banker shipped any; it was all done by Chinese. The market is quotable weak at 53¾@54½ cents

COPPER.—The market is reported unchanged, but the feeling appears to be stiffish. The East continues to report conservative buying by Americans, but the export movement continues remarkably free, considering the large exports for weeks past. James Lewis & Son of Liverpool writes that the statistics for the first quarter of this year show an increase in English home consumption of 6,654 tons, or at the rate of 26,616 tons per annum, while the exports have increased 3,538 tons. or at the rate of 14,152 tons per annum. Official figures issued in Germany show the consumption there during January and February of this year to have exceeded that of the same months of 1895 by 3,075 tons, or at the rate of 18,450 tons per annum. Large as the American production has been for the first three months of this year, being at the rate for the whole year of 34,937 tons over that for 1895, should the consumption in England and Germany alone continue on the scale of the last three months, a further increase of 10,000 tons per annum in the production of the world would be required to prevent further decrease of stocks, assuming that there is no increase of consumption in other countries. Production generally, with the exception of the United States, shows no signs of increase. The London *Times'* report of last week of trade in Scotland states that it continues very active, that shipbuilders are busy and booking large orders, that copper smelters are busier than they have been for years and that the same applies to boilermakers, marine and locomotive engineers and brassfounders. We hear the same of the Tyne, where the leading shipbuilders have orders for warships booked extending over several years and are extending their yards.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

TIN.—The market for pig has held fairly strong here and at the East. Tinplates have strengthened at the East in sympathy with the advance in iron and steel plate. With us no change in quotations has been reported.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

ANTIMONY.—The market is quiet and weak at 8½@9c cents in a jobbing way. New York mail advices quote 7½@7¾c for Cookson's, 6¾@6¾c for Hallett's and 6½@6¾c for Japanese, from store.

LEAD.—The market has ruled fairly firm at unchanged quotations. The East reports quiet markets, with business flat.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

QUICKSILVER.—There is a fair export demand for the west coast of Mexico and Central America. The home demand is light.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| Distant points up north | 38 00 |
| West coast of Mexico, for export | 34 00 |

POWDER.—The demand continues exceptionally large. The prices at which sales are being made do not leave any profit to manufacturers, but, notwithstanding this, we are authorized by the California Powder Works to state that the published statement that a combination is being formed is without foundation.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Hercules, No. 1, per pound | 11½c | | |
| " No. 2, " " | 8½c | | |
| Refined, in car lots | 6⅛ | | |
| Refined, in sacks | 5⅞ | | |
| Powdered, in car lots | 6⅛ | | |
| Concentrated, " | 5⅝ | | |

BORAX.—The market is quoted as follows:

LUMBER.—The market is fairly active at firm prices.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 14 00 | @ | 19 00 |
| Spruce | 26 00 | @ | 31 00 |

NAILS.—Dealers report a good demand at last week's advance. The East reports a strong, higher and active markets.

The market is quoted as follows:

| | |
|---|---|
| Wire, carloads, basis per keg | $3 22½ |
| " jobbing, " " | 3 35 |
| Cut, carloads, " " | 2 97½ |
| " jobbing, " " | 3 10 |

IRON.—The consumption in this city of pig continues on liberal scale. The market, while quoted unchanged, is said to be firm. The East reports a steady increasing and expanding demand with railroads free buyers.

Our market is quoted as follows:

AMERICAN.

| | To Arrive. | Spot. |
|---|---|---|
| Sloss | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |

ENGLISH.

| | | |
|---|---|---|
| Barrow | $21 00 | $23 50 |
| Gartsherrie | 21 50 | 23 50 |

COAL.—There is nothing new to report in our market. Good crop prospects are against import sellers as is the increased coast output.

SPOT FROM YARD—PER TON.

| | | | |
|---|---|---|---|
| Wellington | $7 50 | @ | 8 00 |
| Greta | 6 00 | @ | 6 50 |
| Nanaimo | 6 50 | @ | 7 00 |
| Gilman | 5 50 | @ | 6 00 |
| Seattle | 5 00 | @ | 5 50 |
| Coos Bay | — | —@ | 4 50 |
| Cannel | — | —@ | 8 00 |
| Egg, hard | — | —@ | 13 00 |
| Wallsend | — | —@ | 6 50 |
| Scotch Splint | — | —@ | 7 50 |
| Brymbo | — | —@ | 7 50 |

TO ARRIVE—CARGO LOTS.

| | | | |
|---|---|---|---|
| Australian | 5 | 25 | |
| Liverpool Steam | 6 | 25 | |
| Scotch Splint | — | — | |
| Cardiff | 6 | 25 | |
| Lehigh Lump | 9 | 00 | |
| Cumberland | 13 | 50 | |
| Egg, hard | 10 | 00 | |
| West Hartley | 6 | 50 | |

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 10 00 |
| " in sacks | — — | @ | 10 50 |
| Cumberland | — — | @ | — — |

## Mining Share Market.

SAN FRANCISCO, May 7, 1896.

The market for mining shares was featureless the forepart of the week under review. While there was no radical weakening in prices, yet the market had the appearance of going all to pieces, which discouraged outsiders on the long side and encouraged short sellers. Under such a condition it was only natural that large numbers sold. The shares thrown out were taken in by a combination of two or more small pools that seem to be doing the manipulation. Yesterday Chollar developed considerable strength, moving up under large transactions from around 95 cents a share in the morning to $1.55 at the close of the day's business. In the advance the whole line sympathized, with shares in Best & Belcher and Gould & Curry selling at a considerably higher percentage than did those in the other mines. It is the current belief with the better informed that much of the advance was due to some of the shorts filling on reports of a further improvement in the Chollar workings on the Brunswick lode. The advance in the market confirms the position taken in this department that two or more of the small pools could combine and promote an upward move at almost any time, but we still believe that, unless support should be given the market by large moneyed men, higher prices will be short-lived and result in quite a break; for as far as the writer is advised, present developments on the Brunswick lode do not warrant a large advance in the market. What may be found hereafter is a debatable proposition, but it is the uncertainty that makes the gamble. The advance in the market for shares in the mines on the Brunswick and Comstock lodes was felt by the Bodies, which also sold at higher figures. At this writing it looks as if, after the shorts have been forced to fill and chronic bulls come in as buyers, the market will decline and the leading shares sell at figures considerably lower than those at which they sold around top prices.

Assessments were levied the past week by the following companies: Savage, 20 cents a share; Overman, 10 cents; and Alta, 10 cents.

The news from the Comstock mines continues to report more or less work from one end of the lode to the other, except in Kentuck and Exchequer. Some of the work is of quite an encouraging character yet it points to time before results of a positive character can be determined, but while prosecuting it stringers are liable to be run into any day which may have a temporary favorable effect on the market. In the Alta group the only work officially reported is in Alta but it is essentially unchanged from that heretofore given out the past few weeks. While prosecuting the work a few tons of ore are extracted each week. In the Gold Hill group a few tons of ore raised each week by Overman, Confidence, Belcher and Seg. Belcher, with the two latter reporting the largest quantities. In none of these mines will the ore when milled pay current expenses. In Crown Point the most active exploiting work is being done which calls for the largest expenditure of money. On the 800-foot level of this mine they have started on the 2½ foot ore found in running the east cross-drift. On another level they were, at last advice, in ore assaying from $1 to $3 a ton and on still another level $3 to $7 ore has been found. It is useless to say this does not pay for extracting. We are not informed if work is being done in the Yellow Jacket mine. Prospecting work is still being done in Confidence on the level heretofore reported. Work has been stopped in the joint Confidence, Challenge and Con. Imperial west cross-drift pending some needed repairs. In Alpha the usual work on the 500-foot level is reported with no material change given out. Official letters from Bullion continue to report work on the long west cross-drift from the 850-foot station level. In Potosi, Chollar, Hale & Norcross, Savage and Best & Belcher the work is on the same levels as heretofore reported with no essential change either for the worse or the better. Ore is raised by the first four as the work progresses but it does not cover current expenses. In Gould & Curry the long west cross-drift is being pushed slowly ahead. Official letters from Con. Virginia report active exploiting work on several levels. While prosecuting the work enough ore is extracted, raised and milled to pay all expenses, which is largely in its favor. Interest continues to be centered on the work that is being done on the 1000-foot level of this mine. In Ophir and also in Mexican work is being pushed ahead on the 1000-foot level with no material change reported in the material encountered. On the central tunnel level of Ophir a few tons of hihg grade ore is being extracted as exploiting work is pushed ahead. From Union and Sierra Nevada our advices do not report any change in the character of the work or formation of the ground run through. The same advices come from Utah and Andes.

Interest seems to be largely centered by operators on the work under way on the Brunswick lode. In Occidental they are running lateral drifts south and north, so as to find the extent and value of the recent find on the upper level, while on the 750-foot level they are crosscutting the recent find. It is asserted that the ore found is base. Work under way at another point on the lode is attracting considerable attention, particularly that being done in the Chollar ground. Official letters report crosscutting on the 200-foot level, while the shaft is still being sunk. When a sufficient depth has been secured, a crossdrift will be started, so as to run for the downward continuation of the ore found above. Private letters received last Tuesday report quite an improvement on the 200-foot level. Several persons that have seen the ore are reported as saying that it is base.

From the Bodie district official letters do not report any change in the work or essential change in the material encountered, but private letters state that some stringers have been encountered of quite an encouraging character.

The market to-day partook largely of old times, with the exception that prices are not so high. Transactions were larger to day than at any time since the up-move commenced, with a most decided advance in the shares of the mines having ground on the Brunswick lode. This seems to indicate that the strikes on this load are making themselves felt. In the upheaval to-day the Gold Hills did not advance much, neither did Occidental and Hale & Norcross. The market opened strong and active this morning, but after call it shaded off slightly, only to close the informal session at noon at an advance on the 9:30 Call. The leader in the move was Chollar, with Best & Belcher, Gould & Curry, Savage and Potosi good seconds. Con. Virginia, Andes, Ophir, Union and Sierra Nevada also higher. At the 2:30 session this afternoon there was further advance under a large business, Con. Virginia leading in the north ends, Chollar in the middles and Confidence in the Gold Hills. With a very few exceptions shares sold higher to-day than for several months. The reported strike in Ophir is said to be in disputed ground; it is said to be claimed by both Andes and West Con. Virginia.

The following illustrates the changes of the week:

| MINES. | Apr. 30. | May 7. |
|---|---|---|
| Alpha | ..... | $ 18 |
| Alta Consolidated | ..... | 09 |
| Andes | $ 28 | 35 |
| Belcher | 50 | 59 |
| Best & Belcher | 58 | 1 00 |
| Bodie | 50 | ..... |
| Bullion | 14 | 26 |
| Challenge | 38 | 50 |
| Chollar | 68 | 2 15 |
| Confidence | ..... | 1 15 |
| Consolidated California and Virginia | 1 75 | 2 90 |
| Consolidated New York | ..... | 03 |
| Crown Point | 35 | 60 |
| Exchequer | ..... | 18 |
| Gould & Curry | 44 | 90 |
| Hale & Norcross | 1 25 | 1 45 |
| Justice | ..... | 08 |
| Mexican | 35 | 68 |
| Ophir | 1 25 | 1 65 |
| Overman | 13 | 14 |
| Potosi | 37 | 85 |
| Savage | 32 | 56 |
| Sierra Nevada | 63 | 87 |
| Union | 55 | 68 |
| Utah | 04 | 15 |
| Yellow Jacket | 37 | 50 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, May 7, 1896.
9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 1600 Alpha | 15 | 500 H. & N | 1 35 |
| 500 | 14 | 300 | 1 30 |
| 100 Alta | 08 | 400 Mexican | 52 |
| 200 Andes | 35 | 600 | 53 |
| 200 Belcher | 52 | 400 | 51 |
| 200 | 54 | 100 Mono | 14 |
| 100 | 53 | 450 Occidental | 1 20 |
| 500 | 55 | 400 | 1 25 |
| 200 Best & Belcher | 81 | 450 Ophir | 1 50 |
| 400 | 80 | 400 Overman | 12 |
| 800 | 84 | 1500 Potosi | 56 |
| 550 | 85 | 700 | 57 |
| 200 Bullion | 20 | 300 | 55 |
| 500 | 23 | 500 Savage | 44 |
| 200 Challenge | 43 | 300 | 42 |
| 2450 Chollar | 1 50 | 100 Scorpion | 08 |
| 100 | 1 45 | 500 S. B. & M | 16 |
| 1000 Con Cal & Va | 2 20 | 600 Sierra Nevada | 73 |
| 850 | 2 25 | 300 Union Con | 63 |
| 1000 Con Imperial | 02 | 700 | 64 |
| 250 Confidence | 95 | 1000 Utah | 15 |
| 300 Crown Point | 54 | 100 Yellow Jacket | 43 |
| 50 | 55 | 400 | 41 |
| 200 Exchequer | 07 | 450 | 42 |
| 600 Gould & Curry | 73 | | |
| 600 | 74 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 1000 Ophir | 1 65 | 200 Alpha | 17 |
| 100 | 1 60 | 700 | 18 |
| 500 Mexican | 66 | 300 Belcher | 58 |
| 600 | 65 | 200 | 57 |
| 100 | 64 | 200 | 59 |
| 1000 Gould & Curry | 88 | 200 Confidence | 1 15 |
| 700 | 87 | 200 Sierra Nevada | 86 |
| 200 | 89 | 300 | 87 |
| 100 | 90 | 200 | 84 |
| 200 Best & Belcher | 93 | 100 | 83 |
| 700 | 96 | 1500 S B & M | 17 |
| 600 | 1 00 | 1100 Savage | 55 |
| 300 C. C. & Va | 2 75 | 700 | 56 |
| 500 | 2 90 | 500 Utah | 15 |
| 50 | 2 80 | 200 | 14 |
| 500 | 2 85 | 650 Bullion | 26 |
| 800 Chollar | 2 15 | 500 | 25 |
| 1200 | 2 10 | 100 Exchequer | 18 |
| 1200 | 2 00 | 500 Overman | 14 |
| 50 | 2 05 | 300 Justice | 08 |
| 500 Crown Point | 60 | 600 Union | 68 |
| 800 Potosi | 85 | 100 Alta | 09 |
| 100 | 83 | 100 Caledonia | 15 |
| 1200 | 81 | 700 | 14 |
| 100 | 84 | 600 Challenge | 50 |
| 100 | 82 | 1300 Occidental | 1 30 |
| 550 | 80 | 200 Lady Washington | 05 |
| 400 H. & N | 1 45 | 200 Andes | 45 |
| 700 | 1 40 | 800 | 43 |
| 700 Yellow Jacket | 50 | 500 Con New York | 03 |
| 200 Kentuck | 07 | 500 Bulwer | 30 |

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied, Deling't and Sale. | Secretary. |
|---|---|---|---|---|
| Alaska-Willoughby G M Co, Alaska | 1 | 20c | Apr 6..May 25..June 29 | T Pollard, 22 California |
| Alpha Con M & M Co, Nev | 16 | 5c | Apr 7..May 12..June 2 | C E Elliot, 309 Montgomery |
| Alta S M Co, Nev | 52 | 10c | May 4..June 9..June 30 | J E Jacobus, 309 Montgomery |
| Bullion M Co, Nev | 47 | 10c | Mar 18..Apr 22..May 14 | R R Grayson, 331 Pine |
| Bur ington G M Co, Cal | 2 | 3c | Apr 23..May 27..June 17 | W C Ralston, 331 Pine |
| Caledonia S M Co, Nev | 46 | 5c | Apr 1..May 6..May 27 | A S Groth, 414 California |
| Challenge Con M Co, Nev | 21 | 5c | Mar 27..Apr 29..May 20 | C L McCoy, Mills Building |
| Crown Point G & S M Co, Nv | 67 | 20c | Apr 2..May 6..May 26 | J Newlands, Mills Building |
| Gould & Curry S M Co, Nev | 78 | 15c | Mar 25..Apr 28..May 20 | A K Durbrow, 309 Montgomery |
| Inyo Marble Co, Cal | 28 | 10c | Mar 30..May 4..June 4 | M A Cahn, Phelan Bldg |
| Mexican G & S M Co, Nev | 54 | 20c | Apr 23..May 28..June 18 | C E Elliot, 309 Montgomery |
| Occidental Con M Co, Nev | 23 | 10c | Apr 2..May 6..May 28 | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 2 | 3c | Apr 3..May 10..May 26 | F L Olmstead, 315 Montgomery |
| Ophir S M Co, Nev | 68 | 25c | Mar 17..Apr 20..May 11 | E B Holmes, 309 Montgomery |
| Overman S M Co, Nev | 75 | 10c | May 2..June 5..June 25 | G D Edwards, 414 California |
| Peabody G M Co, Cal | 6 | 10c | Apr 28..June 3..June 24 | B Natorp, 124 Sansome |
| Potosi M Co, Nev | 45 | 20c | Apr 9..May 14..June 4 | C E Elliot, 309 Montgomery |
| Savage M Co, Nev | 89 | 20c | May 1..June 3..June 23 | E B Holmes, 309 Montgomery |
| Summit G M Co, Cal | 14 | 5c | Mar 17..Apr 20..May 12 | J E Jacobus, 309 Montgomery |
| Utah Con M Co, Nev | 22 | 5c | Apr 3..May 6..May 27 | A W Havens, 309 Montgomery |

## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice. There are delinquent upon the following described stock, on account of assessment (No. 5, levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows.

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| Chas. A. Moore | 102 | 7,222 | 361 10 |
| Chas. A. Moore, Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6,000 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore, Trustee | 150 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 100 | 6,667 | 333 35 |
| N. L. Bell, Trustee | 128 | 250 | 12 50 |
| A. U. Rugg | 16 | 1,000 | 50 00 |
| A. U. Rugg | 67 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 155 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg, Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg, Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 160 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 111 | 1,667 | 83 35 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 143 | 3,135 | 156 75 |
| E. C. Godfrey | 154 | 4,000 | 200 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Nos. 37 and 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

### POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until SATURDAY, May 9, 1896, at the hour of 2 P. M., at the office of the Company, Room 38 Crocker Building, San Francisco, Cal.

E. C. GODFREY, Secretary.

### POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until MONDAY, June 8, 1896, at the same hour and place. E. C. GODFREY, Secretary.

Office, No. 38 Crocker Building, San Francisco.

TO THE STOCKHOLDERS OF THE SOUTH PALOMA GOLD MINING COMPANY, LIMITED:

Notice is hereby given that by resolution of the Board of Directors of the corporation, adopted on the 21st day of March, 1896, a meeting of the stockholders of the corporation was called for the purpose of increasing the capital stock to the amount of two hundred thousand dollars, to be divided into one hundred thousand shares of the par value of two dollars per share, and of determining the disposition to be made of the increased capital stock; and it was resolved that such meeting shall take place at the principal place of business of the corporation being the same building where the Board of Directors usually meet, to wit: No. 212 Sansome street, room 17, in the City and County of San Francisco, on WEDNESDAY, the 10th day of June, A. D., 1896, at 11 o'clock in the forenoon of that day.

Dated San Francisco, 2nd of April, 1896.

JOHN A. WRIGHT, President.

CHAS. WEBB HOWARD, JR., Secretary.


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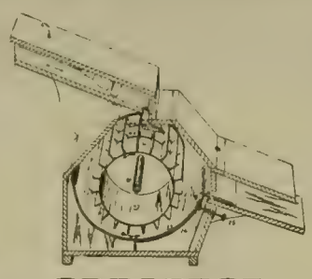
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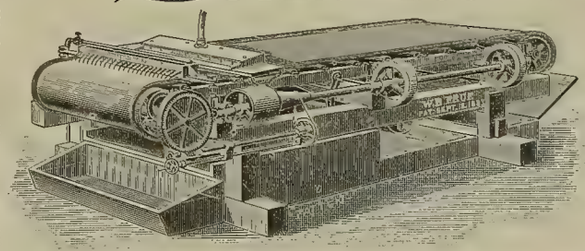
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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1871.—VOLUME LXXII. Number 20. SAN FRANCISCO, SATURDAY, MAY 16, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

## An Improved Geological Survey.

Director Walcott is keenly alive to the unavoidable deficiencies of the U. S. Survey and contemplates several improvements that will bring this important part of the public service more in line with the present need of miners and mining engineers. A bill now in Congress, and favored by those who are cognizant of the requirements of the case, appropriates money to erect monuments and bench marks fixing triangulation points and elevations. It provides not only that elevations above sea level, or some fixed point, shall be marked on the ground, by iron or stone posts or bench marks, in the region west of the 97th meridian, but also that one such mark at least shall be erected in each area equal to a township, six miles square, in the region east of the 97th meridian. If this provision is adopted it will enable the Survey to erect monuments not only at triangulation points, but also to establish monuments and bench marks wherever they will be of service to the civil engineer, the mining engineer, the geologist or any one who may desire to ascertain the true position and elevation of points of reference within any particular area. It is the director's desire that the proposed amendment shall be enacted into law, with a view to raising the topographic surveys to a higher standard of excellence and make them of greater usefulness.

In areal geology the geologist endeavors to delineate upon his map as accurate a picture as possible of the outlines or boundaries of different rock formations as they occur on the tract of ground which the map represents, in order that from this areal map he may draw deductions as to underground structure of that and adjoining regions, and construct profiles showing the courses and positions at various depths of these different rock formations and of their contained useful minerals. Topographic maps, even when the result of the most improved methods and greatest skill, are necessarily more or less imperfect representations of the earth's surface, and the geologist often finds it difficult to determine the exact location upon his map of an important geological feature.

Often triangulation monuments built of loose stones are scattered about, and others are built so that they cannot be distinguished by surveyors from those built by the topographers of the survey. It thus becomes apparent that it will be of great use to the geologist in mountain regions to have permanent and accurately located monuments within short distances of each other, to which he can refer in locating important geologic features and in checking on the ground the accuracy of his geological work.

In mining geology the same advantages will accrue as in areal geology, but to a greater degree. A large part of the observations of the mining geologist are made under ground, and their location is referred to a single point on the surface. This necessitates a still higher degree of accuracy for the location of such points as mouths of shafts or tunnels, because any considerable error may entirely vitiate the deductions drawn as to the probable location underground of ore bodies. Such points are located by mining surveyors with reference to corners of claims, and these in their turn with reference to some township corner. If the township corners are accurately indicated on the ground and on the map with reference to other topographical features, the other locations can be made in the office from the given starting points. In present practice, inasmuch as it is known that township corners may have a considerable though unknown error (in some cases of several hundred feet and in one known case of nearly a quarter of a mile), it is found to be necessary to make a new survey to determine the location of such mine openings as serve to connect underground workings with the surface. Owing to this, it is often the practice at present among local mining surveyors to connect their surveys with the triangulation points of the Government geological surveys, because they are more accurately and permanently located than land-survey marks. At the present time, however, these monuments are built of piles of stone, and often, when stones are scarce, of a single stone with a bottle buried beneath it, containing a record of the position of the monument; and again, the points are more or less widely separated, as they are made with reference only to the triangulation.

The original object of the topographic maps was to serve as a basis for the geologic map of the United States, but with the progress of the survey from year to year the public has become more and more acquainted with the maps, and a strong demand has grown up for the topographic maps as such, and it is time the topographic surveys should be connected directly with the land surveys in the manner proposed, and that permanent monuments should be left in all portions of the country where the surveys are made. As matters now stand it is necessary for an engineer to re-run many of the lines if he would know the exact elevation of any point. Many thousands of dollars expended in such work could be saved by the simple provision of placing a few permanent marks at the time the topographic surveys and the precise level lines are being run. It is estimated by Director Walcott that the cost of the extra work and the monuments will average from $1 to $1.50 per square mile. This will decrease the output of work about one-fifth as compared with the present cost. The greater utility and accuracy of the maps will more than compensate for the additional cost.



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J. F. HALLORAN.....General Manager

San Francisco, May 16, 1896.


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LAST THURSDAY'S official trip of the battleship Oregon in Santa Barbara channel was one of great industrial importance to the coast, which, with the vessel's builders, the Union Iron Works, is to be congratulated on the result. To successfully compete with the Atlantic coast shipbuilders is no small triumph, and the product of a Pacific Coast shipyard now takes her place at the head of the great battleships of the American Navy. The $175,000 extra bonus earned by the builders is a trifle in comparison to the credit that will accrue to them, to California and the entire Coast as the result of last Thursday's performance.

THE depression in silver mining caused Congress in '93 and '94 to suspend for those two years that part of the Federal mining law requiring an annual expenditure of $100 in work or improvement on an unpatented mining claim. That concession ceased in '94. While, individually, the enforcement of the law may work hardship, yet in general that requirement is a good one. If a man cannot hold a claim he had best relinquish it. A miner or prospector is not confined to the ownership of one claim: he can take up and hold twenty if he complies with the law. Many do take up more than they can manage, and that tends to keep back the development of the district. General justice requires that a man should either work a claim at least to the little extent required by the letter of the law, or else give it up.

THERE has been some advance in mining legislation in Congress from that reported in our last issue. The Mineral Land bill which passed the House, and, amended to include Oregon, passed the Senate, has had action delayed upon it before the House Committee where it went for agreement, by reason of Congressman Bowers' illness. It was expected that it would be made a special order for the 15th, when if the House concurs in the Senate amendment the bill will go to the President for his signature. The River and Harbor bill passed last Wednesday with a clause wherein a Board of Engineers is provided to take charge of the Sacramento and Feather rivers, make surveys and superintend the expenditure of all appropriations made for these waterways. For the construction of restraining barriers on the Sacramento and Feather rivers $250,000 is appropriated, to be expended in connection with the conditional $250,000 appropriation made for the purpose by this State. The President may veto the bill, but if he does the necessary two-thirds majority will pass it over his head. The contemplated adjournment of Congress and the approach of the Presidential campaign makes it unlikely that there will be any further mining legislation acted on during this session than that mentioned herein.

## The Hale & Norcross Suit.

Last Tuesday, in the Superior Court of this city, Judge Hebbard announced another decision in the Hale & Norcross case, in which, after quoting from the decision of the Supreme Court reversing his former judgment, he gave judgment for the plaintiff, M. W. Fox, in the further sum of $417,683, in addition to the former judgment of $210,197.50. He took for a basis the value of the car sample assays. After discussing the evidence as to battery assays, he says:

The following facts and figures are admitted to be correctly shown by the record in the case: Number of tons of ore from Hale & Norcross mine milled at the Nevada and Mexican mills from January 1, 1887, to July 1, 1890, 84,068.1700; value of same as shown by car sample assay, $3,224,286.53; average value of same per ton, car sample assay, $38 35. Value of same as shown by battery sample assay, $2,225,256.54; value of bullion returned by mills to mining company, $1,678,921.16, of which $718,345 was gold and $960,576.17 silver; percentage of gold in bullion, .4268; percentage of silver in bullion, .5722; average discount on silver during period, with standard at 1.2929, running from 92 to 1.06, .26112. * * * The value of these ores delivered to these mills during the period mentioned is $2,551,742, of which $1,460,107 is silver and $1,091,635 gold. This value is ascertained by deducting $8 per ton from the car sample assay value. Example: Car sample value, $3,224,286; 84,068 tons at $8, $672,544; balance, $2,551,742. * * * The deduction of $8 per ton is a most liberal allowance. Plaintiff contends that a deduction of $5 would be ample, and the evidence above referred to would perhaps warrant an average deduction of but $5. The amount of the value of the ore delivered to the mills, which was necessarily lost in working or would not under fair milling be separated from the baser matter, and therefore which is the amount to be deducted for loss, is $381,769. The loss is made up as follows: Slimes, $98,358; moisture, $32,214; tailings, $251,197; total, $381,769. * * * The average of these settler sample assays, as claimed by plaintiff, is $3.08 per ton, and as claimed by defendants $3.38 per ton; the latter is adopted for the calculation. As all the slimes and moisture are above accounted for, neither form a part of the tailings for the purpose of the calculations. The total amount of the slimes and moisture must be deducted from the amount of ore in order to ascertain the amount of tailings. Example: Slimes, 7566 tons; moisture, 840 tons; total, 8406 tons. Deduct 8406 tons of slimes and moisture from 84,068 tons of ore equals 75,662 tons of tailings, without deducting the weight of the bullion; 75,662 tons multiplied by $3.32 equals $251,197, total loss occasioned by tailings, and making the total loss occasioned by slimes, moisture and tailings, as aforesaid, the amount of $381,769. From the value of the ore delivered to the mills—$2,551,742—deduct the total loss occasioned by slimes, moisture and tailings, $381,769, and the balance, $2,169,973, is the amount of bullion, with silver at 1.2929, which ought to have been returned to the Hale & Norcross Company. From this amount, $2,169,973, deduct $1,678,921, the amount of bullion, with silver at 1.2929, which was returned, and the balance, $491,053, is the apparent deficit; .5722 of this amount, or $280,980, is silver. Taking out of $280,980 the average discount on silver, or .26112 thereof, which is $73,369, and deducting this total discount for silver, $73,369, from $491,052 leaves a balance of $417,683, which is the net deficit and the amount in money which ought to have been returned over and above the $1,678,921 which was returned in bullion, and this is the amount, $417,683, which the court finds to be the amount of damages sustained by the Hale & Norcross Company. * * * John W. Mackay, D. B. Lyman and other witnesses testified that in the old days of the Comstock the mining companies required a return from the mills of 65 per cent of the wagon sample assays in bullion; sometimes they received a little more and sometimes a little less, but if less than 65 per cent was returned the mills were called upon to make and did make up the deficiency. In view of this evidence it may be interesting to know that the amount of bullion which ought to have been returned to the Hale & Norcross Company, as above found to be $2,169,973, is about 67 per cent of the ore, $3,224,286, as valued by the car sample assay, and it is more than $12.50 per ton less than the average car sample assay per ton of $38.35.

On Wednesday, after hearing argument on the point, the judge concluded that he had power to allow interest on the $412,683 at 7 per cent from June 7, '92, and made an order in accordance therewith.

The case will undoubtedly be appealed to the Supreme Court, where it is likely a rehearing will be ordered, virtually a retrial of the whole case.

J. B. FARISH, a mining engineer working for London and Boston capitalists, who recently returned from Mexico, says: "When in Mexico ten years ago I could not buy a single piece of mining machinery made in that country, nor could I find anything manufactured there except serapas and plain cotton cloth. But with the fall in silver bullion Mexico could not afford to pay $2 for $1 and import foreign manufactures, so home manufactories started up everywhere. Labor wages and local prices are unchanged in Mexico, but you can now buy for a silver dollar or less that which formerly cost a gold dollar and more when imported. You can now buy anything there in the way of mining machinery of local manufacture. Canning establishments have been erected, and where formerly you could not get anything in that line at less than $1 a can, all being imported, you can now buy all you want of local manufacture at 25 cents in silver per can. Ginghams can no longer be imported from the United States. The best are now made there in factories stimulated into existence by the high cost of gold. A young Mexican manufacturer told me that the development of Mexico in the manufacturing line was now going on at such a pace that in a few years it would be a considerable exporter of manufactured goods into the United States. When I first conducted mining operations in Mexico," continued Mr. Farish, "there were no candles to be had in that country except the Goodwin and Snyder candles, which were imported from the United States. The only candles of local manufacture were the ordinary tallow dips of revolutionary days. Now first class mining candles manufactured in Mexico can be obtained at a reasonable cost, and at such figures as prohibit the importation of the United States product. The same thing can be said of soap and many other articles of manufacture. Besides all this, Mexico has already begun a small export trade into the adjacent silver basis countries on the south, which will in time grow to such proportions as to practically exclude imports to those countries from manufacturers in gold basis countries." This makes a good argument for free silver and protection.

## South African Trade.

The trade of this coast and the country in general with South Africa is an increasing one. For the year ending June 30, '92, the United States sent to South Africa goods valued at $3,400,000; for the next year, $3,500,000; for the year ending June 30, '94, $4,122,912; June 30, '95, $5,000,000, and it is estimated that the aggregate for the twelve months ending the 30th prox. will be nearly $10,000,000. Mining machinery is a large item and should be larger. There is an immense trade there, and, under regular conditions, this coast and country should find one of its best customers in South Africa. In '93, while we sent $3,500,000 worth of goods, England's trade there aggregated $46,000,000. California helps feed the South Africans. Oregon and Washington send lumber; but in manufactures, more especially in improved mining machinery, quality and price should overcome the natural tendency of South Africa to trade with England. A New York paper publishes a manifest of a cargo clearing on an American vessel for Delagoa bay, the port of Johannesburg. Among the items are "lard oil, leather, hardware, lamps, codfish, corn, flour, canned meats, axle grease, turpentine, varnish, manufactured wood, barbed wire, doors, handles, plows, axes, cigarettes, canned fruit, baking powder, brooms, carriages, nails, apples, apricots, canned oysters, kerosene, wheat, clocks, medicines, evaporators, hams, stoves, wheelbarrows, dried fruit, sugar, cotton goods, spokes and hubs, oil, crucibles, ropes, seeds, iron pipes, steam pumps, starch, glassware, gloves, curtains, rubber goods, shovels, mining machinery, furniture, organs, whips, hay, clothing, soap, cartridges, wire mats, oats, lumber, nectarines, candy, can openers, tongues, hay cutters, iron bolts, petroleum, books, candles, paraffine wax, suspenders, playing cards, glucose, mail coaches, knives, electrical machinery and supplies, hammocks, paper bags, trunks, exterminators, tomatoes, syrup, white duck, perfumery, windmills, benzine, oil stoves, razor strops, coffee mills, essences, copy presses, iron sieves, picture frames, bird cages, plated ware, watches, dental chairs, dress goods, lawn mowers, scales, drugs, typewriters, paper, charts, rye, bicycles, lead pipe, roofing, carts, trucks, canned salmon, feed cutters, and electrotypes." How much of such a cargo San Francisco could send is easily determined. New York has the bulk of the trade. We are at the front door of the Continent, if we look at it that way.

Terms of sale are yet according to English custom and precedent. English houses give their Transvaal customers six months' credit. American dealers draw at sight for nearly all shipments.

A GOOD MANY THINGS are "going to be done after the election." One thing that should be done is to have a Secretary of Mines and Mining in the Cabinet. The mining industries of this country are of sufficient importance to justify such a department and the miners are numerous and influential enough to secure it. Concentration of effort and unity of purpose will bring it, and it is a good time to begin the agitation of the question.

THE mining industry of this State and the manufacturing and producing interests in direct connection with it are the only California industries that are not dependent upon the result of the fall election or waiting to see what will happen.

## Concentrates.

THE Yreka *Union*, a clean, consistent paper, has begun its 44th year.

THE Trail, B. C., Tramway Co., expect to have their track laid to Rossland, B. C., by June 1.

THE largest stamp mill now in operation in South Dakota is the 200 stamps of the Homestake mine at Lead.

A RECEIVER has been appointed for the New York Mining Exchange, which will probably wind up that concern.

MESSRS. MARSHALL, KNOWLES AND MITCHELL have organized the Pacific Northwest Bureau of Mines at Portland, Or.

H. A. COHEN, manager of the De Lamar, Nev., property, says the new mill is a success, handling daily 200 tons of ore.

THE Western Federation of Miners is in session at Denver, Colo. The first two days were devoted to committee reports.

IT is locally reported that the Pearce family have sold their mine at Pearce, Arizona, for $275,000, of which $30,000 was paid them in this city last week.

THE French company which recently bought the Crown Point mine, Nevada Co., made the final $45,000 payment to A. Gauthier in this city last Monday.

GIANTS used in hydraulic mining in this State are of varying dimensions at the nozzle, according to individual requirements, eleven inches being the limit.

THE Northern Pacific announces in Montana that it will sell any land for which it acquires title for $5 per acre, "whether it be mineral land or not."

THE Treadwell and Mexican mines on Douglas island, Alaska, are credited with intention to increase their milling capacity from 240 to 300 and 40 to 200 stamps respectively.

THE net proceeds of Utah mines will be taxed as other personal property. The assessors will list this year on the basis of the net proceeds of mines for the year ending June 1, 1896.

THE Shasta *Courier* says: Recent storms have added five feet of new snow on the mountains between Etna and Sawyers Bar. The snow is also deeper on Mt. Shasta than usual at this season.

ABOUT three miles from Bodie, Cal., the Standard Co. is building a second cyanide plant of 120 tons daily capacity, the same as the first one. It will be ready to start up about the 10th prox.

SENATOR STEWART of Nevada and some of the officials of the General Land office express their chagrin at the passage of the Mineral Land bill and hope to yet block it by inducing a presidential veto.

FOR April the Alaska Treadwell Gold Mining Company reports bullion shipment, $46,867; ore milled, 22,114 tons; sulphurets treated, 347 tons; of bullion there came from sulphurets $14,759; gross expenses, $27,469.

THE Trail Creek, B. C. *News* wishes the widest publicity given to the statement that there are over 1000 unemployed men in Rossland and Trail and that any one going there seeking work should invariably buy a return ticket.

SYLVANITE, of rare occurrence and scanty yield, is usually composed of tellurium, 55.8 per cent; gold, 28.5 per cent; silver, 15.7 per cent. Sometimes antimony practically replaces the tellurium and a varying percentage of lead occurs.

THE Mountain Mines Co. of Shasta, Cal., appear to have some delay in their workings. However, they are evidently sanguine of success, as they advertise for 10,000 pounds of fresh meat per month for six months beginning June 1st, '96.

THE Victor, Colorado, mine, which originally cost $15,000 is reported sold by D. H. Moffatt and Eben Smith, to a French company for $1,250,000. The company is composed of farmers, gardeners, etc., operating through a Paris representative.

COAL MINING is paying one party of miners in the Yukon better than gold mining paid them. A find of excellent coal was made recently in the Forty-mile Creek district, and with wood at $12 to $14 a cord, the coal vein is an excellent paystreak.

ASBESTOS has again been discovered in Arizona, "for the first time west of the Rocky mountains." There are several deposits in this State and Oregon and two or three asbestos manufacturing establishments in this city where it brings about $30 per ton.

THERE was an unsuccessful incendiary attempt to burn the Bunker Hill concentrator at Wardner junction, Idaho, last Monday. The time selected was when most of the mill hands were at supper. One remaining, saw the fire as soon as it started and promptly put it out.

THIS week the Federal Grand Jury returned indictments against seven Chinese miners, charging them with violating the Caminetti act by employing hydraulic power on the Green Valley mine, in Placer county, without first securing a permit from the Debris Commission.

IN the Superior Court of Riverside county the assignee of the Santa Rosa mine at Perris has been granted an order to sell the property for sufficient to pay all the debts—$10,000—to be paid in cash and the balance in six and fifteen months, secured by a mortgage on the property.

COLORADO'S gold output for 1895, as given out by the Director of the Mint, aggregates $15,013,434. The value of the silver produced is stated to be $31,075,296, calculated on a basis of $1.29 an ounce. The value of the lead produced is computed at $3,047,590, copper $1,065,900.

NO ONE connected with the California Miners' Association in any way has received directly or indirectly any compensation for his services, in some cases those serving even paying their own expenses. The association has secured specific service that, measured by the ordinary standards of value for such skill, would have cost many thousands of dollars.

AT Soulsbyville, Tuolumne Co., last Wednesday four men—J. Mitchell, J. D. Sullivan, A. Slutten and C. Fane—working in the 130-foot level of the Soulsby mine, going in after a heavy blast had been fired, were overcome by the fumes. They were got out alive, but Mitchell died that evening and Sullivan and Slutten were not out of danger at last accounts.

WHEN some Comstock stocks went soaring last week, three brokers had to close their doors. "Servant girls," etc., who had trusted their money were the chief losers. Ordinarily the "servant girl method" of investing in mining stocks, consists of going it blind with the brain empty of knowledge and the breast full of hope, but it is sometimes a matter of misplaced confidence—in the broker.

THE Alabama mine, about 1000 feet south of the Rawhide, Tuolumne Co., has been bonded and men put to work under the superintendency of W. E. Nevills. A 20-stamp mill to work it on the proposition that it was a silver producer was put up many years ago, but was a failure. It is now being developed on the assumption that it can be made a paying gold producer.

IN the Witwatersrand district, South Africa, Crown Reef, from 209,993 tons, gave 130,031 ounces, of the value of £430,364, and Robinson, from 140,655 tons, gave 157,208 ounces, of the value of £566,606. The yield of Crown Reef and Robinson, as given in the Crown Deep report, has been: Crown Reef, 778,952 tons, yielding 512,421 ounces, or 13 dwts. per ton; Robinson, 584,283 tons, yielding 848,454 ounces, or 29 dwts. per ton.

IN Australia, with its low-grade ore, capital and energy propose lifting water 2500 feet and carrying it 225 miles across a desert; in Johannesburg, amid all the natural and political discomforts, capital and energy overcome untoward conditions. In California, under the most favorable conditions, with an auriferous area unsurpassed anywhere in extent and richness, capital and energy occasionally hesitate in taking hold.

SUPT. KEATING of the Savage mine, Virginia, Nev., says on the 850-foot level they have stoped up to the third floor in the ore encountered in the east crosscut which is of good quality and is 9 feet wide. In east crosscut No. 4 they have stoped up to the third floor, and that the ore is increasing in width and is of good quality and states that sixty carloads of ore, assaying by car sample $66.37 per ton, were extracted during the past week.

AN unconfirmed cablegram from Pretoria, South Africa, states that the sentences of Francis Rhodes, John Hays Hammond, Lionel Phillips and George Farrar, who were condemned to death by the High Court at Pretoria upon charges of treason, in being active members of the Johannesburg Reform Committee, which was held to have instigated Dr. Jameson's raid into the Transvaal, has been commuted to imprisonment for a term of five years.

A BULLETIN of the Geological Survey, issued this week, shows complete returns from all smelters and refiners in the United States, giving lead contents of the ores smelted by them, distributed according to States and Territories. Colorado leads in 1895, with 46,984 tons in the former year, as compared with 50,013 in 1894. Idaho follows with 31,638 tons in 1895, as against 33,308 in 1894, and Utah comes next with 31,305 tons in 1895, as compared with 23,190 tons in 1894.

CONGRESSMAN JOHNSON has introduced a bill to amend section 2324 of the Revised Statutes of the United States so that where a person or company has sunk or may sink any shaft of any size by boring for the purpose of developing the depth of a channel in gravel mines or otherwise, the work so done and the money so expended in said sinking or boring shall be taken and considered as assessment work done and performed upon the claim to the amount of the work or money so expended.

KEYSTONE, SOUTH DAKOTA, is favored by the presence of A. W. S. Rothermel of Brooklyn, N. Y., who, it is stated, is able to draw an accurate map of the underground workings of a mine he never saw. Further information is vouchsafed to the effect that he can locate ore bodies and if given a piece of ore can tell what part of the mine it came from. "He always goes alone," which melancholy statement precludes possibility of partnership with Prof. Kimball, who is said to be equally gifted.

LEMUEL EASTMAN of Chicago is the latest man who proposes to "revolutionize the mining industry of the world." He is the inventor of a machine for reducing ores by electricity which, he says, has solved the problem that has so long puzzled Edison and other eminent electricians of the country. The machine, it is claimed, will enable mine operators to secure 98 per cent of the metal in the refuse dumps. It is designed "to work over the dumps and separate the metals from the most rebellious ore at a cost of not more than 1 per cent of the values recovered." Mr. Eastman is so fearful of the possibility of the discovery of his secret that he has hidden the several parts, though an application for a patent has been filed.

SEVENTY-THREE firms are now engaged or ready to engage in the manufacture of tinplates in this country. Thirty-four of these concerns are dipping plants, which merely coat black steel sheets bought in the market and finish them into tinplates. The remaining thirty-nine are tinplate works proper; plants which roll and coat their own steel sheets. These thirty-nine works possess an aggregate of 172 hot mills, used for manufacturing the black steel plates, which when coated constitute tinplates. In the first three months of '96 seventeen such mills were added to the works, increasing their annual capacity by over 500,000 boxes, and bringing the present capacity of the American tinplate mills up to over 5,000,000 boxes a year.

UNDER date of April 25th a prominent mining man of this city is in receipt of a letter from London, England, which says: "The dense ignorance that prevails in London regarding the merits of California gold quartz mines is astonishing. I have been hunting all over London for a copy of the San Francisco MINING AND SCIENTIFIC PRESS, containing information about the mining interests; there is none to be found. To purchase fifty copies of the MINING AND SCIENTIFIC PRESS, each edition distributed in London, Manchester and Liverpool, would be an eye-opener to investors." London is a large place; nearly one hundred copies of this paper go there every week, but one might look unsuccessfully for a copy unless he knew just where to go.

ANOTHER attempt is to be made to raise the copper-laden steamer Pewabic, which sunk in Thunder bay, Lake Huron, thirty years ago, in 180 feet of water, by the American Salvage and Wrecking Company. The company reports a successful test in 220 feet of water in Milwaukee bay. It is said that there will be no trouble in working in water at a depth of from 200 to 300 feet. The Pewabic was sunk in a collision with the Meteor. The copper cargo is valued at about $60,000. It has been found impossible for divers to work at so great a depth of water as the Pewabic is in, and some years ago a diver named Pelig was killed in an attempt to raise the steamer. The bell to be used is built of steel, 1 inch in thickness, and is 6 feet in diameter and 8 feet in height. It weighs 13,000 pounds.

THE old Montana mining law allowed no period after discovery for tracing the course of the vein before marking the boundaries, and while the courts generally have held that the discoverer might have a reasonable time for such development work, yet locators were usually in haste to mark the boundaries, with the result that claims were often not located properly along the course of the lode. It is the policy of the new State law there to give a period of ninety days for exploration in order that the exact course of the lode may be ascertained, and the corner monuments established where they should be. A similar law has been in force in Colorado for several years, and the allowance of such a period for exploration has been approved by the U. S. Supreme Court. Since the law does not require the locator to define his boundaries by monuments at the time of posting his notice, and since nothing is to be gained by establishing the corners at such a time and much may be lost, it is deemed better for the locator to take as much of the ninety days as he needs, to trace with accuracy the course of the lode before marking his boundaries.

IT is one of the laws of the Butte Miner's union that no member shall enter into any contract to do underground work unless he receives a guarantee that his wages will be not less than $3.50 per day while engaged in such work. The union is opposed to the contract system except in certain cases, believing that the miner who toils underground is entitled to the standard wages of the camp and that the mine manager can dispense with the miner's services when he finds that the miner is not competent to do his work. Recently, says the *Miner*, the union has been called upon to adjudicate certain matters of this nature in some of the Butte properties where contracts have been let. It was claimed that in one case the men were not averaging more than $1.50 per day.

IN the case of Trevaskis vs. Peard (Supreme Court, California), 44 Pacific Reporter, 246, it is held that the owner of a placer mineral claim does not forfeit his right to same, so as to render it subject to relocation, by a failure to perform the required annual assessment work during a time when adverse possession is held by another, when he commences an action for its recovery within the statutory time. Where the owner of such a claim, which was erroneously included in a sale under a decree of court, moved his effects from the claim, and absented himself for two years, allowing the purchasers to work it without objection, while he knew that their title was invalid, and intending to claim it only in case their development rendered it profitable to do so, his acts will constitute an abandonment.

OLM & LOFSTRAND have patented in Sweden a process for extracting gold or bismuth from ores by means of melted lead. The process can be applied to mineral mixtures containing, for instance, iron ores, limestone, bismuth, native gold, quartz, or silicates, and even when the mixtures are so poor in gold and bismuth that it would otherwise not pay to work them. The process consists in placing the ores in a bath of melted lead, keeping it as free as possible from contact with the air. To gold ores which contain little or no bismuth, enough bismuth is added to reduce the melting point of the alloy as far as possible, and thus prevent oxidation of the alloy and loss of metal. The bath is filtered through a cylinder, the bottom of which consists of a perforated sheet of metal covered with a layer of asbestos, pieces of iron wire and coal dust.

THE battleship Oregon made a successful official trip in the Santa Barbara channel last Thursday morning. She made an average of 16.79, the world's record, going as high as 17.08. This is a big plume in the cap of the coast builders. Up to the present time the Indiana and Massachusetts held the record for battleships of their class. Now the Oregon, built in San Francisco, shows superior speed. The Union Iron Works will get a premium of about $175,000 over the price of the vessel and a world-wide advertisement. The required speed was fifteen knots. The Indiana had her official trip October 18th, 1895, averaging 15.61; the Massachusetts, April 25th, 1896, average 16.15. The Oregon, last Thursday, with her average of 16.79, and stands at the head of 11,000-ton battleships. The Pacific coast has shown what can be done in shipbuilding; the Union Iron Works have beaten the Cramps, their Atlantic rivals.

APPROPRIATIONS for California are contained in the River and Harbor bill as follows: For improving San Pedro, $50,000; continuing the improvement of Oakland harbor, $75,000; San Diego harbor, $50,000; San Luis Obispo harbor, $40,000; for improving the Sacramento and Feather rivers and tributaries, the Secretary of War is authorized to appoint a board of three army engineers for the purpose of making surveys and examinations of the rivers and submit the most feasible plan for the improvement of the rivers and maintenance of navigation thereon, and to have charge of the work by them recommended as appropriations are made therefor. The board may, under direction of the Secretary of War, expend any balance now remaining to the credit of the rivers in the improvement of the same, after deducting the expense of the surveys and examinations. For the construction of restraining barriers for the protection of the Sacramento and Feather rivers $250,000. For improving the San Joaquin river and completing cuts at Twenty-one mile Slough $20,000. For improving Napa river $4000.

ONE of the great mining communities in France is that at Anzin, where over 11,000 persons are employed. The management at this place has attracted much attention in various places. The pension fund system there, for instance, affords an example which other mining companies are now compelled by law to follow. After an employee has been connected with the Anzin mines for three years and is 18 years of age, he begins depositing at the rate of 3 cents in every two dollars of all his earnings, and the company deposits a like amount until he reaches the age of 50. He can then retire on a pension of about $40 a year, if he likes. The company ceases to make any deposit after that time, but the man may continue to add to his pension account if he likes, and if he keeps on working, as a few miners do. Of the 11,000 employees at Anzin 547 are over 50 years of age. At least half of the whole number are between the ages of 13 and 27; the others vary from 27 to 62. The company provides three ways of housing its miners. A man can rent one of the company's houses, or can buy one, or can get an advance of money to help him build for himself. Medical attendance is provided by the employer without charge. There are some mutual aid organizations among the Anzin miners themselves, but of course the company deserves no special credit for the good done thereby. The average yearly pay is about $290; but this average represents not only adult miners, but a lot of boys between 13 and 16 years of age. The youth of many of the French miners is a painful thing to consider.

## Waste Products of Placer Mining in California.

The loss occurring in gold placer mining has been noted for years; but so far no special effort has been made to ascertain its extent or to remove the causes that occasion it. As yet, in placer mining, all efforts appear to have centered upon perfecting mechanical appliances and using natural forces in the rapid handling of large quantities of material, without special inquiry into the percentage of loss, even in the most gigantic operations and without any scientific study of the composition of the material treated. Pursuing a different course, and investigating the physical properties of the gold and enclosing mineral matter, both in original gravel beds and in the accumulated deposits of waste products so frequent in California, the writer has discovered many of the causes of loss in mining operations, and, based on this experience, has devised methods for its prevention, which are here briefly presented in their most salient features.

A loss of gold occurs in all placer mining operations, chiefly in microscopic gold and through gold encrusted by foreign matter. This loss is variable, and is the greatest, relatively, in hydraulic mining, which, although economic in many respects, yet is the most wasteful of all known methods of gold mining. The average loss of gold in hydraulic mining, when much of the gold is fine, is fully 40 per cent, and may be as high as 60 per cent. This loss is now locked up in the tailings found all through the gravel mines of central and northern California. Much of these tailings have during late years been reduced in volume and concentrated by the action of running water, and in all such instances their gold contents are high enough to be valuable and often far exceed the gold value saved in the original hydraulic operations as quoted in the yield of gold per cubic yard. This gold can be practically recovered from the tailings chiefly in connection with the black sands.

The gold contents of such naturally concentrated tailings vary from 10 cents per cubic yard up to and above $1 to the cubic yard, averaging over 50 cents. The cost of working by my system, including concentration of tailings and extraction of gold from black sand, will, under ordinary conditions, not exceed $15 per ton of black sand, equivalent to 15 cents per cubic yard of moderately concentrated tailings. Tailings in quantity have been found by me going as high as $3 per cubic yard. In many gravels and tailings platinum exists in paying quantities and can be collected. Tin ore (cassiterite) is occasionally found of value enough to pay expenses of extraction. Iron ores present with the black sand can in some instances yield a useful by-product.

By a modification of the present system of hydraulic mining, particularly adapted to the conditions now existing in California, all the valuable portions of the gravels, not saved by present methods, can be separated, concentrated and worked economically by the new system, so that 90 per cent of the gold can be recovered, and the final yield from a given bulk of gravel be double that at present obtained under average conditions. The final waste products can also be stored in dams more safely than at present. The methods proposed can also be applied to beach mining, and generally, from the nature of the material, at less expense than in the treatment of tailings. Under such system the beaches at Gold Bluff and as far south as Humboldt bay would give good returns on the investment. The Oregon beaches about Rogue river also afford a good field.*

*Working Methods for Tailing (Outline).*—When practicable, the material to be handled by steam shovel, and nearly all mechanical treatment to be automatic. (*a*) Separation of coarse material, by riddles and screens, down to a certain size of sand. (*b*) Concentration of sands to a certain specific gravity, and extraction of the coarser gold particles. (*c*) Extraction of gold by mechanical means. (*d*) Final extraction of gold by chemical process.

*Method Applied to Hydraulic Mining.*—(*a*) Gravel to be run out in a flume as usual, but without use of quicksilver. Only one undercurrent to be used. (*b*) Separation of large rock, by grizzlies, down to one inch diameter; grizzlies to be of novel construction. (*c*) Separation of fine material, by screens, to a certain size. (*d*) Subsequent treatment as for tailings.

*Method for Beach Sand.*—(*a*) Screening to remove rocks and impurities. (*b*) Separation of coarse from fine sands, by screens. (*c*) Concentration to a determined specific gravity. (*d*) Mechanical extraction of heaviest gold particles. (*e*) Chemical extraction of finest gold. The final treatment of beach sands will differ somewhat from tailings, the gold-bearing material in each being widely different. Difference in location, climate, grade and water supply, as well as quantity, size and character of gravel and tailings, will demand modifications in the above schemes.

*Treatment of Black Sand.*—This is always based upon the physical character of the gold and gold-bearing minerals, as ascertained for each separate deposit by mechanical and fire assays, analysis and microscopic inspection. No occult or improbable methods are proposed, and the system is based upon a judicious combination of already well-known metallurgical and mechanical processes, applied to the hitherto almost unknown condition of the gold and gold minerals. These have all been tested experimentally, but not always on a large scale. Various mechanical devices used are novel and will be patented, and some already patented machinery can, with advantage, be used in the system.

A fair estimate of the gold buried in tailings of California may be fixed at 70 per cent of the total gold product of the hydraulic mines, and of this 75 per cent may be set down as recoverable, equal to 52 per cent of the original gold contents.

*Illustration of a Tailing Deposit.*—An instance of the condition of a tailing deposit, with which the writer is thoroughly familiar, and which strikingly illustrates their origin, and furnishes a clue to the mineralogical character of such deposits, occurs at Edmanton, in Plumas county, California. On the Mumford's Hill placer mine is found an old channel of limited extent, covering about ten acres and averaging 50 feet in depth. Six hundred feet of this channel rested upon and had been eroded in the Diadem lode, a large body of decomposed quartz, first noted as such in 1865. Previous to this the deposit was worked as a drift mine, and later by the writer as a hydraulic mine. The pay was chiefly in very coarse gold, and generally on or near bedrock; the fine gold obtained formed but a small portion of the total value, and less than 10 per cent. The upper strata consisted of small gravel and pipe clay in nearly equal proportions, and were generally considered barren. The material removed from this deposit by mining operations amounted to 500,000 cubic yards, of which the heaviest matter lodged in a steep ravine below the dump, for a space of 600 feet, and the lighter passed into Big creek, forming there a great deposit of tailings for nearly a mile, varying in depth from 2 to 15 feet. Below that point the light material was generally carried onward through a canyon. Hydraulic mining ceased here in 1876, and during the period following, and up to the present day, the waters of Big creek have removed much of the tailings mentioned, and in most places have cleared the creek almost down to its old bed. The bed of the creek had to a great extent been worked before these tailings flowed into it.

It was found that the debris and loose gravel now remaining in the creek carried much heavy black sand, although giving but small prospects in free gold. The heavy sand concentrated in the creek bed was found comparatively rich in microscopic gold and in gold combined with and enclosed in the grains of sand, the average gold contents per ton being $90. A careful estimate of the black sands remaining in the creek bed and originating from the tailing deposit gives 1800 tons as available, and the average gold contents from sampling the black sand through the whole deposit was computed at $76 per ton. As the sampling shows that the debris now remaining in the creek carries on an average three-fourths of one per cent of black sand, it follows that its gold contents would be one dollar and twelve cents per cubic yard, estimating the cubic yard, equals to two tons. A sampling of the remnants of the original gravel deposit, all situated on high bed rock and on the rims of the channel and taken from the upper and lower strata as well as from the pipe clay, gave one-fourth of one per cent as the average of heavy sands, which applied to the mass of gravel removed would give 2500 tons as the total of the black sands originally contained therein. Estimating the gold contents per ton of this black sand as equal to that found in the tailings would place the total value in the waste matter at $187,500. As all available information places the gold product derived from the original gravel at $200,000, or an average of 40 cents per cubic yard, it follows that the waste carried a value of 37½ cents a cubic yard.

Assuming as correct the estimate of 1800 tons of black sands, as recoverable from the creek bed, and of an average value of $75 per ton, they would contain $135,000. Estimating the cost of collection, concentration and reduction at $15 per ton, a net profit would be probable of $108,000. The heaviest tailings at the dump and in the ravine could not be thoroughly sampled, as they are largely mixed with waste rock from recent quartz mining operations, but are estimated to contain at least 260 tons of black sand with gold contents of $19,500. Samples of the black sands above mentioned have gone as high as $162 per ton, with scarcely any gold visible to the naked eye, which is explained by the fact that this sand contains gold enclosed in the grains of titaniferous iron, an occurrence so far seldom noted and not definitely proven except at this locality.

From the above instance, fully confirmed by the conditions of all tailing deposits examined by the writer, an inference may be drawn of the loss occurring in deep gravel beds, carrying fine and scaly gold and especially when the gravel is cemented, and this belief is supported by the high gold contents of the black sands, from such gravels, which frequently reach $400 per ton. Applying the above cited facts and deductions to the enormous tailing deposits in the Yuba, Bear and American rivers, and the vast amounts of "deep gravels" yet remaining unworked in California, and recognizing also their applicability in all countries where beach or placer mines of gold exist, it will readily be perceived what an immense field is opened by this new branch of mining enterprise and the enormous profits awaiting those who first enter the field with experience, skill, energy and capital.

JOHN A. EDMAN, M. E.

Meadow Valley, Cal., March 30, 1896.

*For detailed information on the black sands of California, the writer refers to his "Notes on the Gold-bearing Black Sands of California," published in the MINING AND SCIENTIFIC PRESS, Volume 69, Nos. 19, 23 and 24.

## The Effect of Washing with Water Upon the Silver Chloride in Roasted Ore.

Continued Discussion of the Paper of MR. MORSE at the Atlanta Meeting of the American Institute of Mining Engineers, October, 1895.

Prof. H. O. Hofman, Boston, Mass. (communication to the Secretary): Mr. Morse's paper and Mr. Godshall's discussion of it recall to my mind three articles by Mr. Dubois, Mr. Gmehling and the late Mr. Aaron on the effect of sulphides on silver held in solution by sodium hyposulphite. Mr. A. H. Dubois,* in making a solubility test with sodium hyposulphite on raw ore, assaying 320 ounces of silver per ton, found that if he filtered fifteen minutes after starting he extracted from 65 to 70 per cent of the silver, while if he left ore and solvent in contact for sixteen hours before filtering he obtained only 12 per cent. Working synthetically, he dissolved 800 milligrammes of silver in the form of silver chloride in 250 c.c. of sodium hyposulphite, added four grammes of sulphurets (galena, blende and pyrites), containing three milligrammes of silver, and left them in contact for sixteen hours, shaking repeatedly. The sulphurets, after filtering and washing with sodium hyposulphite and water, were assayed, and gave 282 milligrammes of silver.

Mr. C. H. Aaron† found that the solubility assay of a roasted silver ore gave much lower results if solvent and ore had remained in contact over night than if only a short time. He found by experiment that copper and silver are quickly precipitated by zinc sulphide from hyposulphite solutions; also that from a dilute solution of potassium of cyanide silver was precipitated by zinc sulphide, and that in a concentrated solution the silver sulphide soon redissolved.

In experimenting at Huanchaca, Bolivia, with a siliceous silver ore, which contained much blende in addition to other metallic sulphides, Mr. Gmehling‡ found that if he leached the chloridized ore as it came from the furnace, i. e., as coarse 10-mesh stuff, he obtained a higher extraction than if he first passed it through a 40-mesh sieve. The explanation for this is that in quick filtering undecomposed metallic sulphide (probably blende), or sulphate (probably lead sulphate), in the ore remains a shorter time in contact with the silver solution, and has, therefore, a less harmful effect.

*MINING AND SCIENTIFIC PRESS, May 11, 1889; p. 334.
†MINING AND SCIENTIFIC PRESS, May 25, 1889; p. 374; *Eng. and Min. Jour*, June 22, 1889; p. 563.
‡*Oesterr. Zeitsch. fur Berg und Huttenwesen*, 1890, p. 284.

## Correction of a Statement in an Advertisement.

TO THE EDITOR:—You will oblige me by correcting a misstatement occurring in your issue of April 18, 1896, in an article on the "Brown System of Mechanical Roasting Furnaces," in which the following sentence appears: "Several furnaces have been devised, embodying the principle of the Brown slotted-wall construction, among the latest of which is the 'Ropp' furnace, now in use at the Selby smelters."

This is a mistake, as there is no "slotted wall" to be found in the "Ropp" furnace, but the hearth or floor of the "Ropp" furnace is cut in two, parallel to the long axis of the furnace. Through this aperture the rabble arm, holding the rabbles, is allowed to enter the roasting hearth proper. If I should be called upon to describe a reverberatory roasting furnace, I would have to say that the furnace proper consists of the following parts, that enclose the room in which the roasting takes place: (1) The roof or arch; (2) The sides or walls; (3) The hearth or floor.

In no language are the roof and hearth called walls, hence I have not made use of "the Brown slotted-wall construction," nor did I intend to do so, as I consider my way of entering the furnace far superior to Brown's method, and have obtained letters of patent on my device without any trouble whatever. Yours truly,

ALFRED ROPP,
Superintendent Selby Smelting and Lead Co.

Selby, Cal., April 27, 1896.

[In justice to Mr. Ropp the above communication is given place. It is in reference to an advertisement which was so marked.—ED.]

THE amount of gold coin in use in the countries of the world is said to amount to $3,600,000,000. About one-third of the gold mined is used for coinage purposes. The value of gold coin in the United States is $600,000,000, against $800,000,000 in France, $600,000,000 in Germany and $550,000,000 in England.

# Electrical Progress.

## Roentgen Rays.

Written for the MINING AND SCIENTIFIC PRESS by PHILIP MILLS JONES, M. D.

In considering the Roentgen rays two questions are of paramount interest: (1) the source and nature of this newly observed radiation, and (2) its possible usefulness.

*The Source of the X Rays.*—Since January 4th, when Roentgen made his first announcement, a vast amount of material has piled up into a heterogeneous mass of observed or supposed phenomena, that may well be termed chaotic. The results of each particular form of apparatus have been treated as though they necessarily held good for every other variety, and, consequently, much error and contradiction has gone on record.

I have carefully followed the work being done, as reported in the technical journals, and have made quite a large number of experiments myself. Thus far I have tested and experimented with something over sixty different tubes, most of them made by Mr. G. E. Lamont, Thurlow Block, San Francisco. Other tubes have come into my hands, for observation, from the East and from abroad, but none have been so satisfactory as a tube made for me by Mr. Lamont, and of a design of which I shall speak later.

It is obvious that the rays designated "X" rays by Roentgen must emanate (*a*) from the anode, or (*b*) from the cathode, or (*c*) some solid upon which either anode or cathode streams, or both, impinge, or (*d*) from the gaseous contents of the tube, in a highly agitated condition. (*a*) The anode. Several observers have found that in the particular tubes with which they were experimenting the source of the X rays was the anode; but in all these experiments reported, so far as I am aware, the cathode stream impinged upon the anode. In a previous paper ("Journal of Electricity," March, 1896,) I gave the results of experiments, which seem to clearly show that *some* rays emanate from the anode when a platinum plate 1 mm. thick intervenes, cutting off the cathode rays from the anode, and that, consequently, some X rays emanate from the anode, *per se*. (*b*) The cathode. The only point upon which all observers seem to agree is that the X rays do not emanate from the cathode. In the article referred to I mentioned three cases in which the rays either emanated from the cathode, or were reflected therefrom. (*c*) Some solid upon which either anode or cathode streams, or both, impinge. In his original paper Roentgen assigned the glass, at the point where the cathode rays strike, as the source of the X rays. Several others have since found in certain tubes X rays emanating from the glass where it receives the cathode stream. Prof. Macfarlane, C. E. Scribner, F. R. McBerty, Prof. Corey and others have noted this. At first I was unable to obtain this phenomenon. I have found subsequently that in this case the X rays do not always proceed from the entire patch excited to flourescence by the cathode rays, but only from a part of the light area. That X rays emanate from a solid within the tube, insulated or uninsulated, upon which the cathode rays impinge, I found to be the case. Subsequently Dr. Morton and Elihu Thomson made the same observation. No one has, so far as I am aware, reported any X rays proceeding from the glass, or other solid, upon which the anode rays alone impinge. (*d*) I have noted a newspaper statement to the effect that Dr. Morton of New York had obtained X rays from a vacuum tube, which was merely encircled by a coiled wire, carrying a high-tension current. This fact I have not seen verified in any technical journal, and is the only experiment (if true) which would seem to point toward the agitation of gaseous molecules being a source of X rays.

From all the data noted, it seems evident that we have rays emanating from (1) the anode, *per se*, (2) the glass upon which the cathode rays impinge, (3) a solid, metal or non-metal, insulated or uninsulated, upon which the cathode rays impinge, and that the greatest X ray intensity is obtained when the cathode stream is focused, by means of a cup-shaped disc, upon the anode. The last conclusion I deduced from my previous work, and have since noticed that one of the professors at King's College, London, had previously reached the same conclusion. Mr. Lamont succeeded in making for me a tube of a design I suggested to him—that is, one having the cathode terminal of cup-shaped aluminum, with its focus at the anode, a platimum disc, set at an angle of about 45°. This I have found to be the most satisfactory of all the tubes I have used. With it the X rays are very intense, and as they emanate from a point, the shadows produced are clear and sharp, which is not generally the case when the rays are produced at and emanate from a larger area. In testing this tube, after sealing off from the pump, Mr. Lamont noticed and called to my attention a fact of great interest. He found that if he put his hand upon the tube, the X ray effect (as observed with a flourescent screen) was materially increased. I went over the entire surface of the tube and found two spots which, if connected to earth, made the X ray emanations many times more intense than when not so connected. These spots I covered with tin-foil and, by fine wires, grounded. One patch is just below the cathode and at the back of the tube; the other is just below the lower edge of the anode and in front. With this tube so arranged it is quite possible to clearly see the bones of the hand at a distance of five feet from the tube, and at fifteen feet the screen is still faintly luminous. The tube is excited by the secondary of an induction coil, capable of giving a four-inch spark in air. In an article in the "Electrical Engineer" of April 15th, Edw. P. Thompson says: "I receded from the Crooke's tube while looking into the skiascope, until the luminosity disappeared, and then measured the distance between the screen and the Crooke's tube. It was about six feet. This represents about the usual power of X rays, except in Tesla's experiments." This is about my experience with all tubes, except the last one noted above made by Mr. Lamont, and with this tube, I may add, I have been able to obtain an excellent negative of the bones of the hand in ten minutes and of the metal embedded in the handle of a screwdriver in five seconds, and at fifteen feet from the tube the screen is quite luminous.

*The Nature of the Rays.*—While theories are increasing in number almost daily, only a few demand serious consideration. They are, mainly, (1) that the rays are longitudinal ether waves; (2) that they are projected particles of matter; (3) that they are ultra-violet light; (4) that they are longitudinal waves in air or matter—in other words, sound waves—of mixed wave length.

And here, as in the case of the source, any of these theories may be substantiated by selected data, though all the facts observed can hardly be explained by any one. Roentgen and numerous subsequent observers are favorably inclined toward the theory of longitudinal ether waves; Tesla, Salvioni, and some others think they have to deal with projected material particles. Only a few remain of the opinion that the X rays may be ultra-violet light rays. Edison has recently voiced the theory that the X rays may be of the nature of sound waves, which theory seems very much like a rehabilitated Teslaen theory. Lord Kelvin has advanced the suggestion that they may be condensational ether waves.

If the effects observed by Roentgen are produced by projected particles, why is it that these particles emanate from the point of impact of the cathode stream (in most cases) rather than from the cathode itself? No effects have yet been observed directly from the cathode terminal, except in the instances noted by myself and above referred to. It would seem most probable for a projected particle to proceed from the point where the projecting force was greatest, rather than from the point where the original stream of projected particles is apparently stopped. If, however, the X rays are ether waves, we would expect to find them emanating from the place where the electrical oscillations are greatest. Now, consider the facts—X rays emanate, weakly, from the glass upon which impinges the cathode stream, which is negatively charged and would induce a positive charge on the other side of the glass and produce electrical oscillation. X rays emanate more strongly from a solid, when both cathode and anode streams are beating upon it—in other words, when the cathode-anode strain is greater than in the previous case, and the number and rapidity of the oscillations is increased. When the cathode rays impinge upon the anode terminal the greatest cathode-anode strain will occur, and in that case we find the maximum X rays emanate from the anode and radiate principally toward the cathode, or at least from that surface which is nearest to the cathode—where is the greatest strain.

Now if, on the surface of a tube constructed like the one referred to, made for me by Mr. Lamont, we place a bit of tin foil, the condenser effect of the tube is increased and an increase in the intensity of the X rays is noted. If the tin foil be grounded the discharge is facilitated, the oscillations are still further increased, and a corresponding increase of X rays is observed. A less amount of energy would be required to charge the tin foil than to induce a charge on the outer surface of the glass, consequently the strain is not distributed over the entire surface of the tube, but is confined almost entirely to the terminals and the tin foil patches. The waves in a condenser field are believed to be longitudinal vibrations. An excited vacuum tube is to a certain extent a condenser. This may be the reason why Edison found that covering the outer surface of his tubes, in the neighborhood of the terminals, with tin foil increased the X ray efficiency—they became better condensers, the electrical oscillations were largely increased.

Prof. Sanford has already called attention to the similarity of the conditions in a condenser field and an excited Crooke's tube, and between the results obtained by the Roentgen rays and those obtained by him in a condenser field.

If, however, the Roentgen rays are merely streams of projected particles, why should grounding one or more spots on the surface of the tube increase their intensity? It certainly does not add to the E. M. F., which, presumably, is to be regarded as the projecting force. Nor does it deflect the cathode stream, perceptibly. It merely increases the condenser capacity of the tube, and hence increases the electrical oscillations. Another fact noted in my work with the tube just mentioned is that after considerable use, when the vacuum had materially increased, the grounded tin foil became unnecessary—the oscillations on the terminals being presumably sufficiently rapid to produce the maximum X rays. One would expect, if the foregoing hypothesis were true, that the X rays would be found to emanate from the glass of the tube, or from the patches of tin foil, which are parts of the condenser. The oscillations on the terminals in the tube would be at all times more rapid and intense than elsewhere, if the cathode stream beat upon the anode. Tin foil on the outer surface of the tube would tend to increase the rapidity of the oscillations at the terminals, if the vacuum of the tube were low enough to offer comparatively slight resistance to the current, but when the relations between E. M. F. and R. became so balanced that the oscillations at the terminals reached their maximum intensity and rapidity, the condenser effect of the tube would have its minimum influence on the electrical condition of the terminals. In tubes so constructed that the cathode rays can not, to any extent, impinge upon the anode, the X rays *are* found to emanate from the glass where the cathode stream impinges. The glass at this point would certainly be in a condition of oscillatory electrification, and hence would be of the nature of a condenser and produce longitudinal ether waves. The strain at this point could never be so great as the strain at the anode, with the cathode strain beating upon it, and hence the X rays would be less intense in the former than in the latter style of tube. This, I think, is the general experience. It certainly has been mine, and has been that of all observers whose reports have come within my notice. In the one-terminal tubes, used by Tesla, the single terminal would be in a state of oscillatory electrification, in its maximum, and hence we would expect the terminal to be the source of X rays, rather than the glass opposite to it. This, I believe, Tesla has found to be the case.

There seems also to be some direct relation between vacuum, E. M. F. and X ray output. An increase in degree of vacuum requires an added difference of potential to balance it and produce X rays. To my mind, this seems to point to a wave of more or less definite length, as the X ray.

*The uses of the X ray* have probably been not more than barely guessed at thus far. Some of them I have demonstrated. In surgery it serves to show the position and condition of the bones of the extremities, and to locate any contained foreign body. I have obtained negatives of all parts of the limbs, as far as the junction with the trunk, and have demonstrated fractures, dislocations and necrosis of the bones, and have located bullets and needles. Thus far I have obtained only negative results in experiments to determine the relative density of the organs in man, but from similar work on small animals I am led to hope that this end may be achieved in the not distant future. It is a prompt and absolutely reliable test of precious and semi-precious stones, and also shows at once whether a given specimen of rock does or does not contain metal (See Journal of Electricity, March, 1896).

From some work I was doing about two months ago, I concluded that the density of substances did not determine their absorption of X rays, and I then made some rough experiments with liquids of the same and different specific gravities. I spoke to Prof. Sanford of my results, and we determined to make further researches on the same line. He kindly furnished me with a number of chemical solutions made up of known densities, and I made negatives of them with the Roentgen ray. We were about to continue this line of work, when an article appeared in the *Zeitschrift fur Physikalische Chemie*, by Novak and Sulc. They found an increase of absorbtive power, with the metals, with increasing atomic weight. "For the salts of the same metals, they are arranged with reference to their absorbtive power in an increasing series, as follows: Carbonate, nitrate, sulphate, chloride, bromide, iodide, etc. Our results seem to agree with theirs, so far as we have gone." The quotation is from Prof. Sanford's letter to me on the subject.

PHILIP MILLS JONES, M. D.
Crocker Building, San Francisco.

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IT has been noticed that lightning often passes harmlessly through the ore and molten iron of blast furnaces to the earth, instead of being attracted to the lightning conductors. The suggested explanation is that the aqueous vapor and carbon in the smoke column offer a better conductor to and through the furnace charge than is offered by the rod outside.

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THE Canyon Creek Electric Light and Power Company is putting lights into Gem, Idaho. Burke is already lighted by the same company.

# Mechanical Progress.

### Matte Smelting.

[The following remarks relative to one of the Orford furnaces referred to by Dr. Austin in our issue of May 2nd have been kindly communicated by Mr. A. H. Wethey, who is in charge of Mr. W. A. Clark's extensive smelting interests at Butte, Montana. Mr. Wethey is the inventor of the Wethey automatic roasting furnace, one of which is in operation at Mr. Clark's smelter in Butte, and about which we may have more to say upon another occasion. Mr. Wethey's statement regarding brick blast furnaces is in line with Dr. Austin's adverse criticism upon that type of smelting furnace. It is interesting to note that at Butte there were two changes made in the style of blowers used with this furnace, in each case tending towards an increase of the pressure of the blast.]

A Raschette blast furnace of the Orford type was erected at the Butte Reduction Works, Butte, Montana, in the spring of 1886, and was operated with more or less regularity for several years. The inside measurements of this furnace were as follows:

| | |
|---|---|
| Width at bottom | 40 inches |
| Width at tuyeres | 42 inches |
| Width at charging floor level | 54 inches |
| Length at bottom | 84 inches |
| Length at tuyeres | 87 inches |
| Length at charging floor level | 120 inches |
| Height from bottom to charging floor level | 78 inches |
| Height from tuyeres to charging floor level | 66 inches |
| Size of tuyeres | 6 inches in diameter |
| Number of tuyeres | 8 |

There was a wind-box under the floor of the furnace, with which the tuyeres were connected. The floor of the furnace was made of thick plates of iron, on which fire brick was laid to a depth of six inches. No trouble ever occurred by the cutting through of the metal into the wind-box or open space below the floor.

The interior side walls of the furnace were protected to some extent by having four-inch pipes placed in them a little above the tuyeres, through which water constantly flowed.

In actual practice it was found that the brick were frequently attacked, and care had to be exercised in feeding the charge so as to preserve the life of the furnace, otherwise the slag would eat its way through the brick work within a short time of the starting of the furnace.

If the furnace were run for many weeks consecutively the brick work would be eaten away, first in one direction and then in another, until the width of the furnace became much greater than it was originally. The pipes from the tuyeres, leading through the brick work, were also cut away, and the shorter these pipes became the wider the furnace grew, and a more powerful blast of air was required to enable the wind to reach to the center of the furnace, and to enable it to smelt the amount of material it was expected to handle.

When the furnace was first erected it was operated with a large Sturtevant fan; this soon proved too small and gave place to a large Baker blower; this in turn gave place to a Root blower of still greater capacity. It was found that the greater the blast the greater the capacity of the furnace.

It was not an altogether unusual thing for the furnace man, in barring out the slag that sometimes ran into the tuyeres, to strike one of the water pipes, or perhaps the water pipes would burn through; in either case the water had to be shut off from the pipe which leaked, and the furnace would be run without the advantage of using that pipe, or else the furnace would have to be shut down and cleaned out in order to replace it.

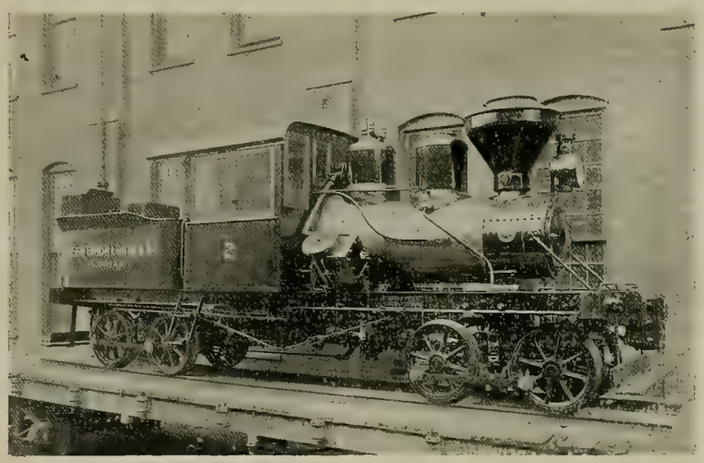
To get the best work out of brick furnaces there should always be one in good repair, so that as soon as the one in operation becomes cut out to any appreciable extent it can be shut down and the idle furnace started, while the other is being repaired.

One great advantage in water-jacket furnaces is that the distance from the inside of the tuyere to the center of the furnace is always the same, and is not liable to the sudden changes occurring in a brick furnace where the center of the furnace may vary several inches in either direction.

The pressure of air in the water-jacket furnace can be constant, while in the brick furnace it must necessarily vary.

### The Heisler Locomotive.

On this page is illustrated the Heisler locomotive, made by the Stearns Manufacturing Co., of which John D. Eby, 17 and 19 Main St., San Francisco, is Pacific coast agent. It is a geared locomotive, which, in construction and efficiency, is considered by its makers to be entitled to the same favor in economic value as that accorded the direct-connected engine. Everything in it is the result of practical experience worked out. A high-class geared locomotive, to successfully and economically haul heavy loads on steep grades and sharp curves, has many important requirements. The makers of the Heisler locomotive claim, among other points, such a locomotive should combine simplicity, the best material and first-class workmanship; great flexibility, to avoid a tendency to leave the rails on sharp curves; a heavily-proportioned truck, constructed entirely of iron, steel and bronze; all bearings of phosphor-bronze, extra large, accurately machined and readily replaced; an independent steel gear-frame, rigidly maintaining in accurate alignment



THE HEISLER LOCOMOTIVE.

the enclosed, oil-submerged and noiseless steel bevel gears; the least possible number of gears; the axle gears removably clamped, so they can be readily replaced on the road by any intelligent engineer without the use of special appliances; the gears should have extra large wearing surface and be exceedingly heavy, so that when much worn they will easily withstand the most severe shocks without breakage; a very large boiler capacity for a given weight of locomotive, so that the boiler need not be destructively forced in order to furnish the large amount of steam necessary to accomplish the severe duty required of such locomotives; a liberal cylinder volume, so the engine can easily start its heaviest loads; those parts subject to most wear so arranged that they may be replaced by inexpensive duplicates; all bearings of phosphor-bronze and adjustable for wear, provided with sufficient oiling devices; all parts to be readily accessible for inspection and repairs; the universal couplings should be self-oiling and so arranged that they can be easily replaced on the road, being preferably secured to the shafts by clamping, not unlike a split pulley; the driving wheels should be of ample diameter and the gear ratio such that when running over the road at a normal speed the motor engines will not rotate so rapidly as to cause excessive wear and danger of destruction; the motor-engines to be provided with balanced slide valves and of the simplest possible construction.

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In an investigation of copper-zinc alloys M. G. Charpy has tested eighteen different mixtures in various ways. After annealing, it was found that the physical properties varied quite regularly with the proportion of zinc, the rigidity of the alloy increasing with increase of this metal to 45 per cent, and the maximum toughness being reached with zinc at 35 per cent.

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In a recent sermon by Dr. Talmage he said that he experienced a pang of regret every time he heard of a new invention that would do the work of fifty men. The *Scientific Machinist*, in reply to the observation of the learned minister, says: "Probably the doctor fears that these fifty men are to be thrown out of employment to become tramps, paupers, perhaps criminals. Did he stop to think of the thousands of men to whom such an invention gives employment, perhaps saving them from starvation? Did he stop to think that that invention might lessen the cost of some article—perchance an article absolutely necessary to the civilized state of living—to millions and either add so much comfort to a vast number of lives or save money for many pockets? The cruel malignity of machinery has come to be believed in as much as the most important article of faith of the Christian religion. Its compensations should also be taken into account."

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Sawdust is turned into transportable fuel in Germany by a very simple process. It is heated under high steam pressure until the resinous ingredients become sticky, when it is pressed into bricks. One man with a two-horse power machine can turn out nine thousand bricks a day.

# Scientific Progress.

The standard Crookes tube proposed by Prof. Elihu Thomson consists of a glass bulb containing two concave aluminum discs mounted at opposite sides on wires sealed in the glass, with a V-shaped piece of platinum supported in the center of the bulb by a third terminal that can, if desired, be used with any of the various sources of electric currents employed for generating Roentgen rays. It is maintained by Dr. Pupin that all substances under the influence of Roentgen rays become in turn secondary radiators of these rays, and this, it is pointed out, may explain the apparent reflection some experimenters have observed. In pictures obtained with magnetic rays by Prof. J. S. McKay the subject was simply laid on the film of a sensitive plate between the magnet and its armature. Both permanent magnets and electro-magnets, capable of lifting one to one hundred pounds, were successfully tried, and silhouettes were obtained with exposures as short as five minutes, substances that are conductors of electricity proving the most opaque to the magnetic radiations.

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In the manufacture of zinc white it has frequently been observed that the product, in spite of no changes in the process of manufacturing, sometimes shows a decided yellow tinge, and this makes the article less valuable. This has often been ascribed to the presence of iron, but Fuchs and Schiff have recently found that zinc white of a yellow cast has not contained a trace of iron, but they have detected as much as 0.003 per cent of cadmium sulfide. Zinc usually contains a slight amount of cadmium, which accounts for the presence of this element in the zinc white. Experiments showed that no oxide of cadmium or iron produced any appreciable change of color in the zinc white. In order to produce the pure white color of the zinc oxide the cadmium sulfide must be converted into cadmium oxide. This may be accomplished by roasting for several hours under exposure to the air. To avoid the yellow shade, however, it is preferable to make the zinc white from as pure a zinc as possible, and to this end the zinc used should always be carefully tested for cadmium.

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M. Deplay says green wood, when cut down, contains about 45% of its weight in moisture. In the forests of central Europe wood cut down in winter holds at the end of the following summer more than 40% of water. Wood kept for several years in a dry place retains from 15 to 20% of water. Wood which has been thoroughly desiccated will, when exposed to air under ordinary circumstances, absorb 5% of water in the first three days, and will continue to absorb it until it reaches from 14 to 16% as a normal standard. The amount fluctuates above and below this standard according to the state of the atmosphere. M. Violette found that, by exposing green wood to a temperature of 212° F., it lost 45% of its weight, which accords with observations of M. Deplay. He further found that, by exposing small prisms of wood one-half inch square and eight inches long, cut out of billets that had been stored for two years, to the action of superheated steam for two hours, they lost from 15 to 45% of their weight, according to the temperature of the steam, which varied from 257° F. to 437° F. (125° C. to 225° C.)

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A foreign journal describes a watch made in Switzerland that calls out the hours in a voice like that of a human being. This mechanical curiosity is the invention of one Casimir Livan, who based its principles upon his knowledge of the workings of the phonograph. The case, instead of containing a striking apparatus, as some of the late costly watches do, is provided with a phonographic cylinder, which is fitted with a sensitive photographic plate, which has received the impression of a human voice before being inserted in the watch.

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On the California Railway from Oakland to Laundry Farm, six miles, will soon run the first electric locomotive in this State, now building by Ingler & Atkinson, Oakland. It is an exact miniature duplicate of the one that hauls the B. & O. trains through the Baltimore tunnel, and which was illustrated and described at length in a recent issue of this paper. Loaded, complete, it will weigh about thirty tons.

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For an outside stucco, hydraulic cement and clean, sharp sand, mixed with fresh water to the consistency of plasterer's mortar, is used. A coat is applied, and a second coat over this before the first has dried. The gravel must be washed so clean that it will not discolor clean water.

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A French chemist has made a blue soap which will render unnecessary the bluing in laundry work. In ordinary soap he incorporates a solution of aniline green in strong acetic acid. The alkali of the soap converts the green into blue, uniformly coloring the mass.

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An odd kind of headgear has been adopted for the use of the Italian garrison artillery—a "telephonic bonnet"—worn by the gun detachment commanders, so that they may be in constant communication with the officer commanding the battery or fort.

# Practical Information.

## Leaky Gas Engine Valves.

When a gas engine refuses to work, and the trouble is caused by a leaky valve, one of three specific reasons may be assigned, viz: The valve is "hung up," the spring of the exhaust valve is too weak or the slide valve seat is damaged. The hanging up of a valve is usually caused by corrosion of the metal by the gases, from standing idle, which makes them stick. Either this or a loose exhaust valve permits a portion of the gas not burned by the explosion to escape during compression into the silencing pot and exhaust pipe. The moisture which thus escapes is burned by subsequent ignitions, which causes an explosion. An oil groove should be made for the exhaust valve spindle and every morning a little kerosene oil squirted in. If the valve spring is so weak as to permit the valve to be lifted during suction by inflowing air, a back draft comes together with the gas mixture drawn through the mixing apparatus which renders the charge inexplosive. The mixture will not pass into the exhaust, but accumulate until, should the fly wheel have momentum enough to keep it going, a powerful explosion would occur. It is, however, sure to stop. Thumping in the exhaust pipe from a damaged surface of the valve may be remedied by taking out the valve, cleaning it thoroughly by rubbing with kerosene oil and replacing.

NEAR the Santa Fe roundhouse, Los Angeles, Cal., is a unique factory where are made splints for the use of surgeons in bandaging broken limbs from a fibrous material that possesses especial adaptability for the purpose—the wood of the yucca palm, which grows plentifully on the Mojave desert, trimmed into logs ten feet long and from ten inches upward in diameter. They are shipped to the factory, where they are stripped of bark and carefully inspected. About half or more of the logs contain what might be called flaws, or kidney-colored masses, so hard that the machinery used cannot cut them. Nobody seems able to explain how these formations are caused, but they make the men at the factory a great deal of trouble and spoil much timber. The logs are sawed up into suitable lengths, a length put into a lathe, and a long knife is pressed against it, taking off a shaving about one-eighth of an inch thick, more or less, according to the use to be made of it. This long shaving or board is then cut into smaller pieces and put away in racks to dry, for the trees are cut up when green, it being impossible to soften them after they are dried. Although they grow in the desert and look parched to the eye, they are full of water and weigh so much when green that they sink in water. The poorer quality of the yucca is cut up into narrow strips which are fastened around young fruit trees to protect them from sunburn and the attack of rabbits, for which purpose they are found to answer admirably, and a great many of them are used. But the use of this material upon which the greatest hope of ultimate profit is based is for splints, for which it is much better adapted than any other material used, as well as being cheaper.

## The Largest Systems.

The *Railway Age* prints the following list in order of the sixteen leading systems of this country, with the mileage, as follows:

| | |
|---|---|
| 1. Pennsylvania system | 8,882 |
| 2. Chicago & Northwestern | 7,931 |
| 3. Atchison | 7,555 |
| 4. Burlington | 7,304 |
| 5. Canadian Pacific | 7,103 |
| 6. Southern Pacific | 6,717 |
| 7. St. Paul | 6,169 |
| 8. Missouri Pacific | 5,326 |
| 9. Southern Railway | 4,644 |
| 10. Union Pacific | 4,459 |
| 11. Northern Pacific | 4,362 |
| 12. Illinois Central | 4,332 |
| 13. Great Northern | 4,256 |
| 14. Rock Island | 3,573 |
| 15. Grand Trunk | 3,512 |
| 16. Louisville & Nashville | 3,163 |

AN evidence of the striking uniformity of size among the Japanese is found in the fact that recent measurements taken of an infantry regiment showed no variations exceeding two inches in height or twenty pounds in weight.

ACCORDING to the census of 1890, there were in this country 249,273 Indians. Hoke Smith, Secretary of the Interior, is authority for the statement that they now number about 300,000, and are increasing.

## Books Received.

*"A Practical Handbook on the Care and Management of Gas Engines,"* by G. Lieckfeld, C. E., with instructions for running oil engines, 103 pp., Spon & Chamberlain, 12 Cortlandt St., N. Y., $1; brief and practical, with plain instructions to users of gas and gasoline engines, with some incidental advertising of two prominent makes.

*"Glossary of Mining Terms; a Compilation of Terms in Most Common Use in the Metal Mines of the United States,"* by L. W. Tatum, 511 Mining Exchange Building, Denver, Colo.; an excellent compendium, of practical value to many unacquainted with the meaning of words in ordinary use descriptive of matters connected with mining. Brevity is one of its merits, and any one who wants in convenient form a definition of nearly all the words in ordinary mining use would do well to send for a copy. Price, 10 cents.

*"The Mining Bulletin,"* published by the Pennsylvania State College, containing "An Estimate of Geologic Time," by Prof. W. A. Brickhout, and "Official Geology," by H. H. Stoek.

*"List of the Publications of the U. S. Geological Survey,"* compiled by H. W. Turner.

*"Journal of the Franklin Institute for May,"* containing "The Filtration of City Water Supplies," "Pending Problems for Wage Earners," by A. E. Outerbridge; "The Electro-Metallurgy of Aluminum," by J. W. Richards; "Stereoscopic Roentgen Shadow Pictures," by Elihu Thomson; the usual notes and comments.

*"Press-Working of Metals.—A Treatise Upon the Principles and Practice of Shaping Metals in Dies by the Action of Presses, Together with a Description of the Construction of such Implements in their Various Forms, and of the Materials Worked in them."* By Oberlin Smith, Member American Society of Mechanical Engineers; Member American Society of Civil Engineers; Member American Institute of Mining Engineers; Associate Member American Institute of Electrical Engineers. Illustrated with 433 engravings; 276 pages; 8vo. Cloth, $3.00. New York: John Willey & Sons. London, Chapman & Hall, Limited. This is a valuable book on an important subject. Whether viewed from a technical, scientific or commercial standpoint, the practical man interested in any way in the press-working of metals will find much of use and information. While the proposed new wire gauge, discussed on pages 98–119, may not meet with universal acceptance yet the author has advanced reasons for its adoption that justify favorable consideration. The book is admirably devoid of mere theory as such, and is a valuable addition to metal-working literature.

## Recent Mining Incorporations.

The Barossa Mining and Milling Company, Los Angeles; capital stock, $400,000; M. P. and J. E. Freebey, E. B. Aspinwall, R. S. Dias, E. Bassett, Los Angeles.

The Gold Reward Mining Company, San Francisco; capital stock, $100,000, $100 subscribed; W. T. Farrar, T. A. Keogh, N. B. Frisbie, B. C. Carroll, C. H. Maass.

Old Judge Mining Company, San Francisco; capital stock, $1,000,000; subscribed, $250; F. W. Beardslee, F. M. Husted, Berkeley; C. C. Shepardson, Kelsey; H. Oterson and W. W. Boughton, San Francisco.

Hathaway Gold Mining Company, San Francisco; capital stock, $250,000, all subscribed; M. Jones, F. E. Luty, T. E. Jewell, W. B. Murdock and S. Gardner, San Francisco.

Rival Mining Company, Oakland; capital stock, $200,000; subscribed, $500; F. Euch, M. Page, G. E. DeGolia and G. Chase, all of Oakland.

A. G. G. Mining Company, San Diego; capital stock, $20,000, all subscribed; A. W. Lane, G. M. Hawley, F. Stephens, H. G. Meyers and L. A. Wright, all of San Diego.

Eagle Mountain Gold Mining Company, Los Angeles; capital stock, $100,000; subscribed, $51,000; H. Coon, D. L. Wilbur, W. J. McIntyre, L. Wilbur and M. McIntyre, all of Riverside.

The Shasta Dredging Company, San Francisco; capital stock, $50,000; $25 subscribed; A. Becker, P. Becker, J. A. Chestnut, J. G. Barker, L. A. Gibbons.

## Recently Declared Mining Dividends.

THE Mercur, Utah, Mining Company on the 11th inst. declared its eighteenth dividend, $25,000, a total of $450,000 to date.

THE Cariboo Mining, Milling and Smelting Company pay a dividend of 2 cents per share ($16,000) on the 16th at their office in Spokane, Wash.

ON the 9th inst. the directors of the Portland Company, Cripple Creek, Colorado, declared a dividend of 1 cent per share, payable May 15th, amounting to $30,000.

# CALIFORNIA MINES AND MINERS.*

## Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

### EL DORADO COUNTY—Continued.

| NAME OF MINE | Character of Mine | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| New El Dorado | Gold quartz. | 1 | 2½ m N of Greenwood | W. N. Martin | Box 201, Oakland |
| Norris, The | Drift placer. | 2 | Volcanoville | J. P. Kates & T. P. Norris. | Georgetown |
| Oak | Gold quartz. | 1 | Grizzly Flat | J. Ryan | Grizzly Flat |
| Ohio | " | 1 | Grizzly Flat | A. H. McAfee | Grizzly Flat |
| Ohio | " | 1 | Greenwood | S. Kaiser | Greenwood |
| Old Gray Claim | " | | Shingle Springs | D. C. Hopkins | 173 Railroad Ave, South S. F. |
| Old Judge | Gravel and quartz. | 6 | 7 m from Placerville | (Incorporated) 35 Wall St., New York | Kelsey |
| Pacific | Gold quartz. | | Placerville | Sierra Nev. Imp. Co. | Placerville |
| Pacific Placer | Placer. | 3 | Georgia Slide, Canyon C'k | T. Kenna | Georgetown |
| Padre | Gold quartz. | | 2½ m N of Nashville | J. M. Vandergrift | Nashville |
| Payne | Drift gravel. | 1 | Grizzly Flat | J. M. McClean | Grizzly Flat |
| Philadelphia & Gold Note | Drift gold. | | Grizzly Flat | Polk, Parker Bros. & E. W. Chapman. | Omo Ranche |
| Phillips' Drift | Gravel. | 2 | Volcanoville | G. Phillips | Georgetown |
| Pine Hill | Gold quartz. | | Shingle Springs | Pine Hill G. M. Co. | Shingle Springs |
| Pocahontas | " | | El Dorado, near Logtown | W. H. Harvey | Shingle Springs |
| Pocahontas (old mine reopening) | " | 10 | 7 m from Placerville | D. W. C. Morgan, Mgr. | Kelsey |
| Pyramid | " | | Shingle Springs | W. H. Harvey | Shingle Springs |
| Rattler | " | | 2½ m S of Placerville | John Deuch & Jas. Keyser. | Placerville |
| Red Rover | " | | 3 m S E of El Dorado | E. Harper et al. | El Dorado |
| Revenge | " | | Greenwood | W. Dixon | Greenwood |
| Ribbon Rock | " | | Placerville, Scotts Ravine | M. Miller | Placerville |
| Rocky Bar | " | | Greenwood | S. Kaiser | Greenwood |
| Salisbury | " | 15 | 7 m from Placerville | M. Salisbury, Mgr. | Kelsey |
| San Francisco | Slate. | 23 | 3 m N of Placerville | S. F. Slate Co.; J. R. S. Kymersley, Pres't. | R 5, 10th floor, Mills Bldg, S. F. |
| San Martine | Gold quartz. | 1 | 1½ m N of Greenwood | Ed. Kimmel | Greenwood |
| Santa Rosa | Drift. | 2 | Hopkins Creek | G. N. Tupper, Sec'y. | Santa Rosa, Sonoma Co. |
| Slager | Gold quartz. | | Greenwood | John Wade | Myrtle St, Oak'd |
| Spanish | Seam gold. | 2 | Greenwood | M. M. Howe | Greenwood |
| Standard | Gold, pocket. | 2 | Coloma | Ch. Schultze & G. Patrick. | Coloma |
| Staple | Gold quartz. | | Logtown, 2½ m S of El Dorado. | | |
| Starlight | " | | 2 m S of El Dorado | Starlight G. M. Co. | El Dorado |
| St. Lawrence | " | | Kelsey | Myerson & T. Alderson | Placerville |
| Stillwagon | " | 10 | 7 m from Fairplay | P. H. Parsons | Omo Ranche |
| Stuckslager | " | 2 | 1 m S W of Union Town | C. H. Grube & W. B. McKinney. | Lotus |
| Sunday | " | | Grizzly Flat | Mrs. M. Jeffrey | Grizzly Flat |
| Superior | " | | Placerville | — Martin | S. F. |
| Shaw | " | | Green Valley Dist | D. P. Gray | Oakland |
| Sailor Jack | " | 12 | Mud Springs | D. W. C. Morgan | El Dorado |
| Texas Hill | Drift. | 9 | 2 m E of Placerville | F. Fleming | Placerville |
| True Consolidated | Gold quartz. | | 3 m N of Placerville | John Melton | Placerville |
| Tall House M. G. Co. | Drift. | | Smiths Flat | W. P. Stanley | Placerville |
| Two Channel | Hyd'l'c & drift. | 30 | 8 m from Georgetown | H. E. Picket, Part Own. and Mgr. | Georgetown |
| Unity M. Co. Hydraul'c | Gold. | 9 | 3 m N E of Placerville | G W. Kimble | Placerville |
| Vann | Gold quartz. | | Georgetown | T. Newlands | Georgetown |
| Webster | " | | Quartz Canyon (Georgetown.) | D. C. Webster | Georgetown |
| Welch | " | 1 | Bell Ravine (Greenwood) | H. Welch | Greenwood |
| Woodside | " | | Georgetown | C. M. Fitzgerald | Georgetown |
| W. W | Gravel. | 2 | Georgetown | R. S. Wilton | Georgetown |
| Wilton | " | 9 | El Dorado | W. C. Greene | Georgetown |
| Zintgraft | Gold quartz. | | Wild Goose Flat | J. G. Zintgraft | Newcastle P. O. |
| Franklin | Gravel. | 20 | 2 m from Placerville | Thos. Clark, Mgr. | Placerville |
| Larkin | Gold quartz. | 12 | 3 m from Placerville | (Incorporated) D. H. Jackson, Supt. | Placerville |
| Live Oak | Prosp't quartz. | 6 | 3 m from Placerville | D. H. Jackson, Supt. | Placerville |
| Lady Emma | Gold quartz. | 18 | 6 m from Placerville | (Incorporated) F. W. Beardslee, Supt. | Kelsey |
| Lone Star | Prosp't quartz. | 3 | 4 m from Placerville | D. H. Jackson, Supt. | Placerville |
| Marguerite | " | 4 | 3 m from Placerville | D. H. Jackson; (Bonded.) | Placerville |

### FRESNO COUNTY.

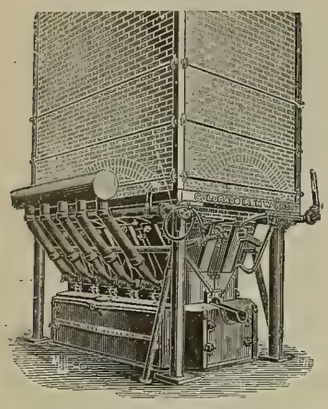
| | | | | | |
|---|---|---|---|---|---|
| California | Coal. | | 5 m N of Coalinga | A. Ballantine, Supt. | Coalinga |
| Chonchilla Canal | | | E S San Joaquin | Miller & Lux | Chonchilla Land Company. |
| Del Monte | Coal. | 1 | 20 m W of Alcalde | O. W. Nelson, Supt. | 1189 Market, S. F. R. S. Falconer, Sec. |
| Enterprise Canal | | | Near Fresno | F. M. Chittenden, Supt | Fresno |
| Fresno Hot Springs | | | 15 m W of Alcalde | A. M. Barker, Supt. | Alcalde |
| Fresno Canal | | | Fresno | F. M. Chittenden, Supt | Fresno |
| Peoples Ditch Co.'s Ditch | | 4 | 15 m S of Hanford | W. H. Wilson, Supt. | Hanford |
| Riverside Ditch Co.'s Ditch | | | 6 m N of Hanford | L. C. Lens, Supt | Hanford |
| San Joaquin Coal Co. | Coal. | | 3½ m N of Coalinga | E. Kanntz, Supt | Hanford |

### HUMBOLDT COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Anderson | Gold. | | Flat P. O | H. Close, Owner | Eureka |
| Big Lagoon | " | | 9 m W of Trinidad | C. T. Bradford, Own. | Big Lagoon P.O. |
| Croton Bar | " | 4 | 1½ m E of Orleans Bar | E. Markerson, Own. | Orleans Bar |
| Crooks Rest | " | | Red Cap, Klamath River | T. T. Tighe, Own | Trinidad |
| China Flat | " | 2 | 2½ m S of China Flat | A. Foote, Own | China Flat |
| Clover Gulch | " | | ½ m W of China Flat | F. Bussell, Own | China Flat |
| Ferris | " | 2 | 1 m W of Orleans Bar | A. Ferris, Own | Orleans Bar |
| Felts Sp'ng, M. Water | | | 5½ m N E of Fortuna | F. D. Felt, Own | Eureka |
| Humboldt Artesian M. Spring | | | 1 m from Eureka | Humboldt Sp'g W. Co. | Eureka |
| Johnston's Claim | Gold. | | 7 m S of Klamath | A. D. Johnston, Own. | Klamath |
| Jacoby | Quarry | | 7 m S E of Arcata | Flannegan & Co., Own | Eureka |
| Low Divide | Chrome | | 8 m E Smith Riv. Corners | Tyron & Co | |
| Little River Beach | Gold. | 4 | 10 m N of Arcata | H. Close et al | Eureka |
| Lupton | " | 2 | 5 m W of China Flat | Platte Lupton | China Flat |
| Morek Hill | " | | 9 m E of Klamath Bluffs | A. B. Campbell, Supt. | San Jose |
| Manapier | " | 2 | ¼ m W of Klamath Bluffs | F. Sebastian, Own | Klamath Bluffs |
| Mettah | " | 4 | 4 m from Klamath Bluffs | Chinese Co | Klamath Bluffs |
| Moore Claim | " | 2 | 4 m W of China Flat | Wm. Moore, Own | China Flat |
| Mountain View Water | | | 28 m E of Eureka | Archie McBride, Own. | |
| Orleans Bar | Gold. | 4 | Orleans Bar | P. L. Young, Supt. | Orleans Bar |
| Osagan | " | | 9 m E mouth of Klamath | Edson T. Adams, Own | Oakland |
| Pearch | " | 6 | 1 m E of Orleans Bar | J. A. Pearch, Own | Orleans Bar |
| Pioneer | " | | 12 m S of Klamath | A. Augur, Own | Arcata |
| Red Cap | " | 4 | 10 m W of Orleans Bar | Wm. Lord, Own | Orleans Bar |
| Ramona | " | | 6 m fm mouth of Klamath | Thos. T. Tighe, Own. | Trinidad |

(To Be Continued.)

—* Begun in issue of April 25, '96.



Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No cracks.

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Established 1860.
1876—Incorporated—1896.

**Denver, Colorado.**

MANUFACTURERS OF AND CONTRACTING ENGINEERS FOR

## Gold and Silver Mills & Smelting Plants

FOR THE REDUCTION OF GOLD, SILVER, LEAD AND COPPER ORES.

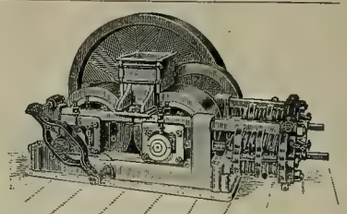
.....We can furnish on Short Notice MACHINERY and GENERAL EQUIPMENTS for..... ...

**Cyanide, Chlorination, Bromine, Concentration and Amalgamation Plants,**

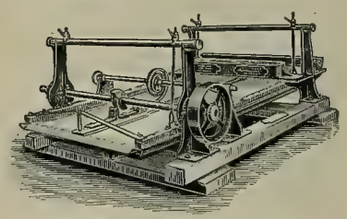
COMPLETE, OR IN PART.

*Catalogues on application.....*

NOTE.—We have a Testing Plant (Mill) on our premises and test ore by Concentration and Amalgamation in ten-ton lots or more, to arrive at best possible method to save values, machinery to be selected accordingly.



CAZIN'S IMPROVED CRUSHING ROLLS.
"Superior to all others."
LARGE CAPACITY. FINE CRUSHING.



PERFECTION CONCENTRATOR.
Capacity 5 to 15 tons in 24 hours. A machine that will do the work.



NOTICE TO GOLD MINERS!

## SILVER-PLATED AMALGAMATED PLATES

**For Saving Gold**

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

## San Francisco Novelty and Plating Works

Incorporated.

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## Justinian Caire, Agent

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**Assayers' and Mining Material.**

—MANUFACTURER OF—

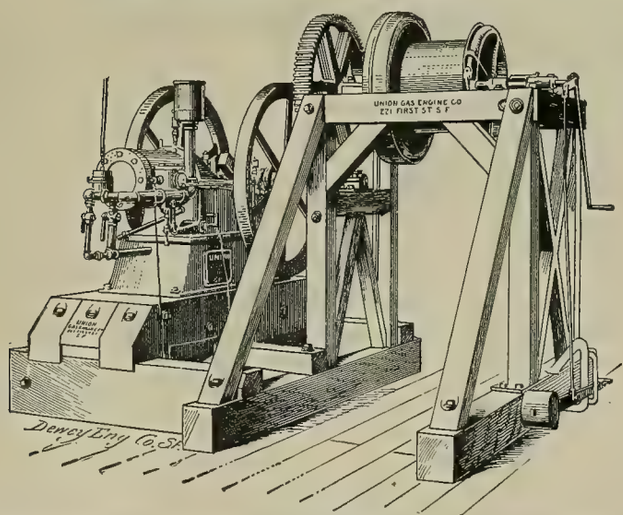
BATTERY SCREENS AND WIRE CLOTH.

—AGENT FOR—

Hoskins' Hydro-Carbon Assay Furnaces.

# UNION GAS ENGINE COMPANY,

309-311 Howard Street, San Francisco, Cal.,




Have Built the LARGEST GASOLINE ENGINES that have been Built in America.

— MANUFACTURERS OF —

ENGINES FOR ALL PURPOSES.

Engines for Stamp Mills, Hoisting and Pumping for Mines a Specialty.

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AMERICAN AND FOREIGN PATENT SOLICITORS

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TAKE ELEVATOR No. 12 FRONT ST.

SAN FRANCISCO, CAL.

# HAMMOND M'F'G. CO.

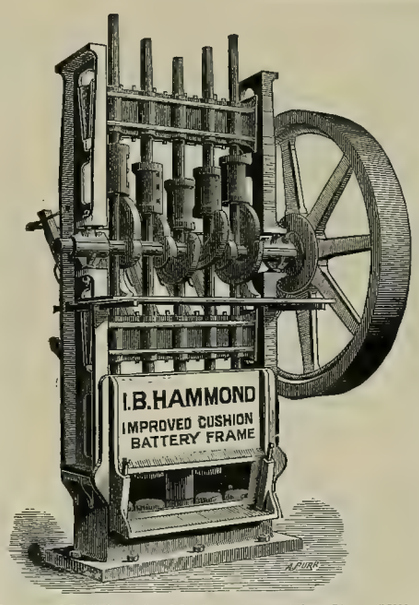
## 69 First Street, PORTLAND, OR.

MANUFACTURERS OF

## Stamp Mills, Ore Feeders

DETACHABLE BUCKET WIRE-ROPE TRAMWAYS,

Roller Grinding Pans, Desulphurizing Furnaces, Etc.




Improved Self-Contained Cushion-Frame Five-Stamp Mill.
Patented in the United States and Foreign Countries.

**The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Setf-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill**

**FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.**

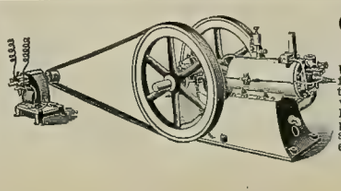
**SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.**

**THIRD: The Large Amount of Space Saved.**

Late improvements in the amalgamation and concentration of ores enable us to offer to the mining public, in connection with our Self-Contained Mills, an apparatus which amalgamates and concentrates at the same operation and provides a perfect trap for escaping quicksilver. Write to us for information.

Send for Catalogue and Price List.

CORRESPONDENCE SOLICITED.



## CHICAGO GAS & GASOLINE ENGINE

Used for making Electric Light or furnishing power for any purpose required. Specially adapted for electric light in private enterprises. The latest great invention of this progressive age. Built in from 2 to 50 horse power. Stationary or portable. Is the simplest power on the market. A dwarf in size, a Samson in strength. Costs but little to run it. Has no equal for even speed and durability. Send for catalogue.

J. J. NORMAN CO., Mfrs., 53 S. Clinton St., Chicago.

## Coast Industrial Notes.

—An experimental petroleum well is being sunk near Redlands, Cal.

—An oil well recently struck at Coalinga is reported to have flowed eighty barrels in four hours.

The semi centennial occupation of California by Americans will be celebrated at Monterey July 4-7.

The Alaska Packing Association paid its twenty-ninth dividend of 75 cents per share on the 12th inst.

The Atchison, Topeka & Santa Fe Co. is projecting a new air-line railroad from Victor, San Bernardino Co., to Silver City, N. M.

A. Rosenholz of San Francisco has invented an underground trolley system, that he expects will supersede the overhead electric wire.

—California has a monopoly in this country in the growing of olives. The crop of '95 brought $250,000 to the growers, and this year it is estimated at $3,000,000.

—The San Francisco and San Joaquin Railroad directors have let a contract for seven new locomotives - four freight and three passenger. They will be ready for use in ninety days, when the road will be finished to Fresno.

—The representative of the American Trading Company in Japan, Mr. Morse, has obtained from the Korean Government a concession for the first railroad in Korea, between Seoul and Chemulpo. The distance by road is 26 miles, but by rail it will be 30.

—A Federal appropriation was made for the purchase of a San Francisco postoffice site nine years ago and a site secured at a price which appeared reasonably dear. It is now suggested that before the close of the century work should begin on the proposed edifice.

—The basis of this year's Home Product Exhibition at the Mechanics' Pavilion in this city is that two committees of equal number from the Mechanics' Institute and the Manufacturers' and Producers' Association will have joint charge of the exposition, that all net profits over $10,000 shall be divided equally between the two organizations, and in case of a deficit the M. and P. Association would not be responsible.

—A disastrous fire last Sunday morning burned the Vulcan Iron Works, Fremont St., this city, and did considerable damage to the Reliance Foundry adjoining. The loss aggregates a very large amount; the Vulcan Iron Works insurance is about $45,000. Manager Graham has a temporary office N. E. Cor. 1st and Mission Sts. He says the firm is taking orders as usual, and will go ahead, it being as yet undecided whether the old site will be used or a new one secured.

—The Los Angeles *Times* reports that the Producer's Oil Company has completed a 40,000-barrel iron tank alongside the Pacific Oil Refining and Supply Company's tank of equal capacity. A few hundred feet distant is the iron tank of the Union Oil Company, having a capacity of about 30,000 barrels. In another quarter of the city are the iron tanks of the Standard Oil Company, aggregating 55,000 barrels. These tanks combined give Los Angeles an iron tankage of over 175,000 barrels. It has been but a few months since there was not an iron oil tank it the city. The Oil Exchange sold 100 barrels of oil Monday at $1 per barrel. Reports from the oil district are encouraging, and indications point to remarkable activity in drilling operations.

—H. A. Butters has returned to Oakland from the City of Mexico, where he recently bought the street railway lines of that city, which will be converted into electric lines. He says: "I succeeded in buying up the entire street railway system of the City of Mexico, or, rather, I bought all the lines in that city, for there was no system. Some were mule lines, some used goats, and others steam locomotives. There were in all 150 miles of road. The purchase was made in the interest of a syndicate of London and South African capitalists. When in South Africa I was instrumental in buying a large number of roads in the Transvaal and turning them into electric lines. I saw at a glance, when I visited Mexico last fall, that the same thing could be done there. Coal is $20 a ton in Mexico. All the coal is imported. Recently the city began the construction of a tunnel to drain the city. Mexico has never been a very healthy place on account of the bad drainage. This tunnel will be completed at a cost of $13,000,000. I bought the right to use the water after it had been drained from the valley. The city is very high, but is surrounded by mountains. The fall of water will give enough power to make a 10,000 H. P. electric current—more than enough to run the entire street car system and enable us to sell power to others for general use."

—The Supreme Court of California is called upon to adjudicate a case involving over a hundred thousand dollars. The result turns upon the precise meaning of the word "their" as it appears in a contract. The sentence is as follows:

And at *their* option the Adams Company is to have the use of all the machinery and coal-hoisting appliances now in use by the Southern Companies.

It is very plain that the word is a pronoun standing for an antecedent noun in the sentence, but there are two such nouns, and the question is to which one does it refer. It is said that the Southern Pacific Company's lawyer did not see the possibilities of the queer bit of grammar until long after the litigation had begun. It was admitted in the first answer to the suit, that the Adams Company had the option of using the Southern Pacific Company's machinery. But the latter company now rests the entire case on the contention that the word "their" meant the Southern Companies and not the Adams Company. In the sentence under dispute appears the words "Adams Company is," and the southern Companies claim that the word "company" is therefore written in the singular sense and the word "their" cannot apply to it. If the writer had meant it to apply to the Adams Company he would have used the word "its" instead of "their." The other side claims that the word "their" must refer to the Adams Company because the latter is the nearest noun to the disputed pronoun.

—It is estimated that San Francisco will receive this year 150,000,000 feet of redwood and 250,000,000 feet of pine. The total cut of the State will be in the neighborhood of 500,000,000 feet, of which there will be 230,000,000 feet of redwood from Humboldt, Del Norte, Mendocino and Sonoma counties, and 30,000,000 feet south of the bay of San Francisco. The rest of the cut will be out in the interior from the headwaters of the Sacramento to to those of the San Joaquin, along the great mountain slopes, where fine timber grows. Yellow and sugar pine of various descriptions will make up the balance of the cut. Besides this, there will be shipped to southern California from the Puget sound country and the Columbia river about 75,000,000 feet of pine, which will make, consumed in the State and shipped from its borders, between 800,000,000 and 900,000,000 feet of lumber.

## Personal.

W. H. STORMS of the State Mining Bureau is traveling through San Diego county.

GEO. QUINN succeeds F. Cook as superintendent of the App mine, Tuolumne Co.

T. J. NOLTON of Siskiyou has gone to look at some mining property in Sonora, Mexico.

BENJ. JOHNSON has been appointed superintendent of the Ford mine, near San Andreas, Cal.

G. B. WARREN has been appointed superintendent of the Golden Winnie and King gold mines, Murray, Idaho.

MANAGER STANTON relinquishes the Baldwin Hotel business and will turn his attention to his Kern Co. properties, on which he will erect a mill.

GEN'L MGR. GURNEY of the Gurney M. & M. Co. is in the city on his way to England. His company is operating extensive mines at Topia, Durango, Mexico.

HERMAN BELLINGER, formerly of Austin and Eureka, Nevada, is in charge of the British Columbia smelting plant at Trail, B. C. A local paper says he has a salary of $10,000 a year.

J. B. TONKIN has resigned the superintendency of the Iron Mountain mine, Shasta Co., and will take charge of the Iunker mine, Honolulu, on the Klamath. He has also charge of the new railroad now building from Sisson to Squaw Valley.

H. S. DURDEN, Secretary State Mining Bureau, will deliver a free lecture on "The Mother Lode" at the Good Samaritan Mission, Second and Folsom streets, this city, on the evening of the 21st inst. The lecture will be illustrated by maps and charts.

J. H. TIBBITS, at Buluwayo, Matabeleland, South Africa, under date of March 18th, states he has been appointed assistant manager of Clark's Consolidated, Limited—a company organized by and named for Captain C. Jefferson Clark, deceased. He is stationed at Guanda, a little town forty-five miles from Buluwayo.


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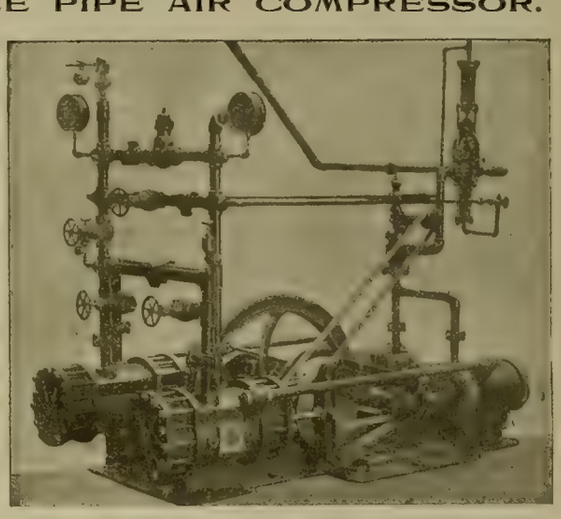
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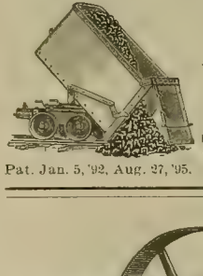
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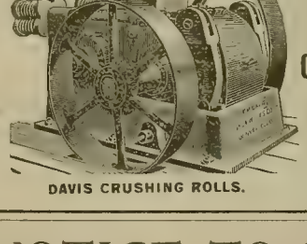
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# Mining Summary.

## CALIFORNIA.

### Amador.

At the Wheeler gravel mine at Pine Grove, recently sold to Chicago men, three monitors are at work.

The shaft at the Oneida is down 200 feet.

The Bellwether, recently incorporated in Illinois at $1,000,000, will shortly begin work.

It is understood that at the Argonaut sinking will be continued till a depth of 2000 feet is attained.

The *Record* learns that at the Anita good milling ore has been found on the 200-foot level.

The *Record* also reports that at the Wildman-Mahoney, Supt. Ross has the 70 stamps crushing 7000 tons monthly.

At the Wieland, or Union Con., mine the upper Paugh tunnel is in 800 feet and the lower tunnel 780 feet. About 160 feet more will connect with the main shaft. There are 35 men on the payroll. B. Bibo is manager.

### Butte.

The bonders of the Big Betsy, near Forbestown, are doing considerable work and have put in machinery to operate the property. The Magalia and Princess, near Magalia, are also being vigorously worked. A depth of 1000 feet has been reached in the Barrow quartz mine near Oroville.

At the Banner the shaft is down 1000 feet. A tunnel will be run from the bottom of the shaft to tap the ledge when it is expected the mill will commence crushing ore from the 1000 foot level.

### Calaveras.

The owners of the Keystone mine, near Altaville, will soon incorporate the property.

In the Soap Root mine, West Point, recently bonded for $6,000, at the bottom of the 100-foot shaft, a four-foot vein assays well.

C. F. Horswell is running a tunnel to tap the gravel bed at the California mine, below North Branch, 6x7 feet in the clear. It will have to run 1500 feet.

At the Infernal gravel mine an old drift filled with a soft slum was tapped, and as the men could not hold it in place, they hoisted it to the surface and put it through the sluices. There were about fifty carloads of the stuff and it yielded a little over eight ounces of gold.

At the Machu mine, West Point, sinking the shaft is being steadily prosecuted and Whitlock, Wells and Snyder will sink a double-compartment shaft on the San Andreas quartz mine, about 100 feet south of the old shaft. The owners claim that the ore will pay $40 to the ton in free gold. It also contains a large percentage of sulphurets.

A $10,000 hoist is building at the Esperanza mine near Mokelumne Hill, preparatory to sinking 3000 feet.

AROUND SAN ANDREAS.—*Citizen:* John McSorley has resumed operations in the Green Mountain mine. Rich gravel has been struck in the Banner gravel mine. The Victoria mine in Chili Camp district is being worked by the King amalgamator process. The King Solomon mine, near Burson, is being worked by Dr. Huntington. The tunnel at the Specimen mine will be run 200 feet, when it is calculated it will intersect the lead. Pumping out the Keystone mine, near Altaville, is about completed.

### El Dorado.

(Special Correspondence).—John Kohlert has granted bond to J. Morgan Taylor and others for 100 acres gravel property. Permission to hydraulic has been applied for. This is near Indian Diggings, 75 miles southeast of Placerville.

Edward Bind has negotiated a bond for two years, to be granted A. E. Head and Jos. Clark of San Francisco, by the Cosumnes Copper Mining Co., of a claim long abandoned. The property is 20 miles east of here. Work has already begun preparatory to operate the claim. The result of assays shows the ore to be 50 per cent gold, 30 per cent copper and 20 per cent silver.

Hayward & Lane begin operations on a gravel claim near Indian Diggings. They are erecting buildings and machinery quite extensively.

A collection of ore specimens from the various mining properties in this county, for a cabinet exhibited in the Ohio House, begun eight weeks ago, resulted in gathering 165 pieces—no duplicates in the collection. Mr. T. Schamb manifests perseverance and taste in this work.

D. W. C. Morgan, a veteran California miner, is rehabilitating the old Pocahontas and also the Tullis mines.

Supt. Beardslee of the Lady Emma is in Berkeley.

Machinery for a steam hoist, to be placed on the Larkin, is being transported from the railway at Diamond station to the mine. The sinking on this property is progressing satisfactorily. At a depth of 172 feet the shaft has come into promising ore, showing free gold.

### Inyo.

In vast southeastern Inyo there are mines and mining operations which few residents know anything about. And in that region of mountains and deserts it is difficult to describe locations, no existing map showing anything about them. It is also hard to describe some of the mismanagement in their attempts to get money out of the mines. At the Mineral Ranch (the Anthony mines at Pleasant Canyon, in the Telescope or Panamint mountains), a Los Angeles company, the Golden West, erected a five-stamp steam mill and concentrator under the mines, which are on an almost overhanging cliff 1400 feet in height. In the comparatively smooth canyon below they placed the mill part of the plant, 600 or 700 feet above a stream of water flowing four to six inches. Then they sunk a shaft above the mill and drifted around the bed of the canyon to get water, failing in which they laid pipes below and put in a small boiler and pump with which to raise it. That failed, and they placed a larger boiler and pump, which also failed. It has been shown by tests that the ore carries $45 and upward, gold, to the ton, but it is not free milling, and it is understood that what ore they did "work" produced about $5 per ton. However, an assay office forms no part of the outfit.

About one-fourth of a mile below is a natural mill site, under the flowing water, and in line of a practicable tramway from the mines. The company has expended $14,000, at least $10,000 of which has been wasted.

Half a dozen miles to the southward of the Golden West Co.'s operations, the Redlands M. & M. Co. located and bought prospects galore; erected a quartz mill and proceeded to pound out all the rock they had extracted, amounting to about one day's run. This was a case of putting up a mill before they had a mine, with the usual result. This company, however, like its neighbor, have honorably paid up all their obligations.

D. C. Lane's mine at Darwin is working satisfactorily. He shipped three carloads to Selby & Co. the past week.

Curving to Death Valley diagonally to the southeast, 40 miles from the Mineral Ranch, on the Funeral range, says the *Register*, is situated the Confidence Mining Co.'s plant. It is a Salt Lake corporation, represented by Cannon, Langford, Montgomery et al. It is a strong three to four-foot ledge, 1000 feet in length, of rich rebellious gold ore. April 4th, two shafts of 150 feet were about being connected by drift on the bottom. The mine is near the summit, five miles from the nearest fresh water, a spring on the east side of the the mountains. On the west side, on the edge of Death Valley, these operators dug an 80-foot well, from which a China pump raises about the saltiest water on earth. From an immense tank it passes to a condenser, and thence to the milling plant. This consists of a rock-breaker, a Bryan roller mill, having a capacity of 20 tons per day, and a few feet of silvered copper plates. The power is supplied by a 20-horse power gas engine. Costly as all these things are at that point, there is absolutely no provision for any chemical treatment of the rich but rebellious ore, except the simplest free process. The mill was idle, but a very large accumulation of tailings showed what had been done. Men who prospected there assert that a miner could make $5 per day panning them out. No assayer cuts any figure here, either, and one wonders how they can have any idea of "where they are at" in the mining and milling business. The same company own the Johnny and Chispa mines at Montgomery, Nye county, Nevada, distant by trail about 55 miles, and teams were hauling supplies away around by Saratoga Springs, and the whole length of the Amargosa wash, from one place to the other. No superintendent or paymaster had been seen since last January. Some 20 of the men employed quit on April 4th. The company must have expended $40,000 to $50,000 in a mill that will have to be extensively added to or removed entirely before they can ever get a dollar out of it.

### Kern.

From what is usually considered a reliable source it is learned that in the Rand district G. Kenyon and sons have discovered a mine whose ore runs remarkably rich. The find recently made was a blind ledge which has all the appearance of being continuous. It is about eight feet in width, of a uniform quality and dimension. The rich streak is a strip extending through the ledge which is about four inches in width. The owners of the bonanza are not attempting to work any of the ore, but are sacking it and will buy a mill and reduce it themselves. There are several mines in the locality which are reported rich.

The Blackhawk mine, owned by Kuffel & Swarthout, is one of the best developed in the district, and is now handling ore which is said to mill $80 per ton. It is two miles south of the Burchman mine.

The Los Angeles *Express* says thousands of prospectors have hunted for the quartz ledge which has always been believed to have fed the gold fields of Goler, but the finding was reserved for F. H. Heald of Elsinore, who has just located; the ledge fifteen feet wide, solid quartz, is the first quartz ever found at Goler bearing gold. The mines at Randsberg are ten or twelve miles south of Goler in another range of mountains with a dry lake between. Mr. Heald and his friends have located eight claims and he has located a mill site with plenty of water and 640 acres of coal adjoining the mines. A new district has been organized and named after the discoverer.

### Lassen.

AT DIAMOND MOUNTAIN.—L. D. McDow is crushing ore from the Belt mine in the Branham & McDow mill.

Shinn Bros.' tunnel is in 200 feet. The rock is hard blasting and progress slow.

G. Spellier has completed 65 feet of a 100-foot tunnel to tap the old Union ledge.

The placer mines, owing to a greater supply of water than usual, are being worked for all there is in them by their respective owners.

The stamps of the Lone Pine began dropping last Tuesday.

### Madera.

The old Wilson and Berry mines, near O'Neals, were purchased about two months ago by Hart, Hedinger, McKenzie, J. Hoxie of Fresno, and will be worked.

W. Phips of San Jose is building a 5-stamp mill on his claim beyond the Zebra mine. The Krohn mine is sold to an English syndicate for $25,000, and will be operated on a large scale.

### Nevada.

*Transcript:* Work has been resumed at the upper shaft of the Reward mine, at the old rifle grounds. Operations are being carried on through both shafts.

Miners down from the English Mountain mine report it has been closed down, and it is not known when work will be resumed. The weather has been severe, and the snow is between 12 and 15 feet deep at English Mountain.

*Transcript:* At the Harmony drift mine the channel is encountered by the new drift, and gravel that pays $10 per carload is being taken out.

The *Union* says the ledge has been struck on the 800-foot level at the Federal Loan mine, and it is large in size and rich in quality.

### Mono.

In the Bodie Consolidated prospecting work continues on the 200 and 300 foot levels.

In the Mono mine the east crosscut on the 400-foot level was extended 10 feet during the past week. The face is in soft porphyry.

A little good ore is being taken from the Bulwer Consolidated.

### Placer.

*Sentinel:* The Mayflower mill is running steadily, with a good prospect of increasing the working force during the coming season.

At Red Point Supt. Hoffman reports 58 men on the payroll. The recent cave in the main tunnel has been repaired and the returns from the gravel they are taking out at present are very encouraging.

At the Eureka mine the main tunnel is now in 850 feet. The tunnel is 6½x7 feet. Supt. Felix Chappellet Jr. says that he expects to reach the 1000-foot mark during the month of May.

### Riverside.

A $75,000 mortgage on the Good Hope mine of Perris was placed on record last week to secure the payment of the above sum by H. B. Johnson of New York, who is expected to resume work on the mine, to the Good Hope Mining Co. On August 1st $10,000 is payable, on November 1st $5000, and on August 1st, 1897, the balance is to be paid. The mortgage is taken as indication that the mine will be under the personal control of Mr. Johnson, and active operations again begun.

### San Bernardino.

E. R. Sweet reports a gold strike in the Pinon mining district, near the Lost Horse mill, about eight miles from the Desert Queen and Eagle Cliff claims. It is a half mile up the mountain side, and is in such a position that by wires and buckets the ore can be carried directly from the mine to the mill.

Oregon men have bought the Sidewinder mine, near Victor, for a large sum. It furnishes low grade milling ore. The size of the ledge and the ease with which the ore is reduced making it considered a paying proposition.

McMillan and McAfee have located a four-foot ledge of boracite, carrying 50 per cent borax, near Daggett.

### San Diego.

The *Bee* says the fire in the Queen mine at Hedges is still smouldering, and it will not be in shape for work for some time to come. They have bulkheaded all places where air could get to the fire and expect it will smother by the confined gas. The fire was caused by the failure of a stick of giant powder to explode, it burning instead. Under the old cave above the 200-foot level there was a large quantity of mashed timbers which prevented the dirt from above settling down through the timbers below, and in order to accomplish that result the blasting was done, with the above result. The main loss is in time, as they will have to shut down part of their stamps.

Rice district reports a strike in the N. G. mine, which C. L. Fair lately bonded for $10,000.

A. C. Morgan of Mesa Grande has developed a ledge three-quarters of a mile east of the Shenandoah mine, which gives indication of permanence and richness.

Dr. Frizell of Escondido reports to the *Union* regarding the strike in the N. G. that it is of considerable value. It was made at the 30-foot level, and is a 4-foot vein.

Rice district is southeast of Warner's ranch, on the edge of the desert, and has been considered a promising camp since its discovery, though nothing of a bonanza nature has been uncovered before.

### Shasta.

Ashe & Poole are reported to have bought the Alta group of mines near Iron Mountain for $12,000.

*Free Press:* The Original Quartz Hill Gold Mining Company, Dr. Midowiz superintendent, suspended operations Tuesday morning and paid its employes in full. The cause of the suspension is said to be a disagreement of the stockholders. The company has been operating the old Harrison mill at Quartz Hill and has been running the old Calumet mill under a lease.

Ludlum and Jones of the Eureka Tellurium gold mine, near Middle creek, have put in two new concentrators and will run a custom mill.

The *Free Press* reports G. C. Richards, manager of the American mine, has bought six claims, the Ellis Brothers' mines, a half mile north of Gladstone, for $10,000 cash.

H. McDonnell, who in company with J. Salee is developing the property at Copper City, tells the *Free Press* that a rich streak of copper has been encountered, but that the main copper body has not yet been reached.

### Siskiyou.

*Journal:* The keels of the new dredging boats on the Klamath river, for mining that stream, have been laid at Oak Bar. They will be sixty feet in length. Two boats will be anchored in the stream together, facing up river, about six feet apart, while the third will be anchored just behind them, below the opening between the other two. Mr. Distlehorst feels confident that his dredging boats will prove successful in mining the bottom of the river, and claims that he can handle the largest boulders besides digging down into the bed-rock toward securing all the gold hidden in crevices. Several liberal offers of mining ground have been made by the owners for testing this new process, and it is probable that a great amount of gold will be realized, especially where the river is deep and difficult to work by means of wings and head dams, pumps, derricks, etc.

The McConnell claim, a little below the mouth of Humbug creek, in Klamath river, will be in readiness for hoisting pay gravel within a couple of weeks. This claim has paid well during former seasons, and will no doubt turn out well during the coming summer and fall.

The Ben Shinar mine, near Nolton, on Thompson creek, has been sold by H. H. Hunter to some Colorado people, who will develop it on a extensive scale. They will commence the construction of a ditch soon, to cover the ground. This is said to be one of the richest mines on the Klamath river.

Hydraulic as well as other mining is flourishing on the Klamath river. The river claims are all in operation, and some excellent reports are expected in this section during the coming summer.

The recent cold weather has held the water back, so that the hydraulic mines in the vicinity of Oro Fino have had scarcely enough water to keep them in operation. Quite a large amount of new snow has fallen in the high mountains, from which these mines secure their supply of water, and will enable them to keep at work fully as late this season as usual.

### Sierra.

The *Enterprise* reports about four feet of snow at Gold Valley and about thirty men working in the mine and mill.

Lane & Barnes of Chicago are having five tons of rock brought down from Purdy's mine on the East Fork to the Gold Bluff mill, to test the rock before purchasing the property.

W. Johns, superintendent of the Sierra Buttes mine, will employ about a dozen men during the early part of the coming season.

The fire which destroyed the two mills at the Alaska mine, Pike City, last week, caused a loss of $30,000. The mills contained twenty stamps each. B. S. Taylor, one of the leading owners in the mine, went from this city to the scene of the disaster. It is understood that he will arrange to pay off the company's indebtedness and build a new mill.

### Tuolumne.

AROUND SONORA.—At the Shawmut Supt. Halsey has started the new air compressor. Forty men are employed doing development work.

Supt. George Smith, at the Grant mine, on Moccasin creek, has a double shift at work sinking the shaft.

At the Rawhide sinking the shaft continues and drifts on the 900 and 950 are being driven. Thirty-five stamps are at work. The chlorination works are treating over a ton of sulphurets daily.

At the Golden Gate about 60 men are employed about the mine and chlorination works.

At the Dutch mine Supt. Trittenbach is increasing the number of men.

The Tuolumne County Mining and Development Company is working the Mt. Zion lode and 3000 feet of an extension of the Mt. Jefferson mine, near Groveland.

At the Star, Wilman Bros. are putting in an air-compressor plant capable of running four power drills and a new hoisting plant.

### Yuba.

The Brown's Valley correspondent of the Marysville *Appeal* says that the Barton Bros. have disposed of their claim to the owners of the Dannebroge and Pennsylvania mines for $3000. Messrs. Walrath and Snell are also reported to have formed a company to develop the Faust mine, formerly known as the Hibbert & Burris.

## NEVADA.

### ESMERALDA COUNTY.

Twenty-five men are working on the Candelaria pipe line.

### HUMBOLDT COUNTY.

The *Silver State* says the Gold Eagle and other mines in Central district are sold to Dr. G. B. Pfoutz and C. L. Wilbur, of Salt Lake City, for $10,000.

### LINCOLN COUNTY.

The Pioche *Record* says: The trouble between the miners and owners at DeLamar has been satisfactorily adjusted.

## OREGON.

On the 16th ult. the new 20-stamp mill on the Bonanza mine at Robinsonville, near Baker City, started up. On the 25th it was closed down for a clean-up. The result was $10,000.

### BAKER COUNTY.

At the Bonanza mine, after running from April 16th to the 25th with the new 20-stamp mill, the cleanup yielded $10,000 in bullion.

A Baker City dispatch says: "The Virtue mine Saturday evening sent in 113 pounds of gold, avoirdupois, worth $35,000, the product of twenty-two days' run with stamps. A depth of 600 feet has been reached in the mine."

### JACKSON COUNTY.

H. Mattern is developing a quartz ledge near Ashland and getting out some ore which is shipped to the Selby Co. The second-grade ore is crushed at the Hicks mill.

### LANE COUNTY.

Several hundred prospectors will work over the territory from the Bohemia mines to the Willamette river, about fifteen miles. Cottage Grove people are raising subscriptions and expect to build a road to the mines so that machinery can be carried. At present everything has to be taken in by pack animals. In the Blue River district development will be pushed, and several prospectors have already gone in.

## WASHINGTON.

Mr. Ellis, a Seattle lumberman, is reported to have bought the Toulee group of mines in the Kettle River country, on the Colville reservation, near the Mission, from A. Miller for $14,000.

A. Carpenter has brought down some ore

from the Lone Star and Washington mines, on the reservation, says the Spokane *Chronicle*, that assays $8 in gold, silver and copper. The tunnel in this mine, which is owned by the Reservation Mining & Milling Co., is down 40 feet. This mine is located in White's camp.

### BRITISH COLUMBIA.

Following are the names and addresses of 100 of the leading mining companies of British Columbia: Pacific Bullion Mining Co., Warm Springs, Kootenay; Kootenay No. 1 Mining Co., Ainsworth, Kootenay district; Kootenay Smelting and Trading Syndicate, Ld., Revelstoke; Revelstoke Mining Co., Ld., Revelstoke; Fraser River Gold Gravels Syndicate, Ld., Vancouver; Northwestern Gold and Silver Mining Co., Victoria; Middle Creek Gold Mining Co., Victoria; Columbia Mining Co., Ld., Ainsworth; Empire Consolidated Mining Co., Ainsworth; West Kootenay Mining Co., Ainsworth, Le Roi Mining and Smelting Co., Trail; Jeanette Mining Co., Ainsworth; Neosho Mining Co., Ainsworth; Western Consolidated Mining Co., Ainsworth; Columbia-American Mining Co., Ainsworth; Kootenay Mining and Smelting Co., Pilot Bay; Kootenay Lake Reduction Co., Pilot Bay; Gold Queen Mining Co., Yale; Shafer Gold and Silver Mining Co., Ainsworth; Spokane and Great Northern Mining Co., Victoria; Duluth and St. Paul Mining Co., Ainsworth; London Mercantile Association, Ld., Nelson; Freddie Lee Mining Co., Kaslo; Byron N. White Co., Nelson; Slough Creek Mining Co., Victoria; Josephine Mining Co., Nelson; Northern Belle Mining Co., Kaslo; East Kootenay Exploration Syndicate, Ld., Wild Horse Creek; Canadian Northwest Mining Co., Kaslo; Kootenay & Columbia Prospecting and Mining Co., Ld., Kaslo; Canadian Pacific Mining and Milling Co., Ainsworth; Kootenay Mining and Smelting Co., Pilot Bay; Horsefly Gold Mining Co., Victoria; Vancouver Mining Co., Ld., Vancouver; Gordon Hydraulic Mining Co., Ld., Victoria; Thunder Hill Mining Co., Ld., Victoria; Port McNeil Coal and Land Co., Ld., Nanaimo; Cataract Hydraulic Co., Ld., Victoria; Scott Mining Co., Yale; Columbia Mining Co., Yale; American Development Co., New Denver; Slocan Surprise Co., Kaslo; Bellingham Bay Hydraulic Mining Co., French Creek; War Eagle Gold Mining Co., Rossland; Trail Mining Co., Rossland; Cariboo Gold Fields, Ld., Barkerville; Finch Mining Co., Vancouver; Kootenay Hydraulic Mining Co., Waneta; Good Hope Mining and Milling Co., Rossland; Paris Belle Gold Mining Co., Rossland; Boundary Creek Mining Co., Boundary Falls; Eureka Consolidated Mining Co., Rossland; Robert E. Lee Mining Co., Rossland; West Le Roi and Josie Consolidated Mining Co., Rossland, Idaho Gold Mining and Smelting Co., Centre Star mine, Rossland; Centre Star Mining and Smelting Co., Centre Star mine, Rossland; Columbia Hydraulic Co., Revelstoke; British American Mining Co., Rossland; Lookout Mining and Milling Co., Rossland; Crown Point Mining and Milling Co., Rossland, Kootenai Mining and Milling Co., Rossland; Iron Horse Mining and Milling Co., Rossland; Spokane Ore Co., Rossland; St. Elmo Gold Mining Co., St. Elmo mine, Red Mt., Trail Creek; High Ore Gold Mining and Smelting Co., Rossland; Phœnix Gold Mining Co., Deer Park Mt., Trail Creek; Evening Star Mining Co., Rossland; Gold Hill Mining Co., Rossland; Virginia Gold Mining Co., Rossland; Silverine Gold Mining Co., Rossland; Poorman Gold Mining Co., Rossland; Caledonia Consolidated Mining Co., Rossland; Dixie Mining and Milling Co., Rossland; O. K. Gold Mining Co., Rossland; Great Western Mining Co., Rossland; Old Ironsides Mining Co., Midway; Josie Gold Mining Co., Josie mine, Trail Creek; French Creek Gold Mining Co., Revelstoke; Iron Mask Gold Mining Co., Rossland; Main Quesnelle Gold Dredging and Mining Co., Ashcroft; Black Jack Quartz Mining Co., Ld., Barkerville; Anglo-American Mining Co., Ld., Yale; Crow's Bar Mining Co., Ld., Vancouver; Stevenson Gold and Platinum Hydraulic Mining Co., Ld., Vancouver; Bear Lake Consolidated Mining Co., Ld., Victoria; Maud Hydraulic Mining Co., Ld., Vancouver; Montreal and British Columbia Prospecting and Promoting Co., Ld., Vancouver; British Columbia Gold Fields Exploration and Concessions Co., Ld., Vancouver; Vancouver Gold and Silver Exploration and Concessions Co., Ld., Vancouver; Islander Gold Quartz Mining and Milling Co., Ld., Victoria; Peters Creek Gold Mining Co., Ld., Vancouver; Nip and Tuck Gold Hydraulic Mining Co., Ld., Vancouver; Golden Gate Mining Co., Ld., Vancouver; Nest-egg Mining Co., Ld., Victoria; Crow's Nest Coal and Mineral Co., Ld., Victoria; Vancouver Island Mining Co., Ld., Wellington; Omineca Prospecting and Development Co., Ld., Victoria; Willow River Gold Mining Co., Ld., Victoria; Salt Spring Island Mining Co., Ld.; Donald Gold Mining Co., Ld., Donald; Alpha Mining and Milling Co., Ld., Victoria; Laura Hydraulic Mining Co., Ld., Victoria; Cariboo Creek Mining Co., Ld., Donald; Lillooet Hydraulic Mining Co., Ld., New Westminster City; Cariboo Reefs Development Co., Ld., Victoria; Invicta Gold Mines, Ld., Wild Horse Creek, East Kootenay.

The law regarding the free admission of mining and smelting machinery not manufactured in the Province has been renewed. Under this concession machinery of the value of $169,749 was brought into Canada duty free last year, and imports during the present season will likely be in excess of this figure.

The Rambler and Cariboo Consolidated Gold Mining Company, capital stock $1,000,000, has been incorporated by McArthur, Shea, Davenport and McClaine of Spokane, Wash.

### ALASKA.

The steamer Al-Ki, from Alaska brings late Juneau reports. The last clean-up of the Appolo mine at Unga was $87,500, the product of a three months run.

### IDAHO.

Reports from the mining region in the vicinity of Pierce City, Idaho, are that the backward season is seriously interfering with placer mining operations. The season is a month later than last year.

From Rocky Bar, in the eastern part of the Boise gold belt on the ground of the old Elmore company, E. C. Koch claims to have crosscut to the Alturas from the bottom level and found it larger and richer than weere the old company worked it 300 feet above.

### MONTANA.

At the recent meeting of the Helena & Frisco Mining Co. A. M. Holter was elected president and A. J. Seligman treasurer.

*News Bureau*. The Boston & Montana Mining Company has nearly $1,000,000 cash on hand and nearly another $1,000,000 due from guaranteed sales of copper. The company is sold a great many weeks ahead and can pretty nearly approximate its earnings for the present year. Some stockholders want the company to increase the dividend to $2.50 per share quarterly, but it is probable no such action will be taken this year.

A chemist has been making tests of the smoke at the Anaconda smelters with a view of ascertaining if sulphuric acid gas could not be made from it; the result is satisfactory. Sulphuric acid can be made from the sulphurous fumes as a by-product, and at a low cost. It is the intention to only make enough for the company's own use at present.
ad Montana

R. A. Ammon is at Great Falls with $35,000 to clear all indebtedness on the Gilt Edge properties and resume control.

H. S. Sherard, manager of the company which has been negotiating for the purchase of the New Year mine, near Lewiston, is reported to have advices from the agent of the company at St. Louis that the deal will probably be closed in a few weeks, the price to be paid being about $200,000.

The Golden Scepter Mining Co. has control of the Alps mine and 10-stamp mill adjacent to the Golden Scepter mines. Superintendent Babcock will put about twenty-five men at work on the property.

### SOUTH DAKOTA.

The Homestake Mining Co. at Lead has added forty stamps to the Star mill, making it 200 stamps. Work will soon be commenced enlarging the original Homestake 80-stamp mill to 100 stamps.

### COLORADO.

In Mint Director Preston's summary of the product of mineral values of Colorado for 1895 the report is made by counties and estimates the gold product of the State at $15,013,434. The total mineral product is estimated at $50,202,220, including gold, silver, copper and lead. Increased gold production over 1894 is shown in Chaffee county as $38,502; El Paso, $3,970,435; Gunnison, $32,445; Hinsdale, $179,128; Mineral, $84,165; San Juan, $176,647; San Juan region, $362,697; San Miguel, $700,930. Other counties are credited with small increases. The report gives Colorado an increase of $4,396,971 over the gold product of 1894, comparisons for the entire product of both years being as follows:

| | 1894. | 1895. |
|---|---|---|
| Gold | $10,616,463 | $15,013,434 |
| Silver | 30,701,375 | 31,075,296 |
| Lead | 3,199,175 | 3,017,590 |
| Copper | 761,575 | 1,065,900 |
| Totals | $45,281,588 | $50,202,220 |

The State Ore Sampling Co. of Denver is looking over the ground at Alma with the view to erecting sampling works and possibly adding a pyritic smelter.

H. C. Bolsinger, manager of the Vendome Mining Co.'s properties in Nevadaville, consisting of the Hubert and Shafts mines and the Vendome mill, has closed a contract to erect a 30-stamp mill at Nevadaville for $20,000.

A ten-stamp mill has been built at McCourt by the Buffalo and Colorado Development Co.

The officers of the Argentum-Juniata, at Aspen, report that the operating expense of the mine from January 1 to April 1, 1896, was $46,295.59, of which 22 per cent was in development, 13 in hoisting and tramming, 6.62 in breaking ore and the remainder for various other mine expenses. The ore shipped for the quarter was 1093 tons net weight; gross value of ore shipped, $84,490.16; net cash returns, $73,345.10; gross value of ore per ton, net weight, $77.30; the average gross receipts for silver per ounce, including lead, was 64.3 cents, freight was 8.4 cents, net returns at mine per ounce was 55.8 cents; deducting mine-operating expense per ounce, 35.2; leaves net profit on silver shipped per ounce at the mine of 20.58 cents, and total net profit for quarter, $27,047.51. The value per ton of ore shipped has increased, having been from June to January, $47.34 per ton; and from January to April 1st, $77.30 per ton; the net profit on silver per ounce having increased nearly 4 cents.

At Gillett, where the El Paso Reduction Company's works have been in operation for a year, the company tells the *Record* that the present capacity, fifty tons a day, will be increased to 100 tons during the season. The process is the improved chlorination method of treatment, securing a gold extraction of 95 per cent and upwards. The ore is crushed by Dodge crushers and rolls and put through a Pearce turret roasting furnace, after which it is passed on to the cooling floor. Thence it is fed into revolving lead-lined cylinders five feet in diameter by nine feet in length, charged with bleaching powder, composed of hypochloride of lime, saturated with sulphuric acid, which generates chlorine gas that separates the gold. The solution is then filtered into lead-lined tanks containing charcoal, which precipitates the gold afterwards placed in cast iron pans in which the charcoal is burned to an ash, which contains an average of 70 per cent gold and is melted in crucibles producing ingots of gold 990 fine and upwards. The management states it can successfully treat any ore thus far found in the district. The average charge is put through by chlorination in about nine hours, whereas by the cyanide process the vats are emptied but once in from four to six days.

A suit involving the Archer Consolidation at Leadville has been filed. L. M. Ballou of New York and A. M. Say of Kalamazoo, Michigan, are the plaintiffs. The defendants are the Ibex Mining Co and twenty-five mining men, chief among whom is J. F. Campion. The complaint alleges that defendants unjustly acquired the property now in possession of the Ibex Co.

### ARIZONA.

W. V. Frost has sold his mine, the Crystal Butte, at Tysons to B. G. Smith of San Francisco for $5000.

Reports from the Congress mine are to the effect that a crosscut drift is to be run from the 1600 foot level to tap a parallel ledge 700 or 800 feet distant. About one carload of concentrates per day is now the output from the 40-stamp mill. When the crosscut drift shall have reached the parallel ledge the mill capacity will be increased to eighty stamps and the working force increased. The pay roll will then carry the names of about 500 men.

### LOWER CALIFORNIA.

The Fortuna Mining and Milling Company will re-incorporate under the laws of Mexico, with $1,000,000 capital. The company has a group of prospects at the Agua Dulce in the Zaragoza district. Mr. Gay Lombard is general manager.

### MEXICO.

G. Freeman and J. Macdermott are placer mining in the southern part of Chihuahua. The nearest railroad station is 300 miles and the country is sparsely settled, mainly by Indians. Morales, the center of the silver mines, is sixty miles away. At San Jose de Grecio sixty miles from their grounds, there are five mines in gold ore and are making big shipments. Mr. Freeman says: "The Anglo-American company for a year past has paid from $5,000,000 to $6,000,000 in dividends from these properties. Now they are shipping from $250,000 a month upward.

"We have enough ground to last us five or six years. The gravel runs about 40 cents a yard and is quite easy to handle except in one thing. There are lots of big boulders about as big as a man can lift, and it takes a pretty heavy head of water to work successfully. We have a fine ditch about two miles long, and up to about March 1 things went all right. Then one day we suddenly found ourselves with only a half a head of water, and I started out on a mule to investigate. I rode up the creek for about six miles and found eight ditches taking water to irrigate wheat fields. Then we had to stop for the dry season which will last until July 1, after which there will be an abundance of water for everybody. It will then rain almost continuously for three months. That is, it will not rain in the early morning. The sun will come up bright and clear, but by 11 o'clock the water will be falling in sheets and the creeks and rivers will not be fordable. Our workings are on the Pacific slope, as are several of the important big producers. To get there we have to travel over the divide and cross the most precipitous country in the world and comparable only with the Grand Canyon of the Colorado. The deepest gulch in Mexico we have at the Huerichic river. This is just one mile deep and about four broad, and the crossing places are about seven miles apart."

### SONORA.

During the months of January, February and March, 3,899,937 pounds of ore were passed through Nogales, being shipped by the various mines throughout the State of Sonora. Following is a list of the mines making the largest shipments: La Dura, in the district of Guaymas, 361,150 pounds; La Mexicana, in the district of Arispe, 358,871 pounds; Las Chispas, in the district of Arispe, 333,772 pounns; Sacramento, in the district of Ures, 332,757 pounds; and La Luz, in the district of Altar, 313,400 pounds.

### SOUTH AFRICA.

South Africa *Mining Journal*, Apr. 4: The Witwaterstrand fields includes the districts of Johannesburg, Boksburg, Krugerdorp, Florida, Doornkop, and Blaauwbank, and the totals for the past year for these various areas campare as follows with the figures for 1894:

| | Year, 1894. | Year, 1895. |
|---|---|---|
| Metres driven | 80,828 | 110 176 |
| " sunk | 23,714 | 40,734 |
| Tonnage mined | 3,062,767 | 3,917,078 |
| " milled | 2,871,395 | 3,501,679 |
| Number of stamps working | 2,381 | Not given. |
| Days milling | 324.5 | " " |
| Tons per stamp per day | 3.716 | 4.086 |
| Concentrates produced (tons) | 26.074 | 40.359 |
| " work-d (tons) | 24,134 | 34,312 |
| " yield per ton (ozs.) | 3.159 | 2.898 |
| Tailings treated (tons) | 2,772,730 | 2,863,868 |
| " assay value per ton (ozs) | 0.233 | 0.240 |
| Whites employed | 4,946 | 6,524 |
| Natives " | 35,611 | 45,287 |
| Gold produced by mills (ozs.) | 1,294,539 | 1,494,094 |
| " yield per ton (ozs.) | 0.451 | 0.427 |
| " value, total | £4,664,542 | £5,383,540 |
| " per ton | 32s 6d | 30s 9d |
| " by concentrates (ozs.) | 83,411 | 105,390 |
| " yield per ton (ozs.) | 3 456 | 3.072 |
| " value, t tal | £315,653 | £382,621 |
| " per ton | 26s 7d | 22s |
| " by tailings (ozs.) | 570,973 | 623,480 |
| " yield per ton (ozs.) | 0.206 | 0.218 |
| " va ue, total | £1,734,586 | £1,926,844 |
| " per ton | 12s 6d | 13s 6d |
| Total production (ozs.) | 1,948,924 | 2,222,960 |
| Value | £6,714,781 | £7,693 010 |
| Alluvial gold (ozs.) | 1.015 | 105 |
| Value, ditto | £3,387 | £361 |
| Total production from all sources (ozs.) | 1,949,939 | 2 223,066 |
| Total value from all sources | £6,718,168 | £7,693,371 |

In purely mining development the footage driven exhibits an increase of 37 per cent over the previous year, while sinking operations give results nearly double. These figures are, perhaps, the best evidence of the extent of the increase in mining work during the year, as the figures for the tonnage mined or milled are not direct evidence of the increased work doing in mining proper. The capital represented by these figures is very large, as the footage driven represents, roughly, the expenditure of a sum of £300,000, and at £10 per foot, the sinking figures represent £400,000. These two represent an expenditure, therefore, of about one million; for in the deep levels the sinking cost, including timbering and extras, amounts to more than £20 per foot. There is a gratifying increase in the quantity of ore reduced per day per stamp, and Rand mills can now be dealt with on the basis of four tons of ore per day. This is a higher average than has ever been attained before over so large a field, but it by no means represents the limit, which must gradually rise to five tons in the near future. The noticeable increase in the tonnage of concentrates produced is accounted for the extension of the sizing process used in connection with the cyanide plants, the first grade obtained being regarded as concentrates. In this fact is to be found the explanation of the falling off in the grade and value, though the decrease in value per ton is more than counterbalanced, in the aggregate, by the larger quantity produced.

## Commercial Paragraphs.

A LARGE Dow steam pump has been sent via Redding for use in the Brown Bear mine at Deadwood.

A LARGE SHIPMENT, something over 100 tons of mining machinery, manufactured by The Edward P. Allis Company, Milwaukee, Wis., consisting of Allis crushing rolls, a complete chlorination plant, engine, boilers, etc., will leave on the P. M. S. S. Co.'s steamer, Colombia, on the 18th inst., for the Two Republics Gold Mining Co., Pijinto, Mexico, via San Blas.

IN these days of electrical power transmission anything pertaining to the cheapening of cost of transmission is of interest. The Power Development Co. of Kern county, this State, is putting in an extensive plant for the transmission of power, in connection with which they are building a flume some four miles long. As water is very valuable and it is essential that none should be lost in transmission, it was necessary to devise some means to insure the absolute certainty of conveying the water this distance with no loss save that caused by evaporation. The engineer, Mr. C. N. Beal, after investigating the subject most thoroughly, decided upon building a double-boarded flume. Between the two courses of lumber is laid a course of the heaviest grade of P. & B. paper. Over this paper is applied a coating of asphaltum paint or compound, in which the upper course of lumber is laid, and it is fully expected by this method to have a flume that is absolutely watertight. The paper is manufactured here by the Paraffine Paint Co., 116 Battery street, who have sold quantities for the same purpose, satisfaction being always had from its use in this manner.

THE following advertisement appears in the Sacramento, Cal., papers:

Bids will be received at the office of the City Clerk until 5 o'clock p. m. on Monday, June 1, 1896 for three (3) Water Tube Steam Boilers of 100 horse power each, or four (4) round Tubular Boilers of 75 horse power each. No bid will be considered under 300 horse power aggregate. Bidders on Water Tube Boilers must figure on nine (9) square feet of heating surface being equivalent to one (1) horse power. Bidders on round Tubular Boilers must figure on fifteen square feet of heating surface being equivalent to one (1) horse power. Boilers must be erected and connected to main steam pipe, feed pipes, below pipes, drains and smoke stack. All exposed steam surface to be covered with asbestos. Boilers must be set in position singly. Bidders must furnish all necessary valves, pipes, breechings, fronts, grate bars and fixtures complete. Bidders on Water Tube Boilers must furnish a regular detailed specification, giving number of tubes, diameter of tubes, and length of tubes. Tubes to be of first class quality and full No. 100 wire gauge. Boilers must be set in position within sixty days from approval of contract. Specifications must show the diameter of drum, length of drum, thickness of shell and heads in drum, and thickness of shell in water legs or wrought headers. No cast headers will be accepted. Bidders on round Tubular Boilers must furnish specifications complete. Boilers will be required to carry 150 pounds of steam for working pressure. Bidder obtaining award of contract will be required to remove old boilers now in position outside of Boiler Room at his own expense. Old brick found serviceable may be used in the construction of new walls and foundation. A certified check for 10 per cent of amount of bid must accompany each bid. The Board of Trustees reserves the the right to reject any and all bids.

Attest: M. J. DESMOND, City Clerk.

### Tours in the Rocky Mountains.

The "Scenic Line of the World," the Denver & Rio Grande Railroad, offers to tourists in Colorado, Utah and New Mexico the choicest resorts, and to the transcontinental traveler the grandest scenery. The direct line to Cripple Creek, the greatest gold camp on earth. Double daily train service with through Pullman sleepers and tourists' cars between Denver and San Francisco and Los Angeles.

Write S. K. Hooper, G. P. & T. A., Denver, Colorado, for illustrated descriptive pamphlets.

WANTED.—A young man with literary ability, having had practical experience in mining and metallurgy, for the editorial staff of a first-class trade paper. Applications will not be noticed unless stating full particulars as to experience, compensation, references, etc. Address "Charter," P. O. Box 2718, New York, N. Y.

V. BLANC, Analytical Chemist, Assayer. Graduate from Paris. 1620 California St., Denver, Colo. Gold and Silver Bullion, Old Gold, Placer Gold, Jewelers' Sweeps and Rich Ore Refined. Melted and Assayed or Purchased. Gold and Platinum Refined for Jewelers and Dentists. All work carefully done. Samples by mail will receive prompt attention.

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING MAY 5, 1896.

559,562.—SCENERY SUPPORT—T. H. Andrews, S. F.
559,344.—SPOOL BOX - C. Christensen, Oakland, Cal.
559,515.—STONE CUTTING MACHINE—Davidson & Walker, S. F.
559,530.—BOTTLE SEAL—W. D. Eitel, San Jose, Cal.
559,382.—DOOR BRACE—C Hoffman, Spokane, Wash.
559,778.—BED LOUNGE—L. G. Ihrig, Seattle, Wash.
559,779.—ORE CRUSHER—G. Johnston, S. F.
559,587.—SASH LOCK—I. W. Lewis, Portland, Or.
559,738.—CEMENT—H. Mizuhara, S. F.
559,595.—RAISING LIQUIDS—E. I. Nichols, S. F.
559,544.—TRACE AND HOLDBACK—J. D. Stanley, Honcut, Cal.
559,546.—BEE SMOKER—Street & Garrett, San Mateo, Cal.
559,549.—SAND BOX FOR CARS—C. H. Taylor, S. F.
559,651.—FLUME OUTLET—D. W. Millard, Redlands, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DRIP ATTACHMENT FOR UMBRELLAS.—Frank Hindes, San Francisco, Cal. No. 559,101. Dated April 28, 1896. This invention relates to an attachment to receive the drip of umbrellas when closed and prevent it falling upon the floor. It consists of a reservoir surrounding the point, or tip, of the umbrella, a disk situated above the reservoir having perforations made through it, and circumferential grooves or channels formed near the base of the umbrella and near the tip, which serve to hold the flexible rubber reservoir, the constricting edges of which fit these grooves so as to hold it in place and render it watertight. The funnel-shaped extention of the upper end surrounding the lower part of the umbrella directs the drip into the openings of the disk and into the interior of the reservoir. The reservoir is removable at any time when it is desired to empty it or to use the umbrella without it.

SAND-BOX FOR CARS.—Charles H. Taylor, San Francisco, Cal. No. 559,549. Dated May 5, 1896. The object of this invention is to provide a simple and effective sand-box for cars, from which the delivery of the sand shall, at all times, be accurate and positive and in which the sand shall always remain dry and loose enough to discharge with certainty. The box consists of a pair of hoppers, one on each side and under the seats of the car, each hopper having a discharge hole below, and a valve seat provided with slots arranged on each side of the discharge aperture, a valve in each valve seat, having a part adapted to be thrown into and out of line with the discharges, a shaft extending from one valve to the other and a flexible tube extending laterally from each discharge hole to the contiguous rail, agitator arms secured to the valves and projecting through the slots in the valve seats, a crank arm on the shaft and a connecting rod and power device by which the shaft is rocked.

BEE-SMOKER.—Charles Frank Street, San Mateo, Cal., and William Garrett, Briagolong, Victoria. No. 559,546. Dated May 5, 1896. This invention relates to that class of bee-smokers, in which are employed a smoke-generating chamber, a bellows or other source of air, and a connection between said bellows and the smoke-generating chamber, whereby air is forced therein and a current or flow of smoke is caused to issue from the smoke-generating chamber. The invention consists in an improvement relating to the disposition and comparative length of the connecting pipe or tube between the bellows and the smoke-generating chamber, the object of which is to guard against the passage of smoke and matters, such as creosote, which the smoke carries into the air pipe and bellows, tending to clog said pipe and to injure the bellows. It also consists in a novel open connection between said connecting tube or pipe and the smoke-generating chamber, which will further insure the object and result above mentioned.

SUPPORT FOR STAGE SCENERY.—Thomas H. Andrews, S. F., assignor of one-half to Harry W. Morosco, same place. No. 559,562. Dated May 5, 1896. This invention relates to a device for supporting such portions of stage scenery as have to be set up hastily and at points where there are no wall or other side supports, such pieces being known as "set" pieces. It consists essentially of a bar pivoted at the bottom of the movable frame of the scenery, a channel formed in the bottom of the frame equal in depth to the thickness of the bar, a rearwardly turning lug projecting from the upper part of the frame, a brace rod having its lower end fixed to the outer end of the horizontal turnable bar, and the upper end bent to stand in line with the pivoted pin of the bar and turnable in a hole in the lug into which it is entered.

BOTTLE SEAL.—W. D. Eitel, San Jose, Cal. No. 559,520. Dated May 5, 1896. The object of this invention is to provide a seal or safety device for bottles and packages whereby it will be impossible to refill such bottles after they have once been emptied. It consists of a bottle having a neck, the upper end of which is provided with a conical chamber diverging from the top downwardly, terminating in a seat provided with a central opening, a tube to be seated in the neck having a thickened upper end with divergent sides to enter the chamber and leave a circumscribing space, said thickened portion forming a shoulder adapted to rest upon the seat at the base of the chamber, a tube extending downwardly through the central opening, a filling of cement in the space between the thickened end of the tube and the walls of the chamber, an annular flange or disk at the top of the tube to extend over the filling and rest upon the top edge of the neck and a ball or valve in a chamber in the neck of the bottle.

COMBINED TRACE AND HOLDBACK AND SHAFT CONNECTION THEREFOR.—John D. Stanley, Honcut, Cal. Assignor of one-half to Austin P. Merrill of same place. No. 559,544. Dated May 5, 1896. This device consists of a combined trace and holdback, adapted at one end to be connected with the breast-strap or with the hames of the harness, as the case may be, and having means at the other end for readily connecting it with the ring or loop of the breeching, and a spring-controlled fastening lug or cockeye on the shaft with which combined trace and holdback is adapted to engage. The objects of the invention are to simplify the work of hitching up and to provide for such a yielding or spring connection with the shaft as will make the draft about equivalent in character to that obtained by connecting with a whiffletree, which latter, as well as a long trace may be dispensed with. These objects are attained by having the trace and holdback combined in one, provided with means for readily incorporating it into the general harness, and for fitting it over a yielding or spring controlled cockeye or lug upon the shaft, thus reducing materially the number of operations, minimizing the time expended, and effecting the necessary yielding draft, to avoid jerks and sudden shocks in starting and pulling.

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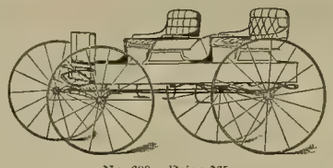
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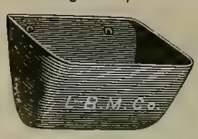
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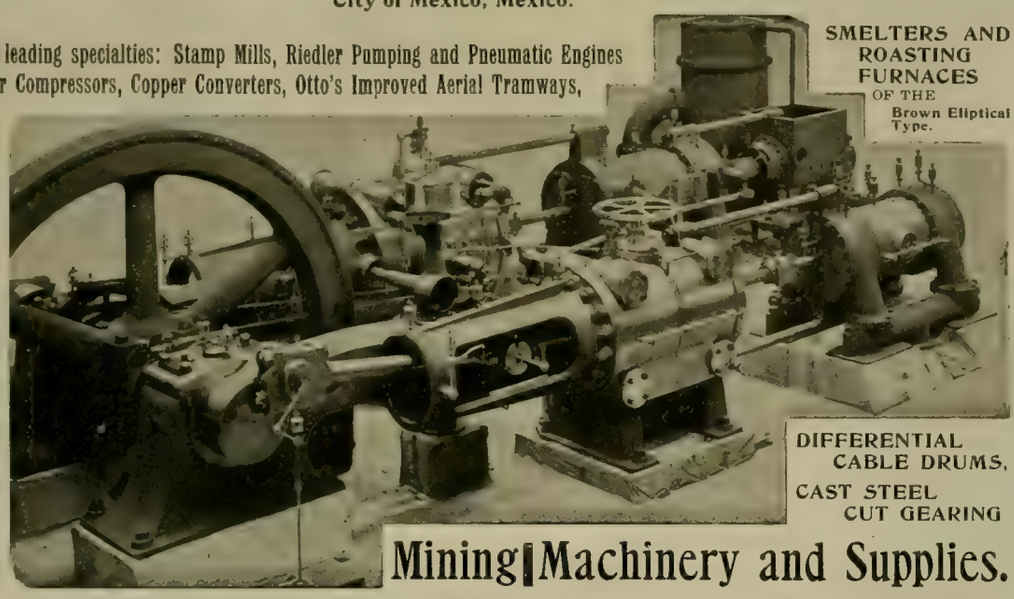
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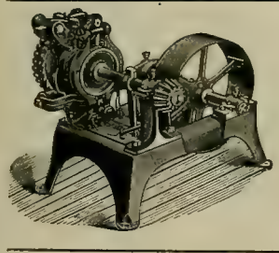
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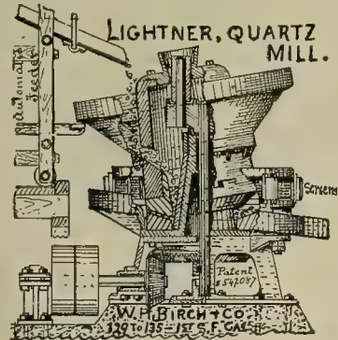


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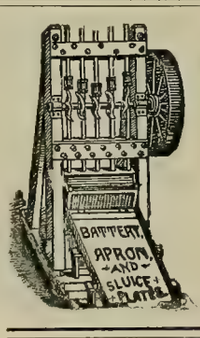
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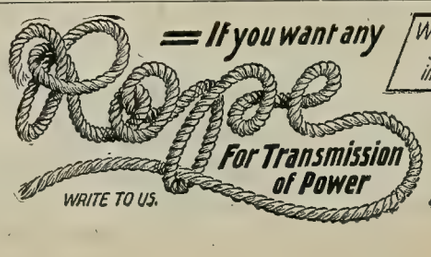
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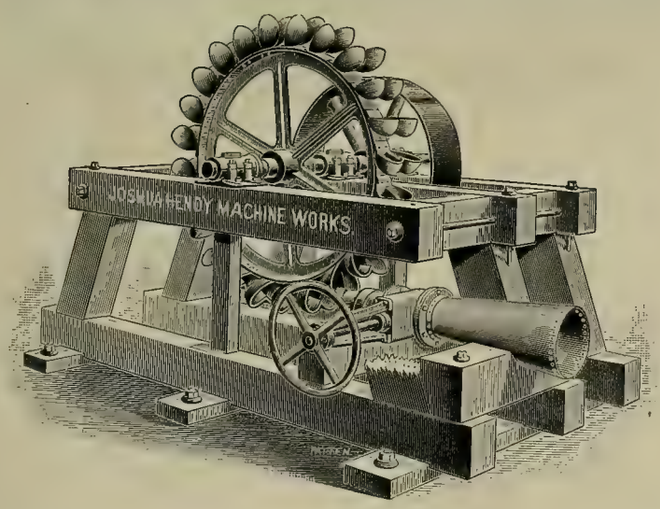
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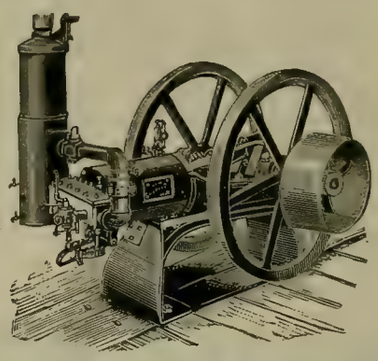
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| | |
|---|---|
| Coal Gas, ten hours' run, 1000 feet | $2 00 |
| Gasoline (74 deg.), ten hours' run, 8¼ gallons @ 14c. | 1 25 |
| Coal Oil, ten hours' run, 7½ gallons @ 10c. | 75 |
| Crude Petroleum, asphaltum base, 16 gallons @ 3c | 48 |
| Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c | 65 |

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon—21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1½c per horse power per hour; and on gasoline, 2½c per horse power per hour.

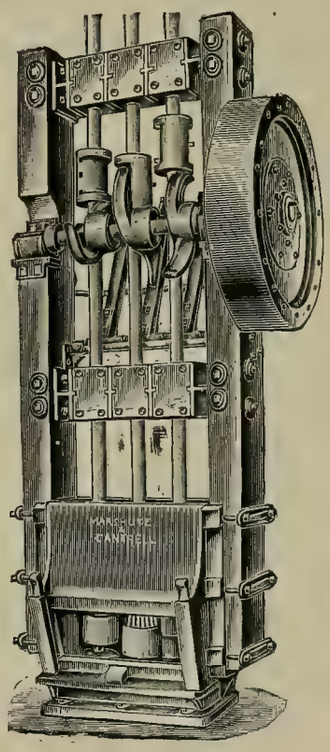
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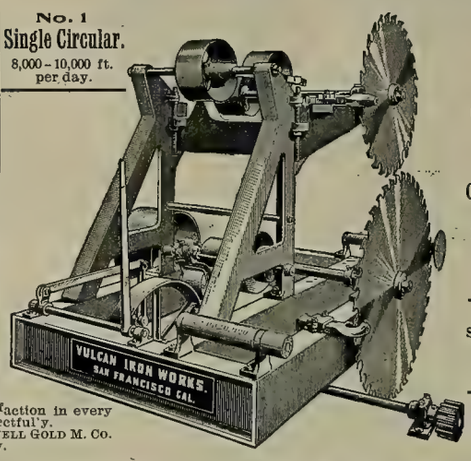
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SAN FRANCISCO.
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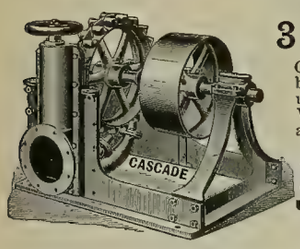
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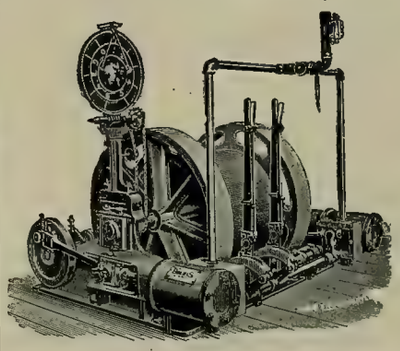
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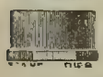
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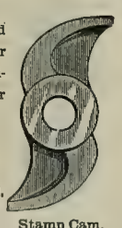




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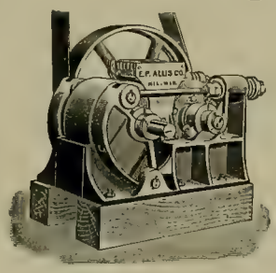
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That save a vast amount of care and labor, divide the pulp and water evenly to two or more lines of concentrators.

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For working the sands from the separating box.

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Works the slimes from the separator.

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Concentrates ores where there is a lack of water.

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To crush to any degree of fineness desired.

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Works cement gravel, without crushing the gravel.

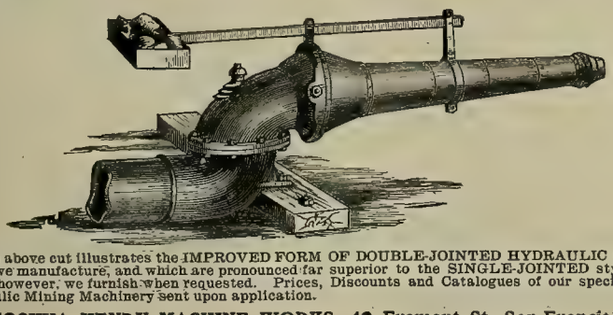
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220 Market St., San Francisco, Cal.

# Market Reports.

## The Markets.

SAN FRANCISCO, May 14, 1896.

With warmer and clearer weather, general trade begins to show signs of improving. The call for goods is said to be increasing and enlarging. Low freights up north have stimulated business in that direction. Alaska continues to draw fairly free. Every vessel clearing for ports in that section take out full cargoes. Fine weather for growing crops has a favorable influence, causing some of the houses to extend larger credits in agricultural districts. From the mines orders are not only free, but steadily increasing. Manufacturers, without an exception, report good orders in hand. This is particularly the case with iron-workers. The sales of mining machinery have been quite large, with a good inquiry still ruling. For agricultural machinery the demand has been larger than for two years past. The gold mining boom continues to enlarge. Capital is still coming in for investment. The New York *Wall Street Journal*, referring to this, says: "One of the significant events of last week was the arrival in the city of one of London's expert miners, Mr. Hamilton Smith. He is said to have come here to look into American mines for people who have tired of South Africa because of the troubles there. One mine in Colorado is reported to have been sold already, and negotiations are reported under way for a number of others. Mr. Smith is here in the interest of those who are engaged in pending negotiations and his purpose is stated to be to examine certain properties. A great deal of money which has gone into South Africa is expected to come here, especially if the feeling grows stronger that the disposition here is to maintain the gold standard."

In the local money market there is a plethora of available funds. While there is a general easing up in the rates of interest, still it requires gilt-edge security or first-class commercial paper to secure lower discount. There has been a decided revival in mining-share speculation, which has tended to draw more money into circulation, but the failure of two brokers and fear that prices have been advanced too high are against banks lending on share certificates, unless amply secured against any break in values. For commercial and manufacturing purposes the demand is slow for accommodations. Mail advices report the New York market as follows: "The extreme ease in money in face of gold exports is due simply and solely to the heavy receipts of currency from the interior. These receipts still keep up in large volume and they more than offset the gold withdrawn and shipped week by week. It might be true in a sense almost to say that the money that comes in from the country displaces gold as fast as it comes in. Most people expected that a good deal of currency would come back from the country about this time, but the arrivals are larger than was thought would be the case and they show to what an extent business is depressed everywhere."

**New York Silver Prices.**

NEW YORK, May 14.—Following are the closing prices for the week:

| | London. | N. Y. |
|---|---|---|
| Friday | 31 | 67⅞ |
| Saturday | 31 | 67⅞ |
| Monday | 31 | 67⅞ |
| Tuesday | 30 15-16 | 67⅝ |
| Wednesday | 30 15-16 | 67¾ |
| Thursday | 31 1-16 | 67⅞ |

| | Copper. | Lead. | Iron. | Tin. |
|---|---|---|---|---|
| Friday | 10 75 | 3 05 | 11 50@12 50 | 13 25 |
| Saturday | 10 75 | 3 05 | 11 50@13 50 | 13 25 |
| Monday | 10 75 | 3 05 | 11 75@13 50 | 13 35 |
| Tuesday | 10 75 | 3 02½ | 11 75@13 50 | 13 40 |
| Wednesday | 11 00 | 3 02½ | 11 75@13 50 | 13 45 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, ⅌ per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 6@7 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | 07½ |
| New York Telegraphic Transfer | 10 |
| London Bankers' 60 days | $4.88¼ |
| London Merchants | $4.86¼ |
| London Sight Bankers | $4.90 |
| Refined Silver, per oz., 1000 fine | 67⅞ |
| Mexican Dollars | 54½@55c |

SILVER.—The market sold lower the fore part of the week under review, but toward the close it began to strengthen. Private advices are to the effect that there is an improved demand from the Orient and India, but as yet it is not of a pronounced character, which is against buying in a speculative way. The last steamer for China took out $256,000 in silver bullion. Considering that shipments for a few weeks past have been small, the quantity sent out is considered quite favorable.

MEXICAN DOLLARS.—The last steamer for the Orient took out 13,076 dollars. They were shipped by Chinese. The demand is light but the market is steady to firm at 54½ @55 cents.

COPPER.—The market is strong for all kinds. From the East quotations come through slightly higher. Mail advices state that the domestic consumptive demand is light while the output of the mines is large, but the continued extraordinary consumption in Europe takes the available surplus. This export movement not only keeps the market steady but quite firm. There are those who look for better figures. This opinion is based on the belief that the domestic demand will improve as the summer months pass.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

TIN.—The local market is quiet but steady. Plates for building purposes are in fair demand but for canning they are dull, the large bulk of the demand having been met. American plates are steadily gaining in favor. The East reports a strong market for both pig and plate, with an improving consumptive demand for the latter. The advance in silver favorably affects prices for pig.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

ANTIMONY.—The market is quiet and weak at 8½@9c cents in a jobbing way. New York mail advices quote 7½@7¾c for Cookson's, 6¾@6¾c for Hallett's and 6½@6¾c for Japanese, from store.

LEAD.—The local market is reported weak. The destruction by fire of W. P. Fuller & Co.'s works has temporarily lessened the demand for pig. The East reports a dull and easy market, but the outlook is promising for an improved demand later on.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

QUICKSILVER.—The market is practically unchanged since our last issue.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| Distant points up north | 38 00 |
| West coast of Mexico, for export | 34 00 |

LUMBER.—There is a continued free home and export movement. The market is steady at the last advance.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 14 00 | @ | 19 00 |
| Spruce | 26 00 | @ | 31 00 |

POWDER.—The market is firm at full prices. Although it is officially denied that a combination is contemplated, yet the belief prevails that it will be done so as to put prices on a paying basis. The demand is very large.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " " | 8½c |

BORAX.—The market is quoted as follows

| | |
|---|---|
| Refined, in car lots | 6⅛ |
| Refined, in sacks | 5⅞ |
| Powdered, in car lots | 6¼ |
| Concentrated, " | 5⅝ |

NAILS.—The market is reported active and firm. A New York exchange reports as follows: "Jobbers in wire nails have been getting the best of the combination. Their plan was to buy nails for export, ship them abroad, bring them back again and sell them 20 cents a keg cheaper than nails can be bought for domestic use. The difference in the price of nails to exporters and to jobbers has been about $1 a keg in favor of the exporter. People connected with the pool say that it has been done only in a few cases and the supply was at once cut off."

The market is quoted as follows:

| | |
|---|---|
| Wire, carloads, basis per keg | $3 22½ |
| " jobbing, " " | 3 35 |
| Cut, carloads, " " | 2 97½ |
| " jobbing, " " | 3 10 |

IRON.—The consumption is reported large, owing to the demand for machinery, structural and railroad purposes. The East reports a stronger market with a good demand ruling.

Our market is quoted as follows:

AMERICAN.

| | To Arrive. | Spot. |
|---|---|---|
| Sloss | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |

ENGLISH.

| | | |
|---|---|---|
| Barrow | $21 00 | $23 50 |
| Gartsherrie | 21 50 | 23 50 |

COAL.—It seems quite impossible to advance prices, notwithstanding the advices from Australia. The supply of all kinds on spot and to arrive is ample for all requirements.

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 10 00 |
| " in sacks | — — | @ | 10 50 |
| Cumberland | — — | @ | — — |

## Mining Share Market.

SAN FRANCISCO, May 14, 1896.

At no time in the history of mining shares has the market shown larger transactions. Prices have been a great deal higher but the daily average transfer of shares were never so large. Another feature of the market has been an advance in the low-priced shares so soon in an upmove, some going up 300 to 400 per cent. Heretofore the "cats" did not show much sign of moving until the leaders were selling at a big advance. Taking last night's closing bids and the shares dealt in aggregate in value $3,000,000, whereas one month ago they aggregated $1,000,000. This is a large advance and should cause outsiders to think twice before venturing too far. While in some of the mines the ore found and present prospects justify higher prices than ruled six weeks ago, yet there is nothing so far reported in the others to warrant the advance, when this obtains, caution should be exercised in buying. The manipulation of the market is different in several respects from any former manipulation, which is somewhat of a mystery to traders—even old time dealers appear to be at sea. From all that can be learned a large majority of dealers that have been long on the market, some for two or more years, have been selling, but the advance in prices have drawn in new buyers, the most of whom pay cash. It is reported that there has been eastern buying but this we are unable to verify. While there may have been some, yet the East fight shy of shares not on a dividend-paying basis, for experience has taught that the bubble may break at almost any time. The present move seems to be based on the work under way in the Brunswick lode, for the heaviest advances have been in shares having ground on that lode, while the others move up more or less in sympathy under strong manipulation. The shares in the Bodie mines have done better the past week. It is stated that there is a contest for the control of Bodie which may have its effect on the market for shares in that district.

No assessments were levied the past week but several will have to be put on before long.

From the Comstock mines official letters, as a rule, are of an encouraging character, so far as concerns the middle and north end mines. In Alta the work under way is about the same as heretofore reported. In Overman they are making repairs, preparatory to again resuming active work. From Belcher and Seg. Belcher the reports are unimportant. No particulars are given as to the work that is being done. In Crown Point active work is still the order. The ore reported in last week's issue has increased in value. In the upraise the assays run from $8 to $12, gold. From Yellow Jacket we are not advised as to the work, if there is any, going on. Confidence still reports exploiting on the 200-foot level, with no ore extracted. Repairs are still under way in the Confidence, Challenge and Con. Imperial west crossdrift. From Alpha nothing new is at hand. The long west crossdrift in Bullion is still being pushed slowly ahead. It is in a little over one-third of a mile. In Potosi, Chollar, Hale & Norcross and Savage fairly active work is being done on the levels heretofore reported. While prosecuting the work some ore is being extracted and raised. In Savage, at last accounts, they were in 9 feet of good ore, which was increasing in width. Work is to be commenced in this mine so as to get ventilation, by which the ore found can be extracted more easily. This will take time. The long west crossdrift in Gould & Curry is being pushed slowly ahead, with no material change reported in the ground through which it is being run. Best & Belcher continues to report fairly active work, with no material change in the material encountered. Con. Virginia reports finding 3 to 4 feet of ore, assaying over $100 to the ton. Nearly 200 tons of ore were raised last week, which assayed over $50 to the ton. This mine is at present more than paying expenses, notwithstanding active exploiting. A report is current of an improvement in Ophir near the Mexican line, but we are not able to have it sufficiently verified to give assurance of reliability. The work, though, warrants close watching, as does that under way in Mexican, Union and Sierra Nevada. It may take considerable time before definite results can be ascertained. The work under way in Utah and Andes is about the same as heretofore made public.

Another Hale & Norcross decision was rendered the past week by Judge Hebbard. This time it is for over $400,000, which is considerably less than that before rendered. It has had no effect on the market value of the shares and this seems to indicate that the public have no confidence in its being right or just. Another appeal will be taken.

The work under way on the Brunswick lode continues the center of attraction. If reports are to be believed, they are opening up something big, but these reports may be accepted with a grain of allowance, but they are helping the manipulators to the market to advance prices and draw in new buyers. Yesterday a report was current that there was quite a change for the better in Occidental. Chollar is to resume exploiting work shortly. Some think that more and richer ore will be found, but there is nothing so certain as the uncertainty of mining. Hale & Norcross is to start up on the Brunswick lode. Good news is reported from the work in Gould & Curry and Savage ground. This has caused quite an advance in the shares of these two mines. It is to be feared that prices may be run up to figures considerably above what present advices from the mines warrant.

From the Bodie district there is nothing new to report. Active work is under way in Bodie, with some low-grade ore found. In Mono and Bulwer no change in the workings is reported in official letters.

The market opened this morning dull and topheavy which brought in the bear contingent who began hammering prices after call. The decline caused timid holders to let go. While the market did not seem to have any support yet all the shares sold went into the hands of strong parties. Towards noon the market rallied slightly only to sell on lower figures on the regular afternoon session. After the call the tone was weak with outsiders and bears still selling. The failure of L. W. McKee, a broker in the Pacific Board added to the distrust. This failure combined with that of C. P. Harris and Atkinson of the San Francisco Board, a few days ago, make operators suspicious and uneasy. It looks at this writing as if the market will make another advance soon for the pools have added to their holdings, while the work in the mines is quite important and the news generally good.

The following illustrates the changes of the week:

| Mines. | May 7. | May 14. |
|---|---|---|
| Alpha | $ 18 | $ 31 |
| Alta Consolidated | 09 | 20 |
| Andes | 35 | 55 |
| Belcher | 59 | 1 10 |
| Best & Belcher | 1 00 | 1 90 |
| Bodie | ..... | 1 00 |
| Bullion | 26 | 40 |
| Challenge | 50 | 75 |
| Chollar | 2 15 | 2 85 |
| Confidence | 1 15 | 1 80 |
| Consolidated California and Virginia | 2 90 | 3 35 |
| Consolidated New York | 03 | ..... |
| Crown Point | 60 | 95 |
| Exchequer | 18 | 17 |
| Gould & Curry | 111 | 1 80 |
| Hale & Norcross | 1 45 | 2 05 |
| Justice | 08 | 14 |
| Mexican | 66 | 1 25 |
| Ophir | 1 65 | 2 50 |
| Overman | 14 | 34 |
| Potosi | 85 | 1 65 |
| Savage | 58 | 1 20 |
| Sierra Nevada | 87 | 1 50 |
| Union | 68 | 1 35 |
| Utah | 15 | 27 |
| Yellow Jacket | 50 | 88 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, May 14, 1896

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 200 Alpha | 31 | 100 Julia | 20 |
| 700 | 30 | 1000 Kentuck | 10 |
| 300 Alta | 30 | 100 Mexican | 1 25 |
| 300 Andes | 54 | 450 | 1 20 |
| 250 | 55 | 200 Mono | 20 |
| 750 Belcher | 1 05 | 600 N G & C | 27 |
| 150 | 1 10 | 200 Occidental | 2 35 |
| 500 Best & Belcher | 1 90 | 550 | 2 30 |
| 950 | 1 85 | 50 | 2 25 |
| 100 Bodie | 90 | 450 Ophir | 2 50 |
| 100 | 85 | 600 Overman | 30 |
| 600 Bullion | 37 | 700 | 29 |
| 100 | 38 | 300 Potosi | 1 65 |
| 1100 | 40 | 450 | 1 60 |
| 200 | 39 | 1550 Savage | 1 30 |
| 100 Bulwer | 44 | 600 | 1 15 |
| 200 Caledonia | 20 | 400 S. B. & M | 30 |
| 400 Challenge | 75 | 200 | 29 |
| 700 Chollar | 2 80 | 500 | 28 |
| 150 | 2 85 | 400 Sierra Nevada | 1 50 |
| 300 Con Cal & Va | 3 30 | 500 S Hill | 07 |
| 100 | 3 35 | 500 St. Louis | 50 |
| 1200 Con Imperial | 04 | 200 Union Con | 1 30 |
| 200 Confidence | 1 80 | 50 | 1 35 |
| 1300 Crown Point | 95 | 300 Utah | 27 |
| 200 Exchequer | 17 | 200 Yellow Jacket | 85 |
| 750 Gould & Curry | 1 75 | 200 | 88 |
| 50 | 1 80 | 200 | 86 |
| 750 H. & N | 2 05 | | |
| 650 | 2 00 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 100 Ophir | 2 20 | 350 Confidence | 1 45 |
| 100 | 2 25 | 50 | 1 50 |
| 200 | 2 30 | 650 Sierra Nevada | 1 35 |
| 200 | 2 35 | 500 Utah | 22 |
| 200 Mexican | 1 05 | 1550 Bullion | 35 |
| 850 | 1 00 | 1200 | 36 |
| 700 Gould & Curry | 1 60 | 100 Exchequer | 15 |
| 200 | 1 55 | 100 S B & M | 23 |
| 250 Best & Belcher | 1 65 | 800 | 22 |
| 550 C. C. & Va | 3 00 | 300 | 21 |
| 350 | 3 05 | 100 Overman | 34 |
| 1550 Savage | 1 00 | 200 Justice | 14 |
| 200 | 1 05 | 400 Union | 1 05 |
| 1300 Chollar | 2 50 | 100 | 1 00 |
| 400 | 2 55 | 200 Alta | 19 |
| 50 | 2 60 | 200 Julia | 21 |
| 200 | 2 65 | 300 Caledonia | 19 |
| 1100 Potosi | 1 40 | 200 | 17 |
| 150 | 1 35 | 250 Challenge | 60 |
| 1000 H. & N | 1 80 | 500 Occidental | 2 00 |
| 1500 Con Imperial | 04 | 200 | 2 05 |
| 700 Crown Point | 80 | 600 Andes | 45 |
| 150 | 82 | 300 | 50 |
| 250 Yellow Jacket | 75 | 200 Scorpion | 09 |
| 300 | 73 | 200 Bodie | 95 |
| 50 | 74 | 200 | 1 00 |
| 350 | 72 | 100 Bulwer | 42 |
| 100 Kentuck | 10 | 200 Mono | 26 |
| 600 Alpha | 28 | 100 | 1 60 |
| 100 Belcher | 87 | | |
| 650 | 86 | | |
| 100 | 85 | | |

UNITARIAN LITERATURE sent free on application. Address Postoffice Mission Committee, First Unitarian Church, corner Geary and Franklin streets, San Francisco. Mention this paper. *

TO THE STOCKHOLDERS OF THE SOUTH PALOMA GOLD MINING COMPANY, LIMITED:

Notice is hereby given that by resolution of the Board of Directors of the corporation, adopted on the 21st day of March, 1896, a meeting of the stockholders of the corporation was called for the purpose of increasing the capital stock to the amount of two hundred thousand dollars, to be divided into one hundred thousand shares of the par value of two dollars per share, and of determining the disposition to be made of the increased capital stock; and it was resolved that such meeting shall take place at the principal place of business of the corporation, being the same building where the Board of Directors usually meet, to wit: No. 212 Sansome street, room 17, in the City and County of San Francisco, on WEDNESDAY, the 10th day of June, A. D., 1896, at 11 o'clock in the forenoon of that day.

Dated San Francisco, 2nd of April, 1896.

JOHN A. WRIGHT, President.
CHAS. WEBB HOWARD, JR., Secretary.

**Michigan Mining School.**

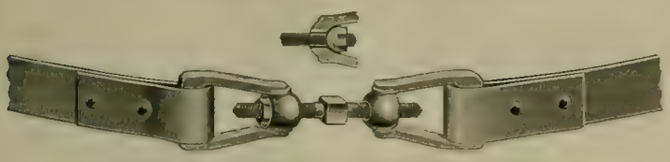
A high grade State technical school. Practical work. Elective system. Summer courses. Gives degrees of S. B., E. M., and Ph. D. Laboratories, shops, mill, etc., well equipped. For catalogues, address M. E. WADSWORTH, Ph. D., Director, Houghton, Mich.

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied, Delinq't and Sale. | Secretary. |
|---|---|---|---|---|
| Alaska-Willoughby G M Co, Alaska | 1 | 20c | Apr 6..May 25..June 29 | T Pollard, 22 California |
| Alpha Con M & M Co, Nev | 16 | 5c | Apr 7..May 12..June 2 | C E Elliot, 309 Montgomery |
| Alta S M Co, Nev | 52 | 10c | May 4..June 9..June 30 | J E Jacobus, 309 Montgomery |
| Burlington G M Co, Cal | 2 | 3c | Apr 23..May 27..June 17 | W C Ralston, 331 Pine |
| Caledonia S M Co, Nev | 46 | 5c | Apr 1..May 6..May 27 | A S Groth, 414 California |
| Challenge Con M Co, Nev | 21 | 5c | Mar 27..Apr 29..May 20 | C L McCoy, Mills Building |
| Crown Point G & S M Co, Nv | 67 | 20c | Apr 2..May 6..May 26 | J Newlands, Mills Building |
| Gould & Curry S M Co, Nev | 78 | 15c | Mar 25..Apr 28..May 20 | A K Durbrow, 309 Montgomery |
| Inyo Marble Co, Cal | 28 | 10c | Mar 30..May 4..June 4 | M A Cahn, Phelan Bldg |
| Mexican G & S M Co, Nev | 54 | 20c | Apr 23..May 28..June 18 | C E Elliot, 309 Montgomery |
| Occidental Con M Co, Nev | 22 | 10c | Apr 2..May 6..May 28 | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 3 | 2c | May 11..June 18..July 6 | F L Olmsted, 315 Montgomery |
| Overman S M Co, Nev | 75 | 10c | May 2..June 5..June 25 | G D Edwards, 414 California |
| Peabody G M Co, Cal | 6 | 10c | Apr 28..June 3..June 24 | B Natorp, 124 Sansome |
| Potosi M Co, Nev | 45 | 20c | Apr 9..May 14..June 4 | C E Elliot, 309 Montgomery |
| Savage M Co, Nev | 89 | 20c | May 1..June 3..June 23 | E B Holmes, 309 Montgomery |
| Utah Con M Co, Nev | 22 | 5c | Apr 3..May 6..May 27 | A W Havens, 309 Montgomery |

# PATENT HOOP CLAMP.

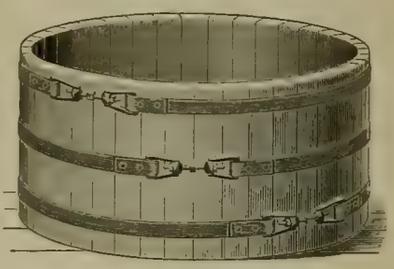
ALL SIZES.



MALLEABLE IRON HEADS, WROUGHT IRON BOLT.

These couplings are the best. They are the most powerful. They have a direct pull with right and left screw. They work freely on ball and socket joints. They are easily applied. We use them extensively in our tank building department.

ORE VATS,
PRECIPITATING TANKS,
SOLUTION TANKS,
SULPHITE SUMPS,
Leaching Vats With False Bottoms,
PAN AND SETTLER STAVES,
BATTERY GUIDES,
—AND—
Water Tanks of all Sizes.



WELLS, RUSSELL & CO., Mechanics' Mills, Cor. Mission and Fremont Sts., San Francisco, Cal.


## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 3) levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| Chas. A. Moore | 102 | 7,222 | 361 10 |
| Chas. A. Moore, Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6,000 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore, Trustee | 130 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 100 | 6,667 | 333 35 |
| N. L. Bell, Trustee | 128 | 250 | 12 50 |
| A. U. Rugg | 16 | 1,000 | 50 00 |
| A. U. Rugg | 67 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 155 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg, Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg, Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 109 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 141 | 1,667 | 83 35 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 133 | 3,195 | 159 75 |
| E. C. Godfrey | 134 | 4,000 | 200 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Nos. 37 and 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

### POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until SATURDAY, May 9, 1896, at the hour of 2 P. M., at the office of the Company, Room 38 Crocker Building, San Francisco, Cal.

E. C. GODFREY, Secretary.

### POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until MONDAY, June 8, 1896, at the same hour and place. E. C. GODFREY, Secretary.

Office, No. 38 Crocker Building, San Francisco.

## DELINQUENT SALE NOTICE.

INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business, San Francisco, California. Location of works, Marmol, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 28) levied on the Thirtieth (30th) day of March, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| W. W. Sargaent, Trustee | 482 | 1,250 | 125 00 |
| W. W. Sargaent, Trustee | 485 | 1,000 | 100 00 |
| W. W. Sargaent, Trustee | 488 | 745 | 74 50 |
| W. W. Sargaent, Trustee | 505 | 1,000 | 100 00 |
| W. W. Sargaent, Trustee | 514 | 500 | 50 00 |
| W. W. Sargaent, Trustee | 516 | 600 | 60 00 |
| W. W. Sargaent, Trustee | 518 | 1,000 | 100 00 |
| G. W. Luce | 310 | 5 | 50 |
| G. W. Luce, Trustee | 369 | 9 | 90 |
| Geo. Dilman | 530 | 980 | 98 00 |
| Israel Luce, Trustee | 397 | 1,000 | 100 00 |
| A. F. Thane, Trustee | 447 | 500 | 50 00 |
| Percy Beamish, Trustee | 494 | 500 | 50 00 |
| Percy Beamish, Trustee | 495 | 225 | 22 50 |
| A. J. Hughes | 522 | 429 | 42 90 |
| H. H. Noble | 524 | 100 | 10 00 |
| F. H. Hilbert | 533 | 100 | 10 00 |
| F. H. Hilbert | 534 | 100 | 10 00 |
| F. H. Hilbert | 535 | 100 | 10 00 |
| F. H. Hilbert | 536 | 100 | 10 00 |
| F. H Hilbert | 537 | 100 | 10 00 |
| F. H. Hilbert | 538 | 500 | 50 00 |
| F. H. Hilbert | 539 | 500 | 50 00 |
| Voss Conrad & Co | 541 | 301 | 30 10 |

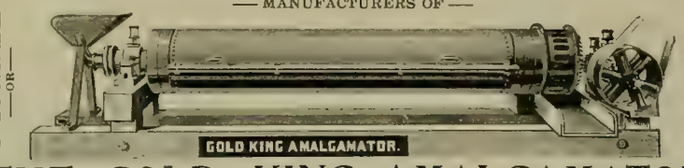
And in accordance with law, and an order from the Board of Directors, made on the 30th day of March, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at their office, Room 323 Phelan Building, San Francisco, California, on THURSDAY, the 4th day of June, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale. M. A. CAHN, Secretary.

Office, Room 323, Phelan Building, San Francisco, California.


UNION IRON WORKS,
SACRAMENTO, ..... CALIFORNIA.

ROOT, NEILSON & CO.,
—MANUFACTURERS OF—
STEAM ENGINES, BOILERS,
*And all kinds of*
✦ ✦ MACHINERY FOR MINING PURPOSES.
Flour Mills, Saw Mills and Quartz Mills; Machinery Constructed, Fitted Up and Repaired.
FRONT STREET, Bet. N & O.,
SACRAMENTO, CAL.

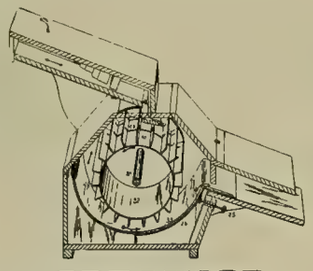
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THE GOLD KING AMALGAMATOR.
The only successful device for saving fine free gold from clay, talc or slimy ores. Has been proven far superior to horizontal plates in every instance. Endorsed by leading millmen. Send for catalogue and price list. Highest award at 28th Industrial Exposition.*
MIDAS GOLD SAVING MACHINERY CO., 114 First St., San Francisco, C. A. RUMBLE, Gen'l M'g'r.

THE OLD RELIABLE
COMMON SENSE STEEL WHIM
STILL STAYS TO THE FRONT.
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1220-1222 Curtis Street ..... Denver, Colo.

VICTOR
Amalgamator.
(PATENTED.)
FOR MILL OR PLACER USE.

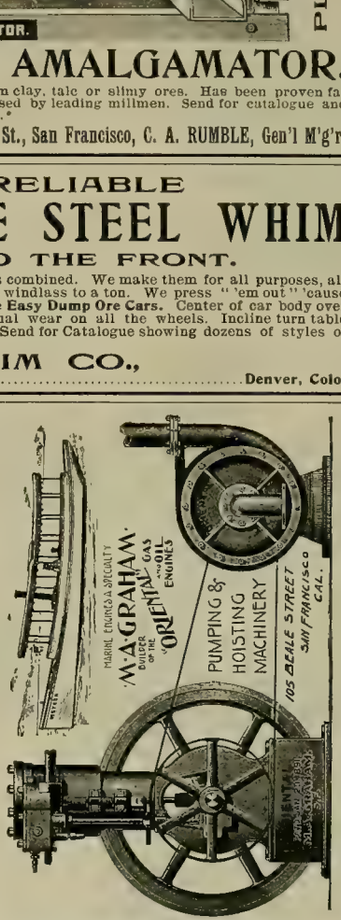


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Gold-Saving
Machine
EVER INVENTED.
It will come nearer saving every color of free gold than any gold-saving device made up to the present time. Whether the gold is fine, flake or flour, its work is perfect. The only machine that works the black sands of the ocean perfectly, saving the fine flake gold contained therein. Our machines are now running on beach sand and on tailings from some of the best mills in California, and they are working successfully. We give guarantee with each machine. In working over old tailings from a stamp mill that contains free gold, amalgam and quicksilver, this machine has no equal Send for catalogue and particulars.
Manufactured only by
VICTOR AMALGAMATOR CO.,
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LOS ANGELES. ..... CALIFORNIA.

Hoskins' Patent Hydro-Carbon Blow-Pipe and Assay Furnaces.



No dust. No ashes. Cheap, effective, economical, portable and automatic.
SEND FOR PRICE LIST TO
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THE ROESSLER & HASSLACHER CHEMICAL CO.,
73 Pine Street, New York.
CYANIDE
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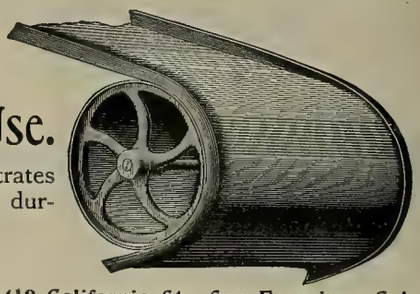
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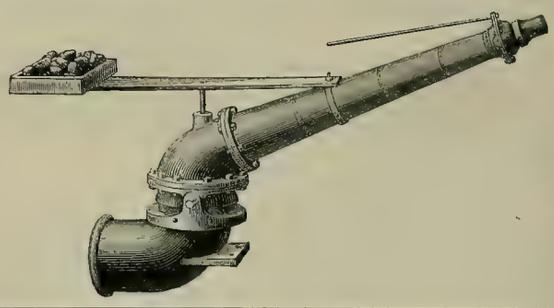
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No. 1872.—VOLUME LXXII. Number 21. SAN FRANCISCO, SATURDAY, MAY 23, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

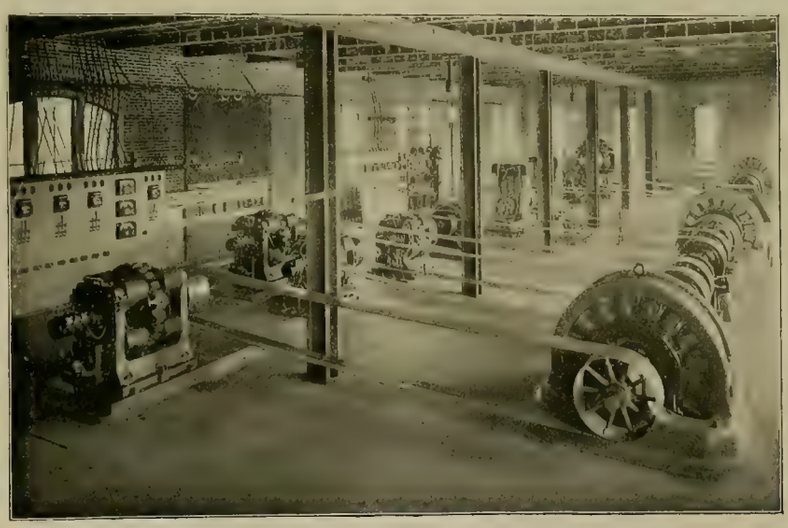
## Sacramento-Folsom Electric Transmission.

The completion of the power-transmission scheme between Folsom and Sacramento is the conclusion of a vast enterprise, undertaken in doubt, and terminated in a success which has electrified the State of California into a realization of the tremendous resources at its command, in the feasibility of electrical transmission over long distance, commercially. Preliminary sketches of the progress of the work have been given in several issues of the MINING AND SCIENTIFIC PRESS, but a short resume of it will not here be out of place.



STATE CAPITOL AT SACRAMENTO.

The scheme, as first conceived by Horatio Livermore, president of the Natoma Water and Mining Co., contemplated nothing more than the building of a dam across the American river at Folsom for the storage of water and the irrigation of lands lying in the Sacramento valley. For twenty-five years intermittent efforts were made to carry out the scheme and but little progress was effected. Calculations had also been made looking to the utilization of the power derivable from the difference in level of the water, and estimates had placed the possible power available at Folsom extremely high, while dreams of a huge manufacturing city to utilize this power at that point were indulged in; but the result turned out differently, and instead of the factories being brought to the power, the power is now taken to the factories.



DYNAMO ROOM SUB-STATION AT SACRAMENTO.



POLE LINE.

In 1881 the rights of the old company presided over by Mr. Livermore were taken over by the Folsom Water Power Company. Work had been begun on the dam, but the development of the scheme appeared so costly, that not until the company made a contract with the State of California whereby convict labor for the construction of the dam and canal was exchanged for the site of a State prison and a certain amount of power, was the work really put under way. In 1888 this contract was signed, the plans were expanded, and under these new plans work was begun in earnest.

The dam is a massive structure of granite, laid in Portland cement. It is 650 feet long, 89 feet high in the center, 87 feet wide at the base, 25 feet wide at the crest and contains about 48,590 cubic yards of solid masonry. It is provided with a heavy wooden shutter, or flashboard, 6 feet high, which at high water is lowered into a recess in the crest of the dam. At low water this shutter is raised by hydraulic pistons, the depth of the basin is increased by 6 feet, and additional storage capacity provided. Normally the dam forms a storage basin, or reservoir, three and one-half miles long, with a capacity of 13,000,000 cubic yards of water.

At each side of the dam are massive granite bulkheads and three head-gates, operated by hydraulic machinery, each head-gate 16 feet wide. The canal on the west side, intended principally for irrigation, is not yet completed.

The east side canal is divided into three sections. The first, stretching as far as the State canal, where the water falls about 7 feet, is cut out of the solid granite and extends a distance of 2,000 feet. The second section is 4,000 feet long, and on the completion of this the terms of the State labor contract were fulfilled. Thus far the canal is built along the face of the cliff. The third section of the canal is an earth ditch, excavated by the Folsom Water Power Co., and is 3,000 feet long. The outer wall of sections two and three carries a broad-gauge railroad track.

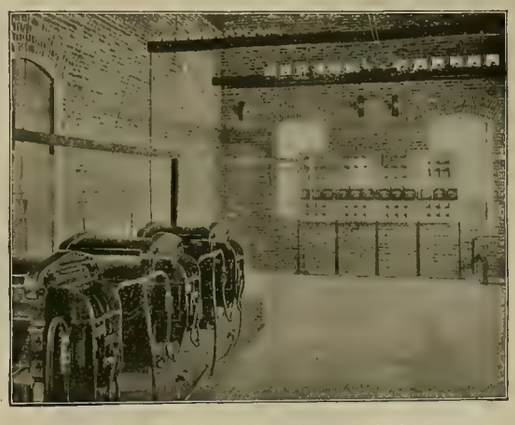
The total length of the canal is 9,500 feet. Section 1 is 53 feet wide on top and 45 on the bottom. Sections 2 and 3 are each 50 feet wide on top and 40 feet on the bottom. The depth is 8 feet.

All the water passes through the State power house, through Leffel turbine wheels, developing some 800 H. P., used for air-compressors, electric lighting and other purposes. Thence the water continues on to the Folsom power house, at the side of which is an immense log basin. Here the jurisdiction of the Folsom Water Power Co. ceases and that of the Sacramento Electric & Power Co. begins.



STEP-DOWN TRANSFORMERS AT SACRAMENTO.

The power house is built on the site of an old placer gold mine, where a fall of 55 feet is available at high water. It is on the west side of the town of Folsom, in a cut about 60 feet deep, 100 feet wide and 150 feet long, from which a channel 40 feet wide leads down to the river. At the power house the canal makes a sharp turn at right angles and widens out into a forebay 150 feet long, 100 feet wide and 12 feet deep, which forms a settling basin for debris. It is divided into two parts by a stone wall, provided with suitable gates, so that one side may be cleaned out while the other is in operation. At the lower end of each section of the bay a sluicing gate connects with the lower river by a sluicing canal, and through these the sand and debris are carried away and kept from the wheels. The hydraulic apparatus, manufactured by S. Morgan Smith, of York, Pa., consists of fourpairs of 30-inch wheels of the McCormick horizontal-shaft turbine type, each pair of 1260 H. P. capacity, at 300 revolutions, oper-



STEP-UP TRANSFORMERS AT FOLSOM.

(Continued on page 420.)

# MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

**San Francisco, May 23, 1896.**


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"If a thing is not patented, all men have a right to make and sell it, to the use of its name, and to every word in the language to aptly describe it." So says the Supreme Court of Alabama, in the case of Scott vs. Standard Oil Company, 19 So. Rep., 71.

THE *Manufacturers' Record* of Baltimore recently sent a letter to six hundred leading manufacturers asking the following question: "What is most needed to bring about greater prosperity for the general industrial interests of the country?" Ten pages of replies are printed in the last number of the *Record*. The general demand, apart from discussion of the currency question, was for a higher form of protection than the present.

A BOSTON paper, quoted on page 422, discoursing on the Merced G. M. Co.'s property in Mariposa county, this State, quotes "a Californian versed in mining" as announcing to it that "$5 ore, even if cheaply mined, will not pay to work, despite all assertions to the contrary." This will be a surprise to Californians who know of the Alaska-Treadwell Co.'s ore, which, though only yielding an average of $2.15 per ton in free gold is worked at a profit, and who have knowledge of results at the Spanish mine, Washington township, Nevada county, where ore which yielded 91 cents per ton was worked at a profit of 32.6 cents per ton.

M. RIGAUD'S "new gold process" briefly described in the issue of the 9th inst, wherein he claims to be able to successfully extract every particle of gold from the ore by using tetra-chloride of sulphur, at a total cost of $1.80 per ton, appears to be a modification of the famous "Zymean process" of Admiral Selwyn, which was advocated by that gallant naval commander in a paper read before the San Francisco Academy of Sciences, August 14, 1893, and adversely reviewed in these columns in the issue of September 2, 1893. The Admiral's process embraced the use of what he called dechloride of sulphur, but wrote $S_2Cl_2$, the formula of the monochloride. Whatever slight merit there may have been in Admiral Selwyn's process does not appear to be shared by that of M. Rigaud, but as the latter has succeeded in inducing French capitalists to put up sufficient capital to give his notions a practical trial, perhaps the commercial results of the Tancorville, Havre, experiment will be sufficient comment on its value.

## Thirty-Six Years Old.

This is No. 1872 of the MINING AND SCIENTIFIC PRESS, this issue completing thirty-six years of uninterrupted and useful existence.

The first issue of this journal was on May 24th, 1860, by Geo. H. Winslow, at 172 Washington street. Mr. Winslow was drowned in rescuing a child that had fallen in the bay, and Julius Silversmith assumed charge in June, 1860. From the first it devoted great attention to the mining and manufacturing interests of the State, and it is not more than the facts warrant to say that through the years it has been probably the most potent factor in publishing California's mining and scientific progress and development. Everything pertaining to the arts and sciences, the advance of industry and the working of the mines has been noticed at length, and no part of the Pacific coast has been ignored in its pages.

On Nov. 1st, 1862, Mr. W. B. Ewer assumed charge. This gentleman, hale and hearty, is still one of the owners of the paper; and after a long lifetime of use and universal benefit, lives to enjoy in his 83rd year a serene old age and to exemplify in his life the value of the temperate principles he always inculcated. Under his energetic management the paper soon became the recognized authority on mining and metallurgy all over the country, and nearly every step in the discovery or invention of improved processes in every department of mining and mechanical industry received its first notice in these columns, its history being the history of mining in this State and on this coast since its beginning. The paper early gathered round it a corps of practical miners and metallurgists, some engaged in office work, others traveling everywhere—a feature it has retained and to which it owes in a great degree its continuous success. In December, 1863, A. T. Dewey became associated in the proprietorship of the paper, and for nearly thirty years was actively interested in the business. In June, 1893, Mr. Dewey disposed of all of his remaining interests in the paper to J. F. Halloran, who since that date has been the general manager. During all those busy years the paper grew and strengthened, its constant policy being that to attain success it must deserve it.

In February, 1870, Mr. Geo. H. Strong became one of the proprietors and the active manager of the patent department, which under the management of Mr. C. W. M. Smith, whom Mr. Strong succeeded, had become an important part of the business.

From that time until now—for upwards of 26 years—Mr. Strong's energies have been devoted steadily to the patent agency in association with this journal; and under his administration it has grown into world-wide relations. Its work is carried on under unusual advantages of experience and acquaintance and of personal relationship to the officials of the patent bureau at Washington. Its record of successful applications now runs into the many thousands, and a steadily increasing volume of business attests the respect and value in which it is held.

In November, '80, the firm moved its entire plant, including the business and editorial offices, to the present large building, corner Front and Market streets, which it has since continuously occupied.

The history of this paper is a history of thirty-six years of California's life. It has seen the outlying frontier develop into populous States and has kept step with the progress of the coast, weekly going into thousands of homes, the recognized medium of communication between the customer and manufacturer and producer. Its proudest boast is its ability to say with truth that it never took a dollar to put anything in or keep anything out of its reading columns—and that is a good deal for any paper in California to be able to say.

Thirty-six years in the life of a paper or a person is a good deal. To a man it means that he has probably advanced beyond the fullest measure of usefulness; with a paper it is different: the connections, the business associations and friendships, the prestige of such long continuance, the reputation for reliability and integrity of character, all are so much capital, so much valuable assets, of which a newer or ephemeral publication is proportionately devoid. Then, again, when a man ages less and less is expected of him. 'Tis just the reverse with a journal: the older it gets the more is expected of it; little lapses that would be overlooked or excused in a fledgling publication are judged by a less merciful standard of criticism. This is probably right, for in the case of a long-established concern it is certainly "old enough to know better."

The MINING AND SCIENTIFIC PRESS is in no way hidebound, nor does it desire to be considered other than reminiscent in this modest little reference to its thirty-sixth birthday. In all that goes to make a paper useful or valuable it professes to keep up with the procession, if not a little ahead of it, and its proprietors believe that never in all its long history had it a larger field of usefulness, or filled it more worthily, than at present. Its pages attest the merit in which it is held by the business community, and its wide circulation is satisfactory evidence of its universal popularity.

## Not "Fashionable" in London.

Under date of the 2nd inst. an English mining man writes from London to a friend in this city: "I am having a lot of copies printed for distribution of the article in the MINING AND SCIENTIFIC PRESS of March 7th on 'The Mother Lode of California,' and I think you will feel the results. I have been talking it up for a year now and I am going to print its merits. Somebody will be benefited if I don't. I have spoken to hundreds about California's wealth, but they say the California mines are not fashionable. Then, if that is the case, I will make them fashionable, or at least try to. In London they are now offering over 1,000 gold and silver mines from all parts of the world. Holders of going mines are too afraid of their properties being examined without a money consideration, whereas other holders invite inspection and grant a reasonable option to intending buyers, without forfeit. This blocks the way. I admit sellers have had cause in the past for declining to tie up their mines; but there are buyers worthy of some consideration now."

So, it seems, California gold mines are not "fashionable" in the British metropolis! Letters received weekly abundantly show that there is a considerable degree of ignorance in London regarding California as a gold mining country. It is erroneously assumed by some Californians, as well as others, that there is a deep-seated antipathy, a settled prejudice, a general distrust, in London regarding gold mining enterprises in this State. Such is not the case. There is an honest absence of information there as to the facts. There is in London a general idea that California is a "has been," that a good many hundred millions of dollars of gold were taken out of the gulches and gravel deposits of this State a good many years ago, but that it is worked out. That mistaken idea is not the exclusive property of the intelligent Londoner. A few weeks ago one of the brainiest men in the United States, our foremost American in private life, was here on a visit from the East, and at a banquet at the Palace Hotel, in trying to say some nice things that would please his hearers, he said: "True, you have dug all the gold out of your hills, but you can raise oranges." He was in dead earnest, and said what he believed to be so. Now, if one of the best informed men in this country has such a mistaken notion about gold mining in this State, it is little wonder that the same idea prevails among the residents of a city 3,000 miles farther away! Of course, in the absence of better knowledge, it is natural to suppose that a region that has contributed $1,300,000,000 in gold would be pretty well worked over. But while this might apply to other localities, the fact remains that in this State the immense amount already produced is only an index, a surface indication, of the amount awaiting production. The gold wealth of California has been touched here and there in the last fifty years, and a total that would exhaust any other gold region has been produced. Were our British friends to realize this truth, California mines would at once become extremely "fashionable" in London. Were they possessed of the knowledge that in this State is a bigger and better gold field than all the British possessions and colonies put together, with a perfect climate, with all the necessities and many of the luxuries of life, and all the requisite accessories to mining in abundance, there would be a very fashionable and popular effort there to own and occupy it.

## Concentrates.

THE Dominion Parliament has placed mining machinery on the free list for one year.

DURING April the Arizona Copper Co., at Clifton, Arizona, produced 364 tons black copper and 388 tons matte.

AT mine No. 1, on the Amador Queen, Jackson district, Amador Co., Manager Dye has a shaft now 275 feet deep.

SACRAMENTO proposes to organize "The Central and Northern California Mining and Land Bureau of Sacramento."

FROM Feb. 14th to May 14th, '96, eighty three mining companies have filed articles of incorporation at Olympia, Wash.

MINING ASSOCIATIONS have recently been formed in British Columbia at Nelson, Revelstoke, Illecillewaet and Trout Lake.

THE *Free Press* learns that James Salee of Copper City has struck a body of copper ore of high grade, 24 feet wide, at a great depth.

SPOKANE, Wash., expects this summer to have direct telephone connection with every important mining camp in British Columbia.

THE May payroll on the Comstock will be some thousands more than for April. The April payroll was about $1000 more than that of March.

SUPT. MARTIN at the Machu, West Point, Calaveras Co., has a two-compartment shaft down 175 feet, and has a ledge which is expected to keep a mill going.

UNDERGROUND miners at the T. M. & M. Co.'s mine, Tombstone, this week struck for a raise from $2.50 to $3 per day. Work goes on at the cyanide mill as usual.

ON May 7th acting Secretary of the Interior Symms passed for patent to the railroad company list No. 32, containing 287,753 acres of land in the Redding land district.

THE California mineral land bill as amended and passed is as previously published herein, except that it has an amendment clause, making its provisions apply to Oregon also.

THE Coeur d'Alene, Idaho, country sends word that the production for '96 is expected to aggregate $7,000,000. At present it is turning out about 10,000 tons of concentrates monthly.

MOUNT MORGAN, Queensland's big gold mine, in April chlorinated 7,966 tons, which yielded 12,608 ounces gold. The total dividends paid by Mount Morgan amount to £4,075,000.

FOR the week ending May 7th, the yield of the world's greatest silver mine, the Broken Hill Proprietary, Australia, was 7,505 tons ore, yielding 474 tons, containing 145,842 ounces of silver.

THE Thistle shaft, Sierra Co., worked by about 100 men, and owned by a Scotch corporation, may be cited as an instance of a drift gravel mine worked through a shaft instead of a tunnel.

THE Hale & Norcross has contracted for 200 M ft. lumber for timbering at $16 per M. During the last six months the company has used 175 M. The present quantity will be used in the 900, 1100 and 975-foot levels, now being worked.

LA PANZA, CAL., is more than ordinarily fortunate. A San Luis Obispo paper says that La Panza mines yield gold "worth $22 per ounce." This is probably the long lost mine where the ore yielded 110 per cent of the assay value.

W. L. HISKY tells a Salt Lake *Tribune* man of the discovery of a mastodon, the bones of which assay high in gold. The self-restraint of the S. L. T. m. in not eliminating the second initial of his informant's name is worthy of commendation.

AS THE Standard Company at Bodie will do no more hoisting at night, they now propose, says the *Enterprise*, to light the town by electricity. This could not be done before on account of the unsteadiness of the lights while the hoist was running.

TWENTY YEARS ago B. C. Kingsbury, now of Spokane, Wash., shipped ore from the Copperopolis mine, White Sulphur Springs, Montana, to Philadelphia for reduction. Now a company of Chicago men has bonded the property and will exploit its value.

CHAS. SWAIN of the Confidence mine tells the Sonora *Democrat* that he will add forty stamps to the 40-stamp mill. The shaft is being retimbered and the largest pump in Tuolumne Co., with a daily capacity of 500,000 gallons, is unwatering the mine.

THE Executive Committee of the Northwest Mining Association will try to secure the passage of a Congressional enactment providing for another cabinet officer—the Secretary of Mines. They also plan a Miners' Convention in Spokane, Wash., the first of October, '96.

THE Boston *News Bureau* of the 15th says: "Calumet and Hecla has made a large sale of copper to domestic consumers at 11c, with deliveries extending three to four months. Quantity believed to be from 5,000,000 to 10,000,000 pounds. Market for copper is firm at 11c."

THE House Committee on Public Lands has ordered a favorable report on the bill for the maintenance of schools of mines in the public land States and Territories, by granting each State from the proceeds from the sale of mineral lands $15,000 for the current year and an annual increase of $1,000 per year for ten years.

CONSIDERABLE mineral land in California has passed to private control under agricultural patents. It now legally belongs to those who have secured Government title, and even though it lie within the gold belt, and be manifestly mineral land, no prospector or miner can work thereon without the consent of the owner.

THE United States Geological Survey in its compilation of the statistics of the coal production in the United States during 1895 shows that the total output was 192,421,311 short tons, with a total value at the mines of $197,572,477; an increase over the production of 1894 of nearly 22,000,000 short tons and in value of $11,500,000.

ON the Geyser mine, at Silver Cliff, is the deepest mining shaft in Colorado. The shaft is down 2100 feet. The machinery is capable of hoisting the ore from a depth of 4000 feet. A peculiarity about this Colorado company owning the property is that the stock is assessable. The plan is to go down 400 feet farther before drifting is begun.

IT is stated that at a meeting of the directors of the Hale & Norcross last Thursday evening a resolution was passed authorizing Superintendent Cronin to commence work on the 300-foot level on the Brunswick lode. This work is to be done jointly by Chollar, Savage and Hale & Norcross. At the point where work is to be started ore has been found of an encouraging character.

THE House Committee on Territories makes favorable report on the bill to amend the law restricting ownership of real estate in Territories to American citizens. It provides that alien bona fide residents may hold land and loan money on real estate, and if foreclosure be had, purchase the land. Such persons are also allowed to acquire mines and townsites.

THE Interior Department has ordered a retrial of the case of the Government against the Copper Queen Consolidated Company, Arizona, in which a jury disagreed at the September term of the Federal Court. The case involves about $30,000 alleged to be due the Government for timber cut by the defendant on public land, which the plaintiff contended was not mineral land.

IT is now considered a certainty that the river and harbor bill will pass with the $250,000 appropriation asked for by the miners of California; it is almost equally certain that the President will veto the bill, and likewise of extreme probability that if he vetoes it before Congress adjourns the national legislature will pass it over his head by considerably more than the requisite two-thirds majority.

AT Grass Valley, Cal., last Thursday afternoon, J. B. Gluyas, foreman of the Massachusetts Hill mine, while working in the shaft, was crushed by the cage coming down on him. The cage was loaded with car timbers and four miners. Gluyas, who is a large, strong man, held up the entire weight, estimated at over a ton. Only his strength saved his life, as the cage crushed him to within a foot of the floor.

WHAT is deemed by the miners excessive royalty led this week to the formation of a miners' union at Georgetown, Colorado, with 65 charter members. There were 178 additional applications for membership. The mines there are mostly worked by the lease system, and very few of the miners are leasing for less than 60 per cent royalty, which leaves them at present figures about 27 cents per ounce for silver gross.

THERE is now pending in Congress a bill in which the Blackfeet Indians, for the consideration of $1,500,000, agree to sell the western third of their reservation in northwestern Montana to the Government. It extends from the northern to the southern boundary of the reservation, and from the main divide, its present western boundary, from fifteen to twenty miles eastward, covering an area of about 600 square mineral sections.

THE Transatlantic steamship companies engaged in carrying export gold from New York to Europe have increased the rates from 3-32 of one per cent to ship $1,000,000 to 5-32 of one per cent. The effect of this will be to increase the rate of sterling exchange a little more than a quarter of a cent (31-100 of one per cent) per pound sterling. If it cost nearly 4.88¾ to lay down gold in London under the old freight rate, it will now cost 4.89 to do so.

"IF your mines are so good, why don't your people invest in their development themselves?" is sometimes asked. They do. California capital to the extent of millions is now being expended on California mines. It is safe to say $5,000,000 of San Francisco money has been put into development work in the last year. In eight mines in one county—Amador—the expenditure of a million dollars is now arranged for; of the fifty-seven counties in California, thirty-three produce gold.

THE London *Mining World* of the 9th inst. editorially announces that "there are those who are working night and day upon an oil process which bids fair to do for Westralia what cyanide did for the Transvaal." Well, well! It also states that "a method has been discovered and patented by Mr. William Herbert Hyatt, F.C.S., a well-known chemical engineer and metallurgist, by which the finest and lightest gold can be recovered without the use of a single drop of water."

THE Boston *News Bureau* of the 13th says: "The Merced gold mining shareholders are notified this morning of a telegram received from the mine yesterday: 'Mill returns show during the month of April 2303 tons of ore treated, the yield being $8700 gold and 25 tons sulphurets, assay value $75 per ton of 2000 pounds. This shows a yield of $4.59 per ton of rock treated. The first return was in the month of March, 1285 tons treated, showing gold obtained $1630 and 9 tons sulphurets, averaging $62.43 per ton of 2000 pounds.'"

A RECENT decision by the Interior Department is of considerable interest to applicants for public lands under the timber and stone act. The case decided was from the Duluth land district. The applicants for lands under this act, who were unable to make proof on the day originally set, will be allowed to readvertise and make proof in the absence of any adverse claims. The ruling has heretofore prevailed that in such cases the entries were held for cancellation when the applicant failed for any cause to prove up at the time stipulated.

THE Transvaal, South Africa, authorities are announced to have reached a decision in the case of their prisoners. Capt. Thos. Mein, C. Butters and H. J. King are to be released. V. B. Clement and J. W. Leonard are to be imprisoned for five months. John Hays Hammond, F. W. Rhodes, L. Phillips and Geo. Farrar, who were at first sentenced to death, have had their sentences commuted to fifteen years' imprisonment. It is not likely that the Transvaal authorities will enforce this sentence. The probability is that the four last named will be fined heavily and permitted to leave the country.

UNDER date of the 18th, a gentleman writes from Placerville, Cal., that in a letter he had received the day previous from a reliable informant he was told that a nugget had just been found "across the river from the Two Channel Mining Company's property, a distance of three miles, of unusual size, weighing forty-five pounds. The Two Channel Company operates twenty-six miles north of Placerville, and thirty miles above Georgetown. The site of the reported find is in Placer county." If a nugget of such extraordinary weight has been unearthed it will certainly receive extended notice.

THE requisite amount of annual work or improvement on unpatented mining claims can be put in the aggregate on one claim only when such work manifestly is for the common benefit of adjoining claims held by the same person or claimants. The Secretary of the Interior has recently decided that when such work is put on one of such adjoining claims it must represent $100 for each claim so held. A claim properly located cannot lawfully be filed on by any other than the original locator before it has lapsed to the Government or been forfeited by reason of noncompliance with the law on the part of the original locator.

IN the list of California mines and miners now appearing, any superintendent, mine owner, agent, or any one else acquainted with the facts, has the opportunity to send data, or, if any error appears, of correcting it. It is the first time that such a list has ever appeared; no one who has not tried to get out such a compilation can have any idea of the work and expense it involves. The only idea in publishing it is to meet the oft expressed demand for such a list. "Everybody is wiser than anybody," and it is only by co-operation that a satisfactory degree of correctness can be secured. Perfection in such a task is obviously impossible.

THE viceroy of the Liangkiang has contracted with the Shanghai firm of Burichester & Co. for the erection of a mint at Nanking, China, inside the city, for silver and copper coinage. According to accounts published in Shanghai, the mint will be capable of turning out 100,000 silver coins and 1,000,000 copper cash per day. The silver coins will be dollars exactly equivalent to Mexicans and fractional currency, and the dollars will not have on them the statement that they represent .717 of a tael; and this fact points to the dollar gradually superseding the tael as the unit of Chinese currency. At the present price of silver or copper and spelter, 1000 cash of the ordinary size cost considerably more than $1, and the size of the new cash will be accordingly reduced. It is stipulated that a foreign assayer is to be permanently employed, so that there may be no doubt of the purity of the silver coinage.

EVERY week items and statements appear in this column that are written in response to requests for information. Space being limited, it is deemed better to answer private inquiries in that way than to print the questions or letters in extenso, and then the answer. To publish the letters received asking for such information every week would take two or three pages. Many of them are answered by mail, but where, in the judgment of "Concentrates," the matter is of sufficient public interest, a concise answer is published, thus carrying the same information to many others who probably want to know on precisely the same point asked about by the writer. This is intended to explain why, so often, trite statements appear in this column concerning matters well known already to a majority of our readers, but not so clearly understood by a large number of men who naturally look to this paper for such information.

THE Executive Committee of the Anti-Debris Association met in the office of the Sacramento Board of Supervisors last Wednesday. Some farmers from Colusa county attended. Manager Phipps and the watchmen as to the hydraulic mines in operation visited by them reported. Attorney Devlin reported that an order had been issued by the United States Circuit Court, returnable June 16th, calling upon certain Chinese to appear and show cause why they should not be punished for contempt of court for engaging in illegal mining at Moore's Flat, in Nevada county. The case of the Government against the North Bloomfield Mining Company, that was to have been heard last Monday, testing the constitutionality of the Caminetti act, was postponed for one week. A report from the Legislative Committee as to the present condition of the mining bill now before Congress, relating to building restraining dams in the Sacramento and Feather rivers, was read, and the committee adjourned until June 16th.

THE report of the London Stock Exchange for the year ending March 25, 1896, shows that during the year the membership was the greatest on record, being 3660 as compared with 3421 in the previous year, while the net income was £184,191 as against £122,275 in the year ended March 25, 1894. The company managing the Exchange is not registered under the limited liability acts, but the capital consists of 20,000 shares upon which £12 each has been paid. The dividend paid for the past year is £7 10s per share—a record figure which the present quotation of the shares on which £12 has been paid is no less than £195. A sum of nearly £30,000 out of the profits was also carried forward to provide for structural alterations contemplated. In addition to the capital above mentioned, there is an issue of debentures amounting to £350,000 bearing interest at 3½ per cent. This is to be increased by a further issue of £500,000, which is to be devoted to acquiring adjacent property and to so enlarge the Exchange. During the whole of the recent boom, the space at the disposal of the South African mining market was inadequate.

THE Mineral Land bill, which is expected to become a law before Congress adjourns, provides for an examining commission of twelve men, four of whom shall be residents of this State. The twelve are to be appointed by President Cleveland. At a meeting of the Executive Committee of the California Miners' Association, held in the rooms of the Union League Club in this city last Wednesday for that purpose, the names of four California miners satisfactory to the association were selected by the Mineral Land Committee for recommendation to the President. The four who head the list as preferred candidates are E. H. Benjamin of Alameda, John McMurray of Trinity, Mark B. Kerr of Calaveras and George D. McLean of Nevada. In addition the following names were also adopted: H. Vischer, San Benito; Chris Runckel, Placer; J. D. McGillvary, San Francisco; E. C. Loftus, Calaveras; J. M. Kendrick, Tuolumne; F. Van Leicht, San Francisco; E. B. Preston, Lassen; S. K. Thornton, San Francisco. These twelve names will be forwarded to Washington to-day by Jno. M. Wright, of the Mineral Lands Committee, and, coming with the endorsement of the association, it is presumed that their selection will have considerable weight with the President in making his appointments, in the event of the passage of the bill.

THE Western Federation of Miners at Denver this week decided to amalgamate with the American Federation of Labor, and will elect delegates to the convention of that body. The selection of a site for a home for invalid miners has been left to the Executive Committee. Congress and State Legislatures will be asked to aid in establishing the institution. By unanimous vote the meeting on the 18th adopted the following: Whereas, the dangerous and hazardous vocation of mining, notwithstanding the modern inventions and scientific appliances, is constantly resulting in the disabling and maiming of a large number of our fellow-miners, rendering them incapable of earning a livelihood and leaving them wholly dependent upon the charity of the world, we feel that the time has arrived when the combined efforts of the miners of the West can do something for the alleviation of the sufferings of our unfortunate brothers. The suitable home to be erected can be paid for by popular subscriptions and by donations from the various local unions. When a sufficient sum has been realized by this means, it is proposed to apply to the Congress of the United States and to our several State Legislatures for the appropriation of a sum of money equal to the amount collected. Therefore, be it *Resolved*, That it is the sense of this convention of Western Federation of Miners of America to empower its executive board to solicit public subscriptions and to receive private donations to be set apart in a fund to establish and maintain an institution in some suitable locality to be known as the Disabled Miners' Home. Old age, permanent injuries of any kind, incurable diseases or the dreaded miners' consumption will be sufficient to permit the entrance of any miner to the home. Resolutions were also adopted pledging the federation to free silver. The following officers were elected: President, E. Boyce of Idaho; vice-president, J. Leonard of Victor, Colo.; secretary-treasurer, W. H. Eddy of Butte, Montana; executive board, T. Graham of San Coulee, J. Maher of Butte, R. Thomas of Butte, J. Ramburn of Leadville, J. F. McDonald of Virginia, Nev., and F. Wolfe of Cripple Creek, Colorado.

# CALIFORNIA MINES AND MINERS.*

## Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

### HUMBOLDT COUNTY—Continued.

| Name of Mine. | Character of Mine..... | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| Salstrun's | Gold. | 3 | 1½ m W of Orleans Bar | Jonas Salstrun | Orleans Bar |
| Swan's Beach | " | 2 | Mouth of Redwood Creek | R. Swan, Owner | Orick |
| Stone Lagoon | " | ..... | 16 m N of Trinidad | Abandoned | |
| Ucellena | " | 3 | 7 m E of Orleans Bar | L. Nelson, Own | Orleans Bar |
| Union (Lower Red Bluff) | " | 20 | 16 m S mouth of Klamath | Gold Bluff M. Co.; A. Caswell, Supt. | |
| Witchpec | " | 4 | Witchpec | Wm. Lord, Own | Orleans Bar |
| Walther's Claim | " | 2 | Trinidad | Chas. P. Walthers, O'n | Eureka |
| White's Claim | " | 2 | 7 m W of China Flat | Duncan White, Own | China Flat |

### KERN COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Kern Valley Water Co. | | | W of Bakersfield | S. W. Wible | Bakersfield |
| Kern County Land Co. | | | Kern Co | Walter James, Engineer. | F. G. Drum, Sec., S. F. |
| Lokern Well, Artesian | | | Lokern | S. P. Railway Co | S. F. |
| Miller & Lux, Artesian | | | 2 m W of Delano | Miller & Lux | S. F. |
| Miramonte, Artesian | | | Miramonte | Geo. A. Raymond | Miramonte |
| North Buena Vista | Oil. | | 3 m N W of Asphalto | J. W. Briggs | Bakersfield |
| Pine Tree | Gold. | 8 | 6 m S of Tehachapi | W. C. Carnicle | Tehachapi |
| Semi-Tropic, Artesian | | | 16 m W of Poso | Semi-Tropic Vineyard Co., N. W. Miller. | Oakland |
| Smyrna Cl'y, Artesian | | | Smyrna | Brown & Co | S. F. |
| Standard Asphalt Co | | 26 | 1½ m S E of Asphalto | C. E. Hayes, Own. Wm. Bell, Supt. | S. F. Asphalto |

### MADERA COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Abbey Mine | Gold. | | At Hildreth | G. W. Grayson, Owner | S. F. |
| Achsall D. Mine | " | | 6 m S of Hildreth | C. B. Halstead, Own | Pollasky |
| Albion D. Mine | " | | 2 m E of Gold Gulch | Keefe & Logan, Own | Gold Gulch |
| Alexander D. Mine | " | | Near Gold Gulch | Mrs. L. Keehn, Own | Gold Gulch |
| Alpha D. Mine | " | | Potter Ridge | Waterloo G.M.Co., O'n | S. F. |
| Alvarita D. Mine | " | | Near Hildreth | N. E Snow et al, Own | Fresno |
| Aurora D. Mine | " | | Potter Ridge | T. Dieks, Own | Gold Gulch |
| Baltimore D. Mine | " | | Jackass Mountain | Smith Norris, Own | Fresno |
| Bandarita D. Mine | " | | Near Hildreth | D. Pray & G. Dean, Own | North Fork |
| Beaumont D. Mine | " | | 1 m S E of Grub Gulch | C. M. Ward et al, Own | Grub Gulch |
| Belleview D. Mine | " | | 5 m S W of Hildreth | — Besone, Own | Gold Gulch |
| Berry D. Mine | " | | Near Hildreth | L. V. Loomis et al, Own | O'Neals |
| Bessie H. D. Mine | " | | 5 m S W of Hildreth | E. Wright, Own | Pollasky |
| Blind Orphan | " | | Jackass Mountain | G. D. Hitchcock, Own | Madera |
| Buena Ventura | " | | 1½ m N of Gold Gulch | Theo. Strombeck, Own | Gold Gulch |
| Burney | " | | Potter Ridge | McClellan & Melvin, Own. | Gold Gulch |
| Butterfly | " | | 2 m S of Grub Gulch | A. W. Poole, Own | Grub Gulch |
| Bullion | " | 4 | Grub Gulch | C. M. Ward et al, Own | Grub Gulch |
| Caledonia | " | | 2 m E of Gold Gulch | D. McClellan, Own | Gold Gulch |
| Caledonia | " | | 4 m E of Grub Gulch | C. M. Ward, Own | Grub Gulch |
| Canady | " | | 8 m S W of Hildreth | A. J. Cassidy, Own | Pollasky |
| Caroline | " | | 2 m E of Gold Gulch | J. Jones and T. C. Vines, Own. | Gold Gulch |
| Central No. 2 | " | | 2½ m N E of Gold Gulch | McClellan & Melvin, Own. | Gold Gulch |
| Chipmunk | " | | 1 m N W of Hildreth | D. L. Pray, Own | North Fork |
| Cliff | " | | Jackass Mountain | P. Ralph, Own | North Fork |
| Colorado | " | | 2 m E of Gold Gulch | D. McClellan, Own | Gold Gulch |
| Columbus | " | | 5 m E of Gold Gulch | Morrison & Vines, Own | Gold Gulch |
| Combination | " | | Fine Gold | J. W. Strat'ham, Own | Hildreth |
| Common G | " | | 7 m S W of Grub Gulch | McKay Bros., Own; Pat Reddy, Supt. | S. F. |
| Contention | " | | Hildreth | Keefe & Taylor, Own | O'Neals |
| County Vein | " | | 2½ m N W of Gold Gulch | D. McClellan et al, O'n | Gold Gulch |
| Crab Tree | " | | Near Fine Gold | T. Jones, Own | Gold Gulch |
| Cross & Crescent | " | | Near Gold Gulch | G. Conklin & H. McCarty, Own. | Gold Gulch |
| Crystal Springs | " | | ½ m N W of Grub Gulch | Chas. Knox, Own | Oakland |
| Dagmar Mine | " | | Potter Ridge | C. Peterson and T. Jones, Own. | Gold Gulch |
| Daniels | " | | Hildreth | E. R. Daniels and R. Higgins, Own. | Pollasky |
| Defiance | " | | 4 m N E of Pollasky | J. Petersen, Own | North Fork |
| Diana | " | | 6 m S of Hildreth | W. R. Hampton, Own | Pollasky |
| Day Granite Mine | Gr'n'te | | 2 m S of Raymond | Day & Sons, Own | Raymond |
| Eighty-four Mine | Gold. | | Near O'Neals | D. R. McKenzie et al, Own. | O'Neals |
| Eighty-six Mine | " | | 3 m W of O'Neals | E. J. Beck et al, Own | O'Neals |
| Eliza Jane | " | | 1 m E of Hildreth | P. Bazinet, Own | Hildreth |
| Empire | " | | 3 m S W of Grub Gulch | Lovely Bros., Own | Grub Gulch |
| Europa | " | | 3½ m S W of Grub Gulch | G. Pendola, Own | Grub Gulch |
| Fine Gold Mine | " | | 3½ m N E of O'Neals | N. Anderson, Own | O'Neals |
| First Venture | " | | 2 m W of Hildreth | L. L. Baker, Own | O'Neals |
| Five Oaks | " | | Potter Ridge Dist | Five Oaks M. Co., Own | S. F. |
| Flying Dutchman | " | | 2 m N W of Gold Gulch | Mrs. Louise Krohn, O'n | Gold Gulch |
| Fresno Banner | " | | Near Hildreth | J. Donohoe et al, Own | Fresno |
| Fresno Enterprise | " | | 5 m E of Grub Gulch | J. Coates, Own | Pasadena |
| Gambetta | " | 14 | Grub Gulch | Murray & Mills, Own | Grub Gulch |
| Grand Central | " | | 2 m N E of Gold Gulch | D. McClellan et al, O'n | Grub Gulch |
| Greaser Gulch | " | | 2½ m N of Gold Gulch | J. S. Lingo, Own | Grub Gulch |
| Great Eastern | " | | Near Gold Gulch | D. McClellan, Own | Grub Gulch |
| Hall Mint Mine | " | | North Fork San Joaquin | W. Hall, Own | North Fork |
| Hanner | " | | 2 m E of Hildreth | H. S. Williams, Own. | Raymond or Madera |
| Harrietta | " | | 2 m E of Gold Gulch | H. McLaren, Own | Gold Gulch |
| Hawkeye | " | | 2 m N of Gold Gulch | Hawkeye M. Co., Own | Gold Gulch |
| Henrietta | " | | Near Fine Gold | J. A. Harris & W. Reed, Own. | Pollasky |
| Hildreth | " | | Near Hildreth | Estate of Wm. Dunphy, Own. | S. F. |
| Hoboken | " | | Potter Ridge | L. Krolin, Own | Gold Gulch |
| Homestake | " | | 4 m S of Hildreth | Wise & Brennan, Own | Hildreth |
| Hughes | " | | Hildreth | R. Williams, Own | Hildreth |
| Indian Peak | " | | ½ m S E of Grub Gulch | Arthur Thomas, Supt. | Grub Gulch |
| Jeff Davis Mine | " | | Grub Gulch | Chas. Knox, Own | Oakland |
| Josephine | " | | ¼ m W of Grub Gulch | Risdon Iron Wks, Own | S. F. |
| Keefe Mine | " | | ½ m N E of Gold Gulch | T. Keefe, Own | Grub Gulch |
| Keno Mine | " | | Potter Ridge Dist | Kipperdano & Murray, Own. | Gold Gulch |
| Lady Tad Mine | " | | 2½ m N of Gold Gulch | J. S. Lingo, Own | Gold Gulch |
| Last Chance | " | | 7 m E of Hildreth | J. F. Hutchinson, Own | North Fork |
| Last Chance | " | | 3 m W of Gold Gulch | J. R. McKenzie, Own | Gold Gulch |
| Last Chance | " | | 5 m E of Hildreth | C. Williams, Own | Hildreth |
| Laura May | " | | 2 m E of Gold Gulch | D. McClellan, Own | Gold Gulch |
| Lawsuit | " | | 2 m E of Hildreth | P. Bazinet, Own | Hildreth |
| Lilly Mine | " | | 2 m N E of O'Neals | McDonald Bros., Own | Sonora |
| Lingo Mine | " | | 2 m N of Gold Gulch | J. S. Lingo, Own | Gold Gulch |
| Little Willie | " | | Fine Gold Gulch | J. R. Gunter, Own | Pollasky |
| Little Wonder | " | | 3 m E of Gold Gulch | D. McClellan, Own | Gold Gulch |
| Letter K | " | | 5 m S of Hildreth | J. A. Harris et al, Own | Pollasky |
| Lucky Bill | " | | 5 m E of Grub Gulch | John Morrison, Own | Grub Gulch |
| Lucky Boy | " | 2 | 3½ m N of O'Neals | C. J. Beck et al, Own | O'Neals |
| Lucky Day | " | | 2½ m N E of Gold Gulch | T. Kipperdam, Own | Gold Gulch |
| Lucky Star | " | | Near Hildreth | R. Stayton et al, Own | O'Neals |
| Mabel Mine | " | | | W. F. Roddeck, Own | Fresno |
| Madera | " | | Near O'Neals | A. Cadoza, Own | O'Neals |
| Mammoth | " | | ¼ m E of Grub Gulch | W. D. Pearson, Own; Arthur Thomas, Supt. | Grub Gulch |
| Manzanita | " | | Near Hildreth | R. P. Brownelle, Own | Hildreth |
| Margarite | " | | Near Fine Gold | Chas. Baker, Own | O'Neals |
| Mayflower | " | | 6 m N E of Hildreth | | |
| Miller, H. T., Mine | " | | 6 m S W of Hildreth | L. H. Miller et al, Own | Pollasky |
| Minneapolis | " | | 1¼ m S E of Grub Gulch | Louis H. Sharp, Own; C. M. Haskell, Supt. | S. F. |
| Mint | " | | 2 m N E of Gold Gulch | C. Peterson & C. Jones, Own. | Gold Gulch |
| Monitor | " | | 1½ m N of Gold Gulch | Peterson & Krohn, Own | Gold Gulch |
| Morning Star | " | | 1½ m E of Gold Gulch | J. Hitchcock, Own | Oakland |

—* Begun in issue of April 25, '96.

### MADERA COUNTY—Continued.

| Name of Mine. | Character of Mine..... | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| Morrow | Gold. | 1 | 2 m E of Hildreth | P. Basinette, Owner | Hildreth |
| Mountain Lily | " | | 3 m N of Gold Gulch | D. McClellan, Own | Gold Gulch |
| Mountain View | " | | 5 m S of Gold Gulch | J. Donohoe et al, Own | Fresno |
| Mud Springs | " | | Hildreth | S. H. Wilson, Own | O'Neals |
| Muhly | " | | North Fork San Joaquin | T. Muhly, Own | North Fork |
| McLennan | Gr'n't | 20 | 1½ m S E of Raymond | A. McLennan, Own | Raymond |
| Nellie Gray | Gold. | | 2 m N of Hildreth | J. H. Prester, Own | Hildreth |
| Neversweat | " | | Fine Gold Gulch | J. A. Harris, Own | Pollasky |
| New Citizen | " | | ½ m N E of Gold Gulch | C. A. Lea et al, Own | Plainfield, N. J. |
| North Lily | " | | 2 m N E of O'Neals | F. Wetmore, Own | O'Neals |
| Old Joe Mine | " | | 2 m S E of Grub Gulch | C. W. Haskell, Supt | Grub Gulch |
| Overlooked Mine | " | | 1 m S E of Hildreth | J. H. Morris, Own | Hildreth |
| Owl | " | | Jackass Mountain | J. D Hitchcock, Own | Madera |
| Paymaster | " | | 4 m S E of Gold Gulch | Waterloo G.M.Co, Own | S. F. |
| Paterson | " | | Hildreth | J. Keating, Own | O'Neals |
| Peterson | " | | 2¼ m S E of Grub Gulch | Louis H. Sharp, Own | 318 Pine St., S. F. |
| Point Grove | " | | 15 m N E of Hildreth | Jas. Lanson, Own | North Fork |
| Pine Island | " | | 5 m W of Grub Gulch | Wm. Downey et al, O'n | Raymond |
| Plain View | " | | Gold Gulch | F. Mello & J. Elam, O'n | Gold Gulch |
| Pray | " | | Near Fine Gold | D. L. Pray, Own | O'Neals |
| Prospect | " | | 2 m N E of Gold Gulch | C. Peterson & Theo. Jones, Own. | Gold Gulch |
| Prospect | " | | At Hildreth | C. Peterson et al, Own | Gold Gulch |
| Providence | " | | 1½ m N E of Gold Gulch | D. McClellan et al, O'n | Gold Gulch |
| Quartz Mount'n Mine | " | | 4 m S of Gold Gulch | J. H. Perry, Agt | Gold Gulch |
| Reba Mine | " | | Grub Gulch | Chas. Knox, Own | Oakland |
| Round Tree Mine | " | | 3 m S E of Hildreth | D. Topping, Own | Hildreth |
| Runaway Mine | " | | 2 m E of Hildreth | R. Williams, Own | Hildreth |
| Raymond Quarry | Gr'n'te | 49 | 1¼ m E of Raymond | D. L. Knowles, Supt | Raymond |
| San Joaquin Mine | " | | 5 m S of Hildreth | J. A. Harris et al, Own | Pollasky |
| San Joaquin Mine | " | | 5 m S E of Hildreth | Geo. Sym, Own | Hildreth |
| Savannah | " | | 1¼ m S E of Grub Gulch | Chas. W. Haskell, Supt | Grub Gulch |
| S. E. Canady Mine | " | | 6 m S W of Hildreth | S E Canady & Bro, O'n | Pollasky |
| Seneca | " | | 5 m S of Hildreth | S. May, Own | Pollasky |
| Sequin | " | | Near Gold Gulch | D. McClellan et al, O'n | Gold Gulch |
| Smultz | " | | Near Hildreth | Smultz Bros., Own | Fresno |
| Snow Flake | " | | On Jackass Mountain | Smith Norris, Own | Fresno |
| Solferino | " | | 4 m S W of Grub Gulch | Lewis Daello, Own; Louis Moretti, Agt. | Stockton Grub Gulch |
| Standard | " | | 2 m N of Hildreth | G. W. Keller et al, Own | O'Neals |
| Standard No. 2 | " | | 2½ m N E of Gold Gulch | D. McClellan, Own | Gold Gulch |
| Starbuck | " | | Near Fine Gold | Mark Anderson, Own | O'Neals |
| Starlight & Riverside | " | | ¾ m S E of Grub Gulch | C. M. Ward et al, Own | Grub Gulch |
| Stemwinder | " | | On Jackass Mountain | Smith Norris, Own | Fresno |
| Sunol | " | | 2¼ m N W of Gold Gulch | J. Krohn, Own | Gold Gulch |
| Surprise | " | | On Jackass Mountain | B. Norris, Own | North Fork |
| Swede Gulch | " | | 1½ m N of Grub Gulch | Theo. Sturnbeck, Own | Gold Gulch |
| Texas Flat | " | | 1½ m N W of Gold Gulch | J. B. Haggin et al, Own | N. Y. City |
| Tiger | " | | ½ m S of Grub Gulch | A. W. Poole, Own | Grub Gulch |
| Triangle | " | | Near North Fork | J. D. Jones, Own | North Fork |
| Unmitigated Mine | " | | Near North Fork | J. Morrison et al, Own | Gold Gulch |
| Viani Mine | " | | Near Hildreth | W. R. Hampton, Own | Pollasky |
| Victoria | " | 2 | 6 m N E of Grub Gulch | John Haley, Own | Ahwahnee |
| Vienna | " | | Potter Ridge Dist | F. Dutchman et al, Own | Gold Gulch |
| Volcano | " | | Hildreth | Chas. O'Neal et al, Own | O'Neals |
| Washington | " | | 2 m N E of Gold Gulch | D McClellan, Own | Gold Gulch |
| Wide Awake | " | | 1½ m S E of Grub Gulch | C. W. Haskell, Own | Grub Gulch |
| Williams | " | | 2 m E of Hildreth | Geo. and Reuben Williams, Own. | Hildreth |
| Willow Creek | " | | ½ m E of O'Neals | Chas. O'Neal, Own | O'Neals |

### MARIPOSA COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Anderson | Gold. | | 3 m S W of Coulterville | W. B. McSherry, Supt | Coulterville |
| Adelaide | " | | 2½ m S W of Coulterville | W. B. McSherry, Supt | Coulterville |
| Adelaide | " | | 2½ m S W of Coulterville | R.E.E.McSherry, S'pt | Coulterville |
| Bull Pup and Bull Dog | " | 2 | 6 m N of Mariposa | J. Helm & Sons, Own | Mariposa |
| Buena Vista | " | | 3 m S E of Centreville | Angelo Gabbarino, O'n | Coulterville |
| Bondurant | " | | 10 m E of Centreville | Bondurant M. Co.; Chas. F. Buner, Supt. | Coulterville |
| Black Hill | " | | 1 m N W of Centreville | Clark McLaymont, O'n | Coulterville |
| Black Bart | " | | 11 m E of Centerville | S. B. Sample, Own | Coulterville |
| Barrett | " | 2 | 6 m N W of Bear Valley | Jos. Barrett, Own | Hornitos |
| Barrett | " | | 7 m N E of Mariposa | J. W. Steten et al, Own | Mariposa |
| Barley Field | " | | 4½ m N E of Mariposa | Jos. Landrum, Own | Mariposa |
| Bandarita | " | | 10 m E of Coulterville | C. L. Mast, Supt | Coulterville |
| Congo | " | | 3 m E of Coulterville | J. Mentzger, Own | Coulterville |
| Compromise | " | | 12 m E of Coulterville | M. Hilliard, Own | Coulterville |
| Cornet | " | | 12 m E of Mariposa | D. Heaton, Own | Jerseydale P. O. |
| Cherokee | " | | 9 m E of Coulterville | J. Shriner, Own | Coulterville |
| Champion | " | | 4½ m N E of Mariposa | Jas. Ridgeway, Own | Mariposa |
| Campodonica | " | | 1 m E of Hornitos | Campodonica M Co, O'n | Hornitos |
| Cabinet | " | | 2½ m S W of Coulterville | C. L. Mast, Own | Coulterville |
| Cranberry | " | | 25 m E of Mariposa | A. H. Ward, Own | Alameda |
| Crown Lead | " | | 4½ m S W of Coulterville | W. B. McSherry, Supt | Coulterville |
| Crown Lead No. 2 | " | | 4 m S W of Coulterville | W. B. McSherry, Supt | Coulterville |
| Crown Peak | " | | 6 m S W of Coulterville | W. B. McSherry, Supt | Coulterville |
| Dalia | " | | 2½ m S E of Coulterville | J. R. Gilbert, Supt | Coulterville |
| Dan Cook Mine | " | | 2 m N W of Coulterville | J. R. Gilbert, Supt | Coulterville |
| Dina Group | " | 16 | 7 m N E of Mariposa | W. H. Wright et al, O'n | Mariposa |
| Doss Mine | " | | 2 m S of Hornitos | C. E. Stewart, Lessee | Hornitos |
| Duncan Mine | " | | 1¼ m S of Hornitos | W. & G. Turner, Own | Hornitos |
| Elizabeth Mine | " | | 4 m S W of Bear Valley | Mariposa Estate | Mariposa |
| Evans | " | | 4 m S W of Bear Valley | Mariposa Estate | Mariposa |
| Farmers Hope | " | | 6 m N of Mariposa | Billingham & Grove O'n | Mariposa |
| Ferguson | " | | 23 m E of Mariposa | Wm. Sharwood, Own | Soulsbyville |
| Feliciana | " | | 10 m N E of Mariposa | Judge J. C. Campbell, Own. | Occidental Hotel, S. F. |
| Flyaway Group | " | | 7 m S E of Mariposa | W. M. Darling, Agt. | 1009 Adeline St., Oakland. |
| Franklin | " | | 2½ m N E of Hornitos | M. L. Rodgers, Own | Hornitos |
| Georgiana | " | | See Mariposa Estate | | |
| Green's Gulch | " | | See Mariposa Estate | | |
| Horse Shoe | " | | 10 m E of Coulterville | C. L. Mast, Supt | Coulterville |
| Horse Shoe | " | 13 | 2½ m W of Bear Valley | J. F. Thorn, Supt | Hornitos |
| Hite Mine | " | 38 | 23 m E of Mariposa | W. S. Chapman, Supt | Jno. L. Minear, Sec., Minear P. O. |
| Heiser & Peregory | " | | 6 m N of Mariposa | C. A. Schlagerter, Own | Mariposa |
| Hay Seed | " | | 6½ m N of Mariposa | J. Helm & Son, Own | Mariposa |
| Hasloe | " | | 10 m E of Coulterville | John Morgan, Own | S. F. |
| Jenny Lind | " | | 4 m N E of Hornitos | M. L. Rodgers, Own | Hornitos |
| Josephine | " | | | | |
| Juniper | " | | 1½ m W of Bear Valley | | |
| Lacy Mine | " | 1 | 7 m N E of Mariposa | Geo. Lacy, Own | Mariposa |
| La Grange Ditch & M. Co | | 3 | Near La Grange | P. Davis, Supt | Coulterville |
| La Grippe Mine | Gold. | | 8 m E of Coulterville | C. L. Mast, Supt | Coulterville |
| Lewis Mine | " | 3 | ¼ m W of Princeton | Mariposa M. Co., Own | |
| Lookout Mine | " | 3 | 2½ m S W of Coulterville | P. P. Mast, Own | Coulterville |
| Louisa Mint | " | 50 | At Coulterville | J. R. Gilbert, Supt | Coulterville |
| Louisiana Mint | " | | 9 m E of Coulterville | J. T. Gove, Own | S. F. |
| Ludwig | " | | ½ m N of Princeton | Mariposa M. Co., Own | S. F. |
| Merced Falls Electric Power Co | | | Merced Falls | Merced Falls Power Co., Own. | Mariposa |
| Mahoney Mine | Gold. | | 2 m N W of Coulterville | Merced M. Co., Own | Boston |
| Malvina Mine | " | 50 | 1¼ m W of Coulterville | J. R. Gilbert, Supt | Coulterville |
| Malvina No. 2 | " | | 1¼ m W of Coulterville | J. R. Gilbert, Supt | Coulterville |
| Manzanita | " | | 1½ m E of Coulterville | M. Hilliard, Own | Coulterville |
| Mariposa | " | | | See Mariposa Estate | |
| Mariposa Est. Mines | " | | Mariposa Grant | John T. Ludwig, Agt. | Princeton |
| Mariposa Mine (Merced Co.) | " | | At Coulterville | J. R. Gilbert, Supt | Coulterville |
| Martin & Walling Mine | " | | 8 m E of Coulterville | C. L. Mast, Supt | Coulterville |
| Mary Harrison | " | 25 | 2 m S E of Coulterville | J. R. Gilbert, Supt | Coulterville |
| Merced Gold M. Co | " | 175 | At Coulterville | J. R. Gilbert, Supt | Coulterville |
| Mexican Mine | " | | 25 m E of Mariposa | | |
| Mexican Mine | " | | See Mariposa Estate | | |
| Mexican Mine | " | | 1½ m W of Bear Valley | Mexicans, Own | |
| Midas (Merced Co.) | " | | 2 m S W of Coulterville | J. R. Gilbert, Supt | Coulterville |
| Midas Mine | " | | 2½ m S W of Coulterville | W. B. McSherry, Supt | Coulterville |
| Mt. Garvis | " | | 5 m N E of Hornitos | Jos. Spagnoli, Own | Hornitos |
| Mt. Ophir | " | | See Mariposa Estate | | |
| Nevada Mine | " | 2 | 2 m W of Bear Valley | Jos. Hall, Own | Bear Valley |
| No. 9 Mine | " | | 2½ m E of Hornitos | M. L. Rodgers, Own | Hornitos |
| Occidental | " | | 3½ m S E of Coulterville | W. B. McSherry, Supt | Coulterville |
| Pine Tree | " | | See Mariposa Estate | | |
| Pinon Blanco, 3 claims | " | | 3 m N W of Coulterville | Capt. A. H. Ward, Own | Coulterville |
| Potosi | " | | 1¼ m N W of Coulterville | J. R. Gilbert, Supt | Coulterville |

(To Be Continued.)

## A Rejoinder From Mr. Lang.

TO THE EDITOR:—When Mr. W. L. Austin of Denver accuses me (see your issue of May 9) of a desire to deprive him of the fruits of his inventive genius, or of inciting others to do so, he commits a most unjust and unmerited act, and one of a nature most unexpected by me. Mr. Austin knows very well that I have not trespassed in any instance upon his inventions, nor have I advised others to do so. The apparatus in use here at Keswick bears not the slightest resemblance to his inventions, nor does the process resemble that which goes by his name, as far as I have been able to discover. There is a tone of violence and bitterness about the gentleman's writings that has no place in a moderate discussion, and much less in one devoted ostensibly to the discovery of truth. The attack which he makes upon me is wholly unjustifiable, and I propose to discuss it until I have proved it to be so.

If the world has failed to render him the praise that is due to the eminent scientist, or if his discoveries have been usurped by others, or his rights as an inventor trampled on unwittingly, he has himself to blame, because he has for years posed as the possessor of momentous secrets, which he was not willing to divulge—except for a consideration—and has left the public in complete ignorance as to the nature of his claims. Two or three years ago, when writing the book "Matte Smelting," I thought I understood the so-called Austin process; but I now take the opportunity of acknowledging that I was wrong. I did not understand it. This process—or what the inventor terms such—has taken on a new form with each change of the moon. It has more colors than a chameleon, more lives than a cat. If "science is progress, progress change," as an eloquent metallurgist has said, then the Austin process is the most scientific method of ore reduction ever yet discovered, for its mutations are innumerable. First I heard of great things accomplished by a central-feeding arrangement, which I am told was soon abandoned. Then came peculiar methods of feeding the ore, unnecessary to recount, because they, too, have passed the way of all such devices. Then I heard of gas being burned in the tuyeres or in the charge. This failed to work a revolution in metallurgy, and next comes a peculiar provision by which the formation of oxides is to be curbed by burning coal oil in the tuyeres.

I have before me as I write a number of drawings and sketches—one in Mr. Austin's own hand, showing different contrivances, presumably illustrative of the Austin process. There is the cut of a blast furnace, or what I take to be such, exhibited with a big umbrella over it, for what purpose I know not, unless it be to indicate that it is warranted good in all kinds of weather. Then comes a cupola, fitted with an extraordinary contrivance—an inside tube, which promises great usefulness, for aside from its proper function, that of admitting the ore, it would serve to feed in lumps of ice, did the temperature get beyond control, according to the inventor's characteristic experience. Then we view a furnace couchant between two gas producers, one on either side, like a sportive young blade between two pretty girls on May day. This, I doubt not, represents the very highest development of the Austin process, or at least I will assume as much.

Now we have nothing like these at Keswick, nor, to be frank, do we desire to have. Furthermore, I have never advised the erection of anything of the sort elsewhere. How, then, can Mr. Austin claim that I have injured him? These metallurgical curios may have merit which would influence their adoption in some localities, and I would hesitate to say anything to their disadvantage. But here in Keswick they would be useless; the inner feeding tube, which prevents the ore from sticking to the walls, because our ore doesn't stick to the walls; and the gas flame in the tuyeres, for preventing the formation of oxides, because we wish to form all the oxides we can, and are bothered by not being able to form more.

Now, lest it be asked: why do you not tell how you do it at Keswick, and an answer not be forthcoming, I will give a short account of our method, premising that the whole story cannot be told in a few lines, and, furthermore, while I wish to tell it all with the utmost candor, there is considerable that I am debarred from telling, because it would conflict with my duty to the company. I cannot, for example, satisfy a natural curiosity about the value of our ores and products, the destination and further treatment of the latter, etc. I may at some future time obtain the sanction of the directors to the publication of more; but not at present.

There are no professional secrets at this works, because I never had any; but there are quite a number of original devices in use, some of which I have patent applications upon, but the most of which are at the disposal of whoever can make use of them. The smelting is conducted simply enough, and consists in charging a mixture of three kinds of ore, namely: sulphides, about four parts; oxides, two parts, and gold-bearing quartz, one and a half parts, together with foul slags and scrap matte, whatever may be on hand, and melting the mixture down with 2 or sometimes 3 per cent of coke, and sometimes a little wood. When the stack works badly or from inattention becomes encrusted along the sides, we feed extra matte and slag, and also when the tray, which takes the place of the crucible in other furnaces, gets choked. When the furnace gets considerably "out of whack," as the men say, we let down the bottom, which rests in slings, and clean out the shaft and start again, the loss of time in the operation being but a few hours, depending of course upon the amount of hammering that is required to loosen the chilled material. I find it far more economical to let down the bottom, than to attempt to remove the obstructions by barring from above or cutting out by feeding slags, etc., the latter process being exceedingly slow and taking days, instead of hours. This convenient construction seems not to find favor with Mr. Austin, who, I judge, prefers the fixed bottom at the present moment, his former preference for movable bottoms resting on jackscrews, as shown in various drawings and cuts above referred to, apparently having given entirely away before his dislike for the things which I advocate.

The slags which leave the furnace are drawn into large pots, holding about 1500 pounds each, and mounted upon four small wheels. These are run into a brick chamber, a hundred feet long or more, and suffered to cool there, while they travel slowly toward the far end, propelled by a hydraulic jack which moves the whole line the length of a pot at each stroke. The heat which is radiated from the cooling slag heats the air within the chamber to quite a high temperature—to about 500°, in fact—and this air is blown into the furnace as the hot blast. How efficient it is may be gathered from the preceding statement of the fuel consumption. The furnace shaft is rectangular in section and is 15 feet (180 inches) in length, being the longest furnace within my knowledge. Its width is 3 feet and depth to the tuyeres 7½, which is a little too much for convenience. Six feet deep would answer a little better. The walls of the shaft are constructed of brickwork, resting on a shallow steel jacket 12 inches high, which serves as a girder to sustain the various strains which exist in a furnace of this kind. The brickwork is kept cool by a system of water pipes embraced within the walls, which preserve it most effectually from corrosion, so that we have not had to replace a single brick yet in our work. The cutting cannot proceed deeper than the plane of the pipes in any event, and rarely goes so deep. Undue heating at any point can be discovered by the steaming of the pipes and the exact location found, when a little fine ore fed along the wall at that point will remedy the trouble. The men acquire great skill in caring for the furnace, and in competent hands there is no trouble at all.

I cannot compliment Mr. Austin on his treatment of the subject of water-jacketed furnaces versus brick ones, for it appears to me that he has entirely missed the important points of the matter. It is absurd to try to make out a clear case in favor of the one or the other, for each is appropriate to its own sphere, and the character of the work to be done will guide an intelligent choice. Whether the one or the other is chosen depends largely upon individual preference and experience. The gentleman cites the experience and the views of those who have abandoned the brick stack for the water-jacket, and declares that no one has yet done the opposite. Now, I do not care in the least for evidence of this kind; and I think that to cite it shows a dependence on the presumed popular notion which is not at all creditable. The whole world abandoning the brick furnace would be a terrible spectacle, but it would not deter me from building one at the first opportunity, provided that I thought it appropriate to the surroundings. Still, he who takes upon him the management of the brick furnace assumes labors to which the manager of the water-jacket is a stranger. The latter can sit in ease and security, fully confident that if he blows hard enough, and feeds plenty of coke, the way is clear. But the former knows full well that the fuel and wind that give his rival the peace that passeth understanding will cause the brick stack to fall, perhaps, a mass of ruins in short order. The influences that act to deteriorate the walls are, first, the action of the blast, that scores them to some extent; second, the chemical effect of the smelting materials, which fluxes away the brickwork; third, the mechanical abrasion of the descending charges; and, lastly, the liquefying effects of the high temperatures produced. Against all these the water-coolod iron surfaces are proof. The water-jacket resists not through its refractory nature, but by abstracting the heat from its neighborhood and transmitting it to the water on the outer side. It is an apparatus mainly for the quick transference of heat from its one surface to the other.

Brick walls, on the other hand, resist destruction not by the transmission of heat (conduction), which cuts small figure here, but by their peculiarities of chemical and physical composition. Having treated this subject more at considerable length in "Matte Smelting," I will not pursue it further here.

The combination which I have effected between water-jackets and brick walls has enabled me to save something in the cost of construction, for jackets of the size of this stack would be very expensive. I save perhaps three-fourths of the water which would otherwise be required for the jackets, as well as an unknown amount of fuel, the proportion of which can hardly be arrived at. It must be quite a quantity, however, for the small flow of water is hardly blood warm. Without desiring to boast about the matter, I should say that the success of this furnace depends chiefly upon the fact that it is a combination, embracing the good qualities of both the brick and the water-jacketed stacks, including the durability and safety of the latter with the heat-conserving qualities of the former. I am so well satisfied of the advantages gained by this form of construction that I never expect to employ any other.

We are smelting at this time from 125 to 140 tons of mixture per day, and effecting a concentration of about four tons of sulphide into one ton of matte, which is somewhat less than we expect to do in future, when our at present unsatisfactory propelling and blowing power is suitably increased. I use five ounces, or a little more, of blast, which is not enough for the best work, but is all I can get now.

It is difficult to believe in Mr. Austin's seriousness when he speaks so confidently of "the ease with which complex sulphides may be smelted." I have given much attention to this very operation, but have never found such material so delightfully easy to smelt, and never expect to. In common with most people who have attempted it, my experience has been quite the contrary, and I have no hesitancy in openly avowing it. I do not blame Mr. Austin's enthusiasm in the advocacy of a process which he has been foremost in introducing; I am only sorry that I cannot share it to the full. I should like to see the time arrive when every man would be his own smelter; when the walls would be placarded, "Smelting of sulphurets taught in ten easy lessons;" "Smelting made easy;" "Get your ore smelted while you wait," and other cheering announcements, and when the humble and necessary cookstove becomes an instrument not only for the satisfaction of man's inner wants, but an efficient means for the conversion of rebellious or refractory pay rock into current gold and silver. At such a time the incautious miner, going about the lower levels with his dripping candle, may approach too near the walls, and, setting fire by a mere touch the highly inflammable sulphides, may find himself enveloped in a conflagration that will bring to a sudden end his hardy explorations. But enough of this. Seriously, I for one never expect to set fire to the solid rocks by touching a match to them.

Enthusiasm begets enthusiasm. When I read how Mr. Austin resurrects dying furnaces by merely charging fine pyrites into their cold and hardly palpitating bosoms, I began to wish that my stack would show signs of a freeze, so that I might rush down and sift a few handfuls of the heat-begetting pyrites into the top, and then stand back and watch her "breeze up," as the men call it, while a crowd of perspiring furnace tenders stood by to admire and to say to each other, "Good Lord, but isn't he onto her tricks?" But all such pyrotechnics are beyond my sphere, and I shall never be able to see the elements melt with fervent heat—at least not in this manner and in this life. Smelting with me will always be a striving and a prayer, not for more light, but for more heat.

Now for definitions and classifications and Mr. Austin's criticism thereon. The gentleman finds fault with my introduction of new terms in general, and with the phrases "German system," "gradual reduction process," and "a practicable cold blast pyritic process" in particular. As to the general impeachment, I reply that I have been so bold as to propose to introduce a few novel terms and definitions into an art which sadly needs them. Perhaps there is no branch of knowledge whatever that is so hampered by the lack of comprehensive definitions and brief and clean-cut designations as metallurgy is to-day. Every other pursuit of a progressive cast has, within the last decade or two, been forced to extend, if not remodel, its terminology. And be it remembered, those votaries who have been bold in making the changes have been censured and even denounced for it. Our inheritance from the dark ages of traditionary terms, of inept designations and indefinite commonplaces, conveyed to us by the iteration of writers who were content to echo and re-echo the ideas of previous ones, does much to retard that progress which the age and our opportunities demand.

In an humble way I have endeavored to advance the ordinary conception of metallurgical processes by referring them to groups and classes based upon scientific differences. No classification worthy of the name can have any other basis than a scientific one, and this can hardly exist where concise and exact definitions are not found. That I have attained at least the merit of conciseness is shown by the fact that my phrase, "German system," covers a meaning which Mr. Austin, in assailing it as an unheard-of and unjustifiable innovation, could not define the process it represents in less than ten words. This process, I will remark, since the gentleman seems unable to recognize it, is the matte smelting in cupolas with coke as fuel. I call it German in recognition of its presumed origin and a system be-

cause it is more than a process. Can Mr. Austin object to the brevity of my definition, or can he defend the indefiniteness of his own?

In endeavoring to classify the different pyritic methods, I found a place for Mr. Austin's process, as I understood it, and thought I had done quite well. But now comes Mr. A., and with some asperity, as it seems to me, brushes it impatiently aside—classification, process and all—and proceeds to erect a new classification all his own. I am sure that, as far as the classification goes, he is welcome to use his own; I prefer mine. But what I want to know is, Where is the Austin process to be put? Has it a scientific basis which would entitle it to a place by itself? Or, if not, what are its fundamental distinctions? I recognized, or thought I recognized, a considerable difference between the ordinary pyritic smelting, such as I practice for example, wherein the ores descend in the ordinary manner down the shaft, getting hot and losing the sulphur gradually, and that advocated by Mr. Austin, who feeds the oxidizable material directly into the smelting zone without the preliminary heating and partial decomposition. And in recognition of the difference, I gave the name "gradual reduction system" to the former in contradistinction to the latter, wherein, if I have apprehended correctly, a more rapid oxidation is held to prevail. I am not particularly in love with the term, and if another more acceptable can be suggested—or still better, if my assumption that a sufficiently radical difference to justify such a verbal distinction exists is shown to be wrong—I shall be very glad to consign the name to oblivion.

Concerning the expression "a practicable cold blast pyritic system," there is much to be said. Mr. Austin makes believe that there is no pyritic smelting aside from that carried on by means of the heated blast. That he is in error there is abundant evidence to show. I can cite numerous examples wherein smelting is or has been carried on partly by the aid of the heat given out by oxidizing sulphides, cold air being blown. There is no radical difference between such smelting and the most extreme degree of pyritic smelting favored by Mr. Austin, the heating of the air not altering in any respect the chemical nature of the effects produced, but only intensifying them. There is no hard and fast line dividing the different degrees of pyritic smelting, for they are pyritic to some extent in all forms of matting in cupolas, as I have remarked in my book, the difference being in degree, not in kind. Since it has been found out that the cold blast is able to oxidize sulphides to a noticeable extent (and I believe I can conscientiously claim to have first pointed it out), a great many furnaces are run with special reference to the fact, and we hear frequently of examples of abnormally low fuel consumption, or, which amounts to the same thing, of improved concentration of the matte product of cold blast cupolas. As it follows that the pyritic effects are not confined to the furnaces blown with hot air, the most that we can recognize in this connection are the differences in intensity, not in kind; whence I argue that it is unphilosophical to attempt to draw a basal distinction between the hot and cold blasts. We should rather avoid these terms as conveying an indefinite impression to the reader, and endeavor to specify more precisely the temperature of the blast. A blast of 300° or 400° F. is not a hot blast, but it is comparatively beneficial in any cupola, and capable of intensifying pyritic effects in a remarkable manner. I need enlarge no further upon this point, as it is treated more exhaustively in "Matte Smelting." I will simply add that as to the phrase "a practicable cold blast pyritic process," I meant just what the words imply—a method of smelting wherein the fuel is economized and the product concentrated through the oxidation of sulphides in the ore. Such a process will be practicable wherever the operator has the skill, the apparatus and the ore to carry it out.

I will trespass no further upon your space at this writing, but I will, with your permission, use your columns in later issues in pursuance of the subject. Especially do I desire to investigate the question whether any one, for the sake of bolstering up a metallurgical process, has perverted the teachings of science and experience, used the public prints as a vehicle for unjust criticism, and, worse than all, has ascribed dishonorable motives to those who have labored honorably in the cause of metallurgy.

Keswick, Cal., May 16, 1896. HERBERT LANG.

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THE following is a description of a safety hat for miners recently patented: "The shell and brim of the hat are formed of a single piece of sheet metal, and inside the shell is a lining or inner shell of suitable textile material, to the edge of which is attached a leather head band. The inner shell and band are somewhat smaller than the exterior shell, and air holes provide for a circulation of air. The band and inner shell are secured to the outer shell by a series of spring clips, the spring of which allows the band or lining to conform to the head. On the front of the hat is a socket plate to receive the hanger of a miner's lamp. The hat is very durable, is waterproof, will not absorb grease from candles or oil, and the lining may at any time be taken out without ripping or tearing it."

# Scientific Progress.

## The Cyanide Process at the Mercur Mine.*

By B. E. JANES.

The Mercur mine is situated in Camp Floyd mining district, Tooele county, Utah, about fifty miles southwest of Salt Lake City, in the south end of the Oquirrh mountains. From nine to twenty-five miles north and northeast are the silver-lead camps of Ophir, Stockton and Bingham.

Camp Floyd district produced in 1870 to 1874 about a million dollars in silver. The ore was a free-milling chloride in rich pockets and was soon exhausted. Cinnabar was discovered at that time in a vein overlying the silver deposit. No one suspected it to contain gold, which fact was discovered years after.

In 1890 some Nebraska men purchased the Mercur and spent thirty to forty thousand dollars in an attempt to amalgamate the ore in pans. It was a complete failure, only fifteen per cent of the gold being taken out. The ore was calcined at an incipient red heat and treated in the pans with a variety of chemicals.




THE CYANIDE MILL AT MERCUR, UTAH.




VATS AND TANKS IN THE MERCUR CYANIDE MILL.




ZINC BOXES IN THE MERCUR MILL.

In the spring of 1891 the MacArthur-Forrest people were advancing their claims, and Mr. Peyton took a carload of the ore to the experimental cyanide plant at Denver. The experiment was successful and they began treating ore in barrels at the mill. When sure of success five 7½-ton tanks were put in, and at intervals since additions have been made, till the present tank capacity is one hundred and sixty tons per day.

Mr. Peyton relieved Mr. Brown as superintendent in May, 1893. I was employed by him as assayer. Mr. J. J. Trimmer, who had worked in the mill from the start, was made foreman, which position he has held since. Mr. Trimmer is a very close observer and together we worked out his ideas. September 1, 1893, the first $25,000 dividend was paid.

In the fall and winter of 1894 a railroad was built to haul the ore from mine to mill, which had been done by teams. It is eleven miles long and is built from Fairfield station, on the Tintic branch of the Union Pacific, four and one-half miles to the mill and six and one-half miles more to the mine. Between the mill and mine it is very crooked, and as the train climbs the divide magnificent views of the Wasatch mountains and of Utah lake are to be had. The town of Mercur is situated in the gulch below the mine.

With this introduction I shall describe the ore and its treatment.

*The Ore.*—The ore is in a vein six to fifteen feet thick, which is conformable to the silver vein as well as to the adjacent limestone strata, and is a few feet to one hundred feet above the silver vein. The dip is 18° to 20° northeast. The footwall is a hard, blue limestone. The hanging wall is a lime shale, and blue limestone above that. The croppings consist of silica, with limestone and clay, and are so varied and peculiar that some prospector sees another "Mercur" in nearly every quartzite or clay stratum.

Between the walls of the vein occur so many kinds of rock, which contain more or less gold, that a description can give but a faint idea of the true character of the ore. Silica, in a form similar to silicious sinter, or geyserite, characterizes the ore. I have always found this kind of rock to contain gold. This form of the silica doubtless gave rise to the theory that the deposit was formed by an ancient geyser. Cinnabar is most abundant in this rock and forms beautiful incrustations in the cellular varieties. Wherever found in the district, cinnabar is considered a sure sign of gold.

Orpiment and realgar occur in large quantities in some of the ore. The fossils I have found appear to be Brachiopods. There is about as much iron as is usually found in impure limestone and clay. Barite and gypsum occur more or less crystallized; also masses of limestone are found mineralized in rings, the outside assaying $6 to $8 and the center a trace in gold. No free gold is visible in the ore, even with a microscope.

It is the general opinion now, I believe, that the present heterogeneous rock was formed by impregnating the shattered original limestone and clay by hot alkaline waters containing the silica and gold in solution.

One remarkable feature is the absence of silver. Assays of the product from thousands of tons fail to show a trace of silver, and so far as I know none has ever been detected. The highest value of the ore in large bodies is $30 to $35 per ton. The average of the ore milled is kept close to $12 per ton.

*The Mill.*—The mill is built on the site of the amalgamating mill.

The ore is delivered by the railroad to the ore bin, which is about 40 feet long, 20 feet wide and 20 feet deep.

A short grizzly is placed before the Dodge rock-breaker, with jaw opening 11x14 inches. The breaker crushes the ore down to 1½ or 2 inches. Beneath the breaker is placed a set of Wall's corrugated rolls, 12 inches in diameter and 24 inches long, which take all of the ore, crushing it to 1 inch.

The ore is then elevated to the revolving screen, which has four holes per square inch. The tailings from the screen go to another set of the same size rolls. The ore passing the screen falls into a bin holding about one hundred tons, from whence it is drawn into a car which runs on the tramway above the tanks. The tanks, of which there are thirty-one, hold from seven and one-half to twenty-five tons. The most convenient size for emptying and rapid work is 12 feet 8 inches in diameter—

*This article was prepared at my request by Mr. Janes, one of the mining students at the University of California, to be read before his fellow students. As much interest attaches to the work at this mine, I have thought the readers of the MINING AND SCIENTIFIC PRESS might appreciate the following brief abstract of his paper. The first notable success with the cyanide process in America was made at the Mercur mine. It is one of the successful attempts to work an ore directly by this method. The peculiar nature of this ore, as described in the paper, explains this success. It seems to be peculiarly adapted to the cyanide process.

Attention is particularly called to the great reduction in time which was brought about by allowing the solution to flow on the ore and then drain out again at intervals. This change has reduced the time of treatment to such an extent that the success of the process may be said to depend upon the new method. Such a treatment, however, would pack most ores so that they would not filter. There are many other comments that might be made, but this is, perhaps, not the time to make them. S. B. CHRISTY.

holding fifteen tons. They are made of No. 10 or No. 12 sheet iron, and have bottoms of 3-inch redwood. The false bottom is of 1-inch pine, with a hole bored in every square inch. The filter cloth is burlap and lasts four to six weeks. Strips of quarter-round iron are tacked down 6 inches apart, to protect it from the shovels. The solution is drained from the ore into sheet iron launders, represented on the plan by dotted lines. They carry it to the tank, from whence it is pumped by Blake single-acting pumps to the tank in the precipitating room. From there the solution is run through the precipitating boxes to other tanks, and from there goes back on the ore. The zinc or precipitating boxes are 24 to 36 inches wide, 10 to 12 inches deep, and about 20 feet long. Partitions of 1-inch pine are placed 12 to 20 inches apart. Alternate partitions are caulked with oakum on the sides and bottom, so the solution passes over the top of one and under the next, and so on. A small tank is used to settle the gold slimes, whence it goes to a box in which the product is placed to drain. Two 12-inch swing lathes are used to turn the zinc shavings.

*The Process.*—Water disintegrates much of the ore into mud, so that fine crushing is not necessary, and in fact would be a disadvantage, largely increasing mechanical difficulties, with only a slight increase in extraction.

Being crushed coarse, the coarse and fine parts tend to separate when the ore is dumped into the tanks. After dumping three or four carloads of ore the charge is leveled, mixing it some, but unfortunately causing it to pack more.

*Treatment with Solution.*—Formerly the solution was kept running through the ore continuously, the ore being kept constantly covered until it was finally drained. Mr. Trimmer and I experimented and found that by alternately covering the ore with solution and allowing it to drain, and repeating this operation about every three hours for eighteen to twenty times, higher results were obtained in one-third to one-half the time required by the old method. This reduced the leaching time to fifty-five or seventy hours, the time depending much on the ability to handle the solution rapidly. After passing through the ore once the solution is each time run through the zinc boxes and the gold precipitated. About four hundred pounds of solution per ton of ore are required for each saturation. By the old method the solution was often allowed to stand in the ore several hours, and as high as ten days were consumed in treating a charge.

Two reasons are suggested by Prof. Christy for the difference in results. The alternate saturation with solution and then draining draws the solution out of the interstices of ore, which, on account of its clayey character, had been done imperfectly; and oxygen, which seems to be essential to the solution of gold in cyanide solution, is supplied in greater abundance. After the last solution the ore is covered once with clear water, which is run into the stock solution to maintain its volume. At one time two or three wash-waters were used, but were discontinued in favor of an additional solution.

*Strength of Solution.*—A solution containing one-tenth to three-tenths per cent pure potassium cyanide is used. The strength is determined with a standard solution of silver nitrate, preferably 13.07 grammes per litre of water. One c. c. of this solution will equal ten mg. of potassium cyanide, or one c. c. of a one per cent potassium cyanide solution.

Potassium bichromate is a good indicator.

The strength of the solution can be very accurately judged from the action in the "zinc" boxes, and by its alkaline feel.

For standardizing the solution the cyanide is added at the lower end of the "zinc" boxes, the judgment of the operator determining the time and amount.

*Consumption and Decomposition of Cyanide.*—The consumption has been reduced from over one pound to one-half pound per ton of ore. A dilute solution gives as good extraction as a strong solution, and saves cyanide, though an occasional strong one is used to completely precipitate the gold.

Arsenic, except in slight amounts, is very detrimental and fouls the solution, which gives off a peculiar odor. At one time the Marion mill in the same district used shavings turned from zinc, which contained arsenic, with disastrous results. The solution gave off a strong odor and but little gold was dissolved or precipitated. If at any time a strong hydrocyanic acid odor is noticed, something is wrong.

*Precipitation.*—Close observation and careful work are very essential to good precipitation; also, the character and condition of the solution can be accurately judged from the action in the zinc boxes.

The shavings for precipitation are turned from sheet zinc. A half-dozen sheets are tightly wound on the mandrel of the lathe and soldered down. The shavings should never be the least wiry.

They are placed in the first six or eight partitions of the zinc boxes, to start with. They fall to pieces and occupy considerable less space as the precipitation goes on. They are then moved toward the head and fresh shavings take their place, and should remain uncolored at the lower end about one hour. The shavings are chemically very active. Solutions containing no gold color them black after a time, and, if many other salts are present, the action becomes vigorous and their efficiency as a precipitant is lessened and a longer time practically destroys them. Water impregnated with carbonates also has a bad effect.

If, at any time after precipitation has begun, the damp shavings are allowed to stand even in a small amount of water or solution, a vigorous chemical action goes on and they soon become very hot. They are then of little use in precipitating gold.

From solutions containing less than one-tenth per cent potassium cyanide the gold is not all precipitated, and more time and zinc are required. Our experience seems to indicate that a certain amount of free potassium cyanide is necessary for a healthy action on the zinc. The solution from the ore assays $2 to $3 per ton, and the solution, after the gold has been precipitated in the "zinc" boxes, fifty cents to five cents per ton. The assay is made by evaporating five or ten assay tons with litharge in a small evaporating dish and fluxing in a crucible.

*Cleanup.*—Once a week the boxes are cleaned up; all the product in the first and possibly second partitions is taken out, if no coarse metallic zinc is seen. It has a honeycomb structure and should have a crisp feel, crushing to a gray-black slime. The rest of the zinc is washed in the solution remaining between the partitions, through about a No. 12 screen. The zinc failing to go through is returned to the box when the latter is cleaned. When the zinc is washed the partitions are knocked out and the solution, with suspended slime, is run into the slime tank beneath the precipitating room. The screenings are scooped into a tub and the box swept clean with water and the partitions caulked in again.

The slime in the slime tank is settled, the solution decanted off and the product and slime dried in an old retort built for the amalgamating mill. It is about 20 inches in diameter and 5 feet long and holds from 120 to 140 pounds of dried product.

The door of the retort is closed, but not luted, and the retort heated for three or four hours to a dull red. At about 150° C. or 180° C., the product ignites and produces a fearful lot of fumes of mercury, arsenic, cyanogen compounds, etc. They sometimes cause salivation and always headache. Some of the men attempt to counteract the evil effects with whisky, but it refuses to stay down. This "gold cure" is only temporary, however.

After heating, the retort is allowed to stand four to six hours and the charge drawn upon a sheetiron table, where the burning is completed.

When cool, it is sampled and sealed up in the zinc cans in which the cyanide is received and shipped to the Omaha and Grant Smelting and Reduction Company, Omaha, Neb. The reason for burning the product is that compounds in it which interfere in an assay are driven off with a loss in weight less by several per cent than the increase in assay value, and attended with very slight loss in the operation. The product assays from 1500 to 2000 ounces gold per ton. Beside the zinc and cyanogen compounds, it contains considerable slime from the ore. The tailings from $12-ore assay about $1.75, giving an extraction of 85 per cent.

## River Mining, in the Present or Future.

TO THE EDITOR:—It was in October, 1848, that echoed over the civilized world the fact of gold in California, and from that day to this the declaration has been verified by the production of $1,300,000,000. When the fact of this discovery of gold in California was first announced, the multitude doubted the reliability of the accounts, and they were only drawn into the whirlpool of adventure after the more enterprising had proved beyond all doubt that California was a land of gold. In these earlier days the rivers were loaded with it, and, in consequence, labor was worth from $10 to $50 per day, with many refusing to work at that. And why? Because they could make from $10 to possibly $500 per day, and this by washing the river margins and crevicing among the rugged rocks. The bars were all a source of great profit. Wing-damming the rivers were the larger operations of the time, and these were in special localities, and what man could not do with his hands and physical strength was left undone. Since these earlier days the rivers have been more or less worked, but mainly along shore, and until now there is but a scanty reward for manual labor. The consequence of this is that labor, not being able to control mechanical appliances, whereby the reward would be greater, has fallen year by year, until now it can be rated as low as $1.50 per day.

But a new era is before all, and with it should come more profitable employment for the many and also a large output of gold. This is in re-working the rivers by machinery. What was left undone in the earlier days, in consequence of having to depend on manual labor at a high rate per day, can now be done by the introduction of machinery and the various mechanical devices applicable thereto. In saying this, I will say I have some idea of what river mining is. I have a few thousands laid away in them; but this was in the days of high wages and manual labor. Between the two periods there is no comparison. This is a new age, new appliances, new ideas and more progressive ones. The main purpose of this article is to call attention of the enterprising to several stable facts.

First.—That along the gold-bearing streams of California are many localities that from certain causes have never been cleaned of their virgin gold deposits—causes which were formidable in the earlier days, but easily overcome by machinery and nerve at the present time.

Second.—In all the rivers, independent of the free gold that may be had in larger or smaller quantity, is the "black sand"—magnetic iron—that can be gathered, and in some places in large quantities. From the pioneer days to the present but little attention has been paid to the gathering of these sands, and yet it is well known that it all contains more or less gold, some of it having a high value per ton. Some seventeen years ago in the MINING AND SCIENTIFIC PRESS was published several articles on this subject, and in some I gave the yield per ton of many tests. It is safe to say that the "black sands" of the rivers have a gold value, if properly concentrated, of from $10 to $100 per ton. The rivers now not only contain the "black sands" of the pioneer days, but about all that has been washed into them from the hydraulic mines. To my mind, the gathering of this "black sand" with its accompanying gold, with suitable machinery for handling the body of sands on a large scale, can be made a profitable and expansive industry and would give employment to a very large body of men.

The third proposition is the associating with this river mining the elevating of the low lands with the debris of the rivers. The sands once raised for separating the gold and "black sands" could, by a system of sluices, be carried on to given localities, and the unproductive low lands be made valuable grain lands. It is clear to see that in handling the river sands by machinery, and for the purposes as stated, that the question of hydraulic mining is solved, and the solution, if carried into effect, means a million a month in gold from this source alone.

When we stop to consider the whole, and study the question of the yield of the precious metals from the working of the rivers, the starting of all the hydraulic mines, and the making of grain lands of the now unproductive low lands, why it seems that it is too important an enterprise to lay inactive much longer. The elevating of unproductive low lands into productive grain lands means a great deal for the State, and not for a year, but for all time. This enterprise inaugurated, we could say to the hydraulic miner, go to work and send down your gravel and your gold. This is to my mind all within the range of possibilities. It simply wants money and brains to carry it out. The matter of miles of ditches and flumes for carrying the debris to the low lands is of but little moment when the great riches to be gained are considered, by encompassing the three propositions into one syndicate, and also when we consider the advantages of electric power for handling large machinery along the streams. This, of course, is simply an outline. Mechanical and engineering skill will fill the details, while capital becomes an important factor. That it is an enterprise of the future if not of the present, and on a large scale, as it is now on a small one, in some localities, is as sure as that time passes.

It is a field in which could be employed all the surplus labor of the State, for their comfort, and a fair reward for capital.

ALMARIN B. PAUL, M. E.

San Francisco, Cal., May 20, 1896.

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RECENT investigations pursued by Margot make it appear that an alloy composed of ninety-five parts of tin and five of zinc melts at 200° C., and becomes firmly adherent to glass, and, moreover, is unalterable and exhibits a metallic lustre. He has further ascertained that an alloy consisting of ninety parts of tin and ten of aluminum melts at 390° C., becomes strongly soldered to glass, and is possessed of a very stable brilliancy. With these two alloys it is possible, it is claimed, to solder glass as easily as to solder two pieces of metal, and this operation may be done by "sweating" the pieces of glass, when heated in a furnace, by rubbing their surface with a rod of the solder, the alloy as it flows being evenly distributed with a tampon of paper or a strip of aluminum—or an ordinary soldering iron can be used for melting the solder.

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THE longest distance that a shot has been fired is a few yards over fifteen miles, which was the range of Krupp's well known monster 130-ton steel gun, firing a shot weighing 2600 pounds. The 111-ton Armstrong gun has an extreme range of fourteen miles, firing a shot weighing 1800 pounds, and requiring 960 pounds of powder. These guns, however, proved too expensive, being unable to stand firing one hundred times, and their manufacture has practically been abandoned. The 22-ton Armstrong gun hurls a solid shot for a distance of twelve miles, and the discharge of the gun can not be heard at the place where the ball strikes.

# Electrical Progress.

## Sacramento-Folsom Electric Transmission.

(Continued from page 413.)

ating under a head of 55 feet. The steel penstocks are 8 feet in diameter and each wheel has two draft tubes. The governors are of the Faesch-Picard type, and these are assisted by heavy flywheels, fitted to the water-wheel shafts. The hydraulic plant also includes two special horizontal wheels for the exciters. The water, after having passed the turbines, is discharged into a tail-race canal, which will distribute water for irrigation over the country south and west of Folsom.

The power house is a two-story brick building. The water wheels are placed in the open air between the forebay and the wall of the structure, through which the turbine shafts pass. To each shaft is coupled a 750 K. W. (100 H. P.) General Electric three-phase generator—the largest of their type yet constructed. Each is a 24-pole machine, delivering current at 60 cycles, 800 volts, and running at 300 R. P. M. The exciters are 4-pole 500-volt 30 K. W. generators, either one of which is of sufficient capacity to excite the fields of all four generators. From the generators the current passes to the generator switchboard, and thence to nine step-up transformers in the upper story of the power house. The capacity of each transformer is 250 K. W. They are cooled by an air blast from blowers driven by induction motors. In these transformers the pressure is raised from 800 volts to 11,000 volts, and the current passes to the high tension transmission lines carried out of the power house through porcelain lined holes in the wall.

The switchboards are so arranged that the generators may be run in parallel or on separate lines, as may be desired. The generator switchboard carries the necessary switches, instruments and other apparatus for synchronizing the generators. The boards in the transformer room carry switches for the high and low tension sides of the transformers and switches and current indicators for the transmission lines.

The pole line is double throughout, and follows the highroad from Folsom to Sacramento, a distance of twenty-four miles. Each pole carries two cross arms for two circuits, each circuit consisting of three bare copper wires supported on double petticoated porcelain insulators, especially designed and made for this installation at the porcelain factory of the General Electric Company at Schenectady. Each insulator before shipment was exposed to a test of not less than 25,000 volts, alternating. Each circuit can carry the output of one dynamo, and any dynamo can be thrown on any line. The loss is calculated 7.5 per cent when transmitting 3000 H. P.

The telephone line is carried on the same pole as the transmission line, and connects the power house with the sub-station in Sacramento. The transmission lines being spiraled every mile, and the telephone wire transposed every fifth pole, no induction is noticeable on the telephone circuits and conversation is not in any way interfered with.



STEP-UP TRANSFORMERS SHOWING AIR-BLAST EQUIPMENT AT FOLSOM.

The sub-station is a fireproof, two-story brick building on the corner of Sixth and H streets, Sacramento, having the transformers on the second floor and the dynamo room on the ground floor. In the transformer room the high tension switchboards receive the terminals of the 10,000 volt lines and operate the different combinations of the step-down transformers. These transformers, also ventilated by blowers, vary in size according to the duty required of them, the secondaries delivering current at 125, 500 and 1000 volts. They number twenty-one, fifteen of 125 K. W. and six of 40 K. W.

The transformers are connected to high and low tension switches on the boards, and from these the current passes to the distributing boards for the synchronous motors, power circuits and incandescent lighting. In the main or dynamo room of the sub-station a line shaft runs the entire length. To this are directly coupled, through friction clutches, three synchronous motors, each of 250 K. W. capacity, wound for a potential of 500 volts and run at a speed of 450 revolutions. To the line shaft are belted one 200 K. W. and one 90 K. W. multipolar General Electric railway generators, and two 100 K. W. Edison bypolar machines, all of 500 volts, and three 100-light and two 75-light Brush arc machines.

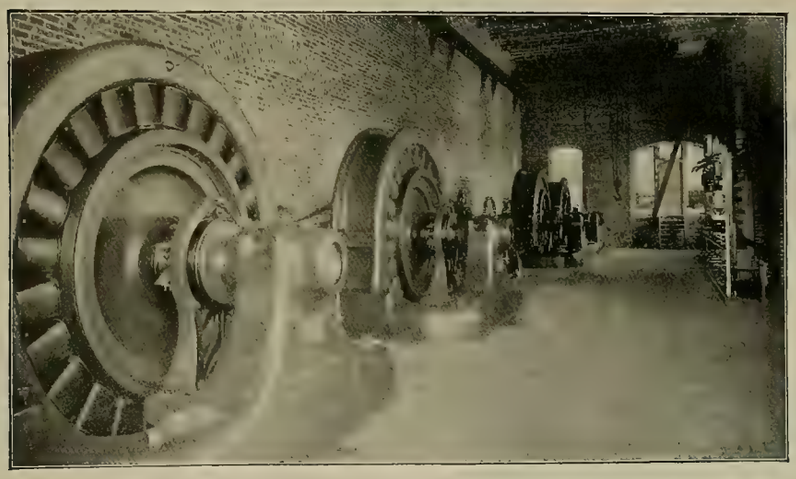
In this room are also the switchboards for controlling the synchronous motors, the railway generators and circuits and the arc dynamos.

For the operation of the synchronous motors 750 K. W. of transformer's capacity is utilized, the balance being used for low and high tension distribution. The low tension current is distributed by a three-phase four-wire system, combining the three-phase and Edison three-wire systems, i. e., three wires for the three-phase current and a fourth or neutral wire. Incandescent lights are connected between the neutral and any one of the three other wires, while motors are connected to the three-phase wires, giving at the mains 115 volts for lamps and 200 volts for motors. The feeders for this extensive system pass from the sub-station through a distributing switchboard, which carries potential regulators for maintaining constant pressure at the mains. Additional circuits run from the sub-station at 500 and 1000 volts, supplying current for lights and motors in the more distant parts of the city.

Power was transmitted for the first time from Folsom to Sacramento on July 14th, 1895, for the operation of the Sacramento street railway. On September the 9th a grand carnival was held to celebrate what up to the present is the longest commercial power transmission ever effected. The balance of the machinery has since been set up and the installation is now complete.

The power transmitted is now being used for manufacturing purposes, as well as for lighting the city and running the street cars. The power is stated by the company to be much cheaper than that generated by steam. Among the establishments now using the power are flour mills, box factories, machine shops and hotels.

The largest consumer is the street railway, which over its twenty-four and one-half miles of single and seventeen miles of double track operates thirty-two motor cars and trailers. The Southern Pacific Railway shops employ a large number of motors for drawbridges and elevators in freight sheds. The Buffalo Brewing Company is about to install five non-synchronous motors to replace steam engines which have been in use for years, and expect to save 40 per cent of the present cost of operation by the change. The entire equipment was carried out by the



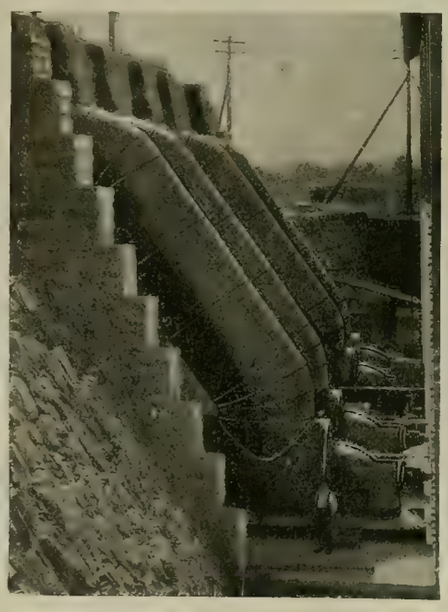
DYNAMO ROOM AT FOLSOM.



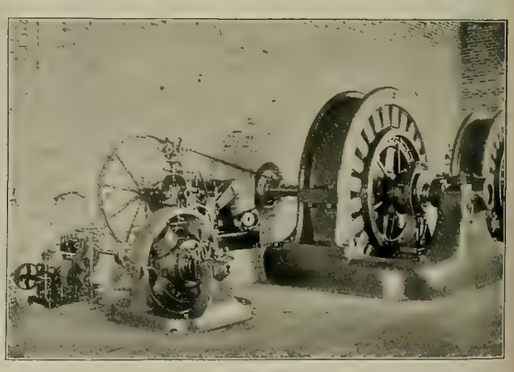
POWER HOUSE AT FOLSOM.



SUB-STATION AT SACRAMENTO.



PENSTOCKS AND TURBINES AT FOLSOM.



EXCITERS AND GOVERNORS IN DYNAMO ROOM.

General Electric Company, whose apparatus is exclusively employed.

This plant is a complete illustration of the possibilities of electric transmission, every problem to be met with in transmitting power over long distances at high potentials and utilizing it having been solved successfully.

The best indication of this success is reflected in the value of the interest paying obligations, the bonds of the Sacramento Electric Light and Power Company finding ready purchasers at par, although the plant has been in operation less than one year.

# Mechanical Progress.

### Tesla's New Electric Light.

A New York despatch says Nikola Tesla has solved the problem which he set before himself years ago, and which may revolutionize the system of electric lighting. It is thought to be the nearest perfect adaptation of the electric current for light uses. In his laboratory is a bulb three inches in length which, when the current is turned on, becomes a bulb of light. With it a large room is lighted so it is possible to read in any corner. This is done without the attachments necessary in existing lights. The rays are so strong that photographs may be taken by them. No new dynamo is required to produce the current. As compared with the incandescent light the Tesla bulb gives a greater per cent of light. The principle of the light is vibration. Illumination is secured by the means of what Tesla terms a vibrator within the bulb, which holds the vibrating needle within a vacuum. The needle vibrates so rapidly that the figures per second sound imaginary, but it is this intensity of energy which gives the light its brilliancy and its apparent steadiness.

### Around the World in Thirty Days.

When the trans-Siberian railway is completed, in 1900, it will be possible for a traveler to encircle the globe in thirty days. Over the new route the human projectile can be in St. Petersburg forty-five hours after leaving London, and 250 hours will see him in Port Arthur. A Russo-American steamship company now in the course of formation will land him in this city seven days later, whence he can proceed via New York to London in about ten days more. The price of the round-trip ticket need not be over $400, and might be as little as $250.

A WELSH newspaper, in discussing the subject of tin roofs, brings to public notice the singular fact that while Great Britain has for years made this material for the world, the tin roof is entirely unknown in England. The Welsh know next to nothing about methods of putting on a tin roof, and those interested in introducing the use of Welsh tin plates for roofing English homes have in contemplation the importation of an American tinner to introduce American methods of using terne plates.—American Manufacturer.

A FRENCH scientific periodical announces that the operation of tanning may be greatly hastened by passing pure hydrogen, or hydrogen mixed with a certain quantity of arsenic, through the fluid in which the hides are immersed. The gas is obtained either from the action of commercial sulphuric acid upon zinc or iron, or from that of steam upon iron, the calculation being, in fact, that in this case the hydrogen obtained will contain a sufficient quantity of arsenic.

IT is pointed out by Dr. Colman Sellers that one of the most notable examples of ball-bearings, now growing in vogue, is the diminishing of the friction of a collar sustaining the hooks of a large crane. Thus, by making the crane hooks with flat washers, between which numerous small balls are placed, resting upon hardened surfaces, there seems to be no difference between the friction of rest and the friction of motion, and hooks heavily loaded are turned with remarkable ease; in fact, the use of balls distributed over plain surfaces is becoming a settled practice, there being no basket or grooves to separate the balls, as the latter are allowed to move at their own tendency—that is, in whatever may be their inclination. As to the size of the balls adapted to different purposes, various experiments show interesting results. In the case of hooks for cranes carrying about fifty tons, between 250 and 300 balls, each of ¾-inch diameter, are scattered between the flat plates, on the assumption that the more points of contact the more lasting the balls; but some tests made with balls of different sizes, and motion kept up under loads to determine their durability, favor larger balls and fewer of them.

RAWHIDE gearing is now used on quite a variety of machines, and gives out a soft purring sound, instead of the almost deafening roar often heard in a mill or factory. The material is more like horn than leather, retaining a certain toughness, which allows the cogs to bend slightly. Lubrication is said to be entirely unnecessary. Such gearing has been tried on street railway motors and appears to stand the test.

# Practical Information.

### Cast Iron Versus Steel Pipe.

In summarizing the report of the expert commission on the Cincinnati, O., water supply in our issue of March 28th it was stated that in estimating the cost of a conduit six miles long, 78 inches in diameter, the commission found that a cast iron pipe would be cheaper than one of riveted steel. We have since received the exact figures showing how this conclusion was arrived at. The fall on this conduit varies between 52 feet and 22 feet, with the level of the water in the high-level roservoir. Before computing the size of the pipe careful tests made on a double line of 60-inch cast iron pipe 4952 feet long, on which velocities up to 2.72 feet a second could be obtained, showed that a coefficient of 123 in the Chezy formula was proper for that size, and accordingly a coefficient of 126 was apopted for the 78-inch main. The cast iron pipe was estimated on the usual lengths of 12 feet, with bell and spigot joints; the iron to have a tensile strength of 18,000 pounds per square inch of section. The steel riveted pipe was estimated in 8-foot lengths, with butt joints and single covers; the transverse seams to be single riveted and the longitudinal seams double riveted. Rivets were to be countersunk on the inside of the pipe, with button-set field heads on the outside. The material was to have a tensile strength of 55,000 pounds per square inch. The steel riveted pipe was further estimated upon the basis of punched, reamed and countersunk work. In either case it is estimated that the conduit pipe will be free from any unusual obstructions upon the inside, and in estimating the flow through cast iron and steel riveted pipe Kutter's formula was employed, with the coefficient of roughness $n=0.013$. In making their estimate there are some items common to both plans, the differing items being, for the iron pipe, 23,843 tons of cast iron pipe at $24 per ton; 32,571 lineal feet pipe-laying at $4 per foot, and six blowouts at $110 apiece, against 17,806,624 pounds of riveted steel conduit at 5 cents per pound, and eleven blowouts at $60 apiece. The difference of these items comes to $187,089 in a total cost of $1,045,183 for the cast iron and $1,232,272 for the steel. This is estimating the steel riveted pipe at $27 per lineal foot.—Engineering Record.

IN the *University of California Magazine* Charles H. Shinn, in writing of the lavish way in which the best parts of California forests have been cleared away, states that in the Comstock mines alone enough timber has been used to build all the houses needed for a city of 50,000 inhabitants. He has seen the bottom of a canyon crowded for miles with the trunks of pines, from each one of which a few flume blocks or a log of butt timber had been cut, while the remainder was left to decay. Not to mention the thousands of acres of the most magnificent coniferous timber known to man destroyed by fires which have burned out the soil itself into great pits, it is stated that the waste of timber in the redwood districts has been even more appalling than it has been in the Sierras. More than once the world's record for the number of feet cut in the day has been broken by some one of the sawmills of the coast redwoods. So much lumber is still produced by rival mill men that it has not paid for cutting, and some of the large California firms of lumber men have become bankrupt. Enormous trees that represent from 800 to 1000 years of symmetrical growth have been sawed up with no profit, or with actual loss, when, if they had been left to stand a few decades longer, the profit might have been $1000 an acre. At the time of the American occupation of California the forests covered perhaps 50,000 square miles. Half of this has been cut over or is inaccessible, or consists of species of less value than those which have heretofore been cut. It is often asserted that California still has 20,000,000 acres of magnificent forest land, but the truth is that there is left hardly 15,000,000 acres, and much of this has been cut away.

THE scourge of domestic animals known as the tsetse fly—including six species—has been one of the most formidable obstacles to the settlement of Equatorial and Southern Africa. It swarms in hot, low lands along the river banks, eagerly sucking the blood of man and animals, and in horses, dogs and cattle, setting up a wasting fever that is almost invariably fatal. On man and wild animals no effect is produced beyond temporary irritation. The Natal government, through Surgeon-Major Bruce, has at last sought out the cause of the mysterious fly disease, or Nagana, as it is called by the Zulus, and finds it to be due to the presence in the blood of a flagellated infusorian, very closely resembling the hæmatozoon, described by Dr. Lingard as the cause of "horse surra," a disease of horses—but not of cattle—in India. The flies inflict no injury on a healthy dog, unless they have previously drawn blood from a diseased animal. Where the flies obtain the parasite, except in diseased animals, which are not known in a wild state, has not been determined. but the fact that animals safely cross the fly-country at night, when the flies are at rest, goes to prove that the disease is not transmitted in the air. Arsenic seems to have so marked an effect that it is expected to serve as a preventive in future. Dr. Bruce confirms an overlooked observation—that the flies are viviparous—a fact which, it is pointed out, makes necessary a continuous supply of blood, if this is their only food, and explains the disappearance of the flies with the retreat of the large game.

GENERALLY speaking, the age of a boiler is by no means a criterion of the boiler's safety. Boilers often explode when brand new, and, on the other hand, they often do faithful service when old enough to vote. It is a good plan, though, not to place too implicit reliance on them when they get very far along in years. These remarks are called forth by a recent boiler explosion in the South, in which subsequent investigation showed that the boiler was thirteen-handed! It was thirty years old and had been sold twelve times. The last owner had been using it only a few minutes, when it blew up and killed him.—The Locomotive.

A SMALL piece of candle may be made to burn all night by putting finely-powdered salt on it until it reaches the black part of the wick. A small, even light may be kept in this way.

### Prof. Langley's Aerodrome.

The first public statement regarding the flying machine experiments conduct by Prof. Samuel P. Langley, the secretary of the Smithsonian Institute, is made with the authority of Prof. Langley. He has been guarded about the experiments, and the account of his latest attempts with the flying machine, embodied in the following statements prepared by Prof. Alexander Graham Bell, is published with the sanction of Prof. Langley, and is of interest:

On May 6th, I witnessed a very remarkable experiment with Prof. Langley's aerodrome, on the Potomac river. Indeed, it seemed to me that the experiment was of such historical importance that it should be made public. I should not feel at liberty to give an account of all the details, but the main facts I have Prof. Langley's consent for giving you, and they are as follows:

"The aerodrome or 'flying-machine' in question was of steel, driven by a steam engine. It resembled an enormous bird, soaring in the air with extreme regularity, in large curves, sweeping steadily upward in a spiral path, the spirals with a diameter of perhaps 100 yards, until it reached a height of about 100 feet in the air. At the end of a course of about half a mile, when the steam gave out, the propellers which had moved it stopped, and then, to my further surprise, the whole, instead of tumbling down settled as slowly and gracefully as it is possible for any bird to do, touched the water without any damage, and was immediately picked out and ready to be tried again.

"A second trial was like the first, except that the machines went in a different direction, moving in one continuous gentle ascent as it swung around in circles like a great soaring bird. At one time it seemed to be in danger as its course carried it to a neighboring wooded promontory, but apprehension was immediately allayed as it passed twenty-five or thirty feet above the top of the highest trees there, and then, ascending still farther, its steam finally gave out again and it settled in to the waters of the river not quite a quarter of a mile from the point where it rose. No one could have witnessed these experiments without being convinced that the practicability of mechanical flight had been demonstrated."

Prof. Langley also makes a supplemental statement, giving some data regarding recent experiments:

"The aerodrome, or flying machine, has not gas to lift it, as in the case of a balloon, but, on the contrary, it is about one thousand times heavier, bulk for bulk, than the air on which it is made to run, and which sustains it somewhat the way in which the thin ice supports a swift skater. The power is derived from a steam engine through the means of propellers, but owing to the scale on which the actual aerodrome is built, there has been no condensing apparatus to use the water over and over. Enough can be carried for only a very brief flight, a difficulty which does not belong to a larger machine than the present example, in which the supporting surfaces are but about fourteen feet from tip to tip. The distance flown each time was about half a mile. The rate of speed depends (as in the case of any vehicle on land) on whether it is going on a level or up hill. In the case of this last trial, on May 6th, the machine was ascending, that is to say, it was going up hill all the time, and went through a distance of one-half mile or more in one and one-half minutes, or at the rate of a little more than twenty miles an hour."

A NEW secondary storage battery has been patented for locomotion purposes, in which the liquid forming the electrolyte, while having free access to the plates, is contained in a suitable absorbent to prevent the free movement of such electrolyte. This corresponds in second batteries to what is known as the dry battery in primary cells.

# Mining Summary.

## CALIFORNIA.

### Amador.

At the South Eureka mine the shaft is down to the 1250-foot level and a station is to be cut as soon as the sump is sunk.

The *Republican* says: Chas. W. Haskins, who bonded the Wheeler gravel mine, together with the Chandler claim adjoining, has determined to forfeit his bond. He paid $5000 on the Wheeler and $1000 on the Chandler claim. He also expended $9000 or $10,000 in fitting up and working the claims. After what was considered a fair test, the yield fell below expectations and he determined to stop. The mine is thought to be rich. Before purchasing, a small test was made which yielded handsomely. The ground seems to be pocketty. He has ordered all the pipe to be taken up and it will be shipped back to San Francisco.

J. G. Mayborn & Co. are working on the Lighthouse property, near Big Bar bridge. They have started a tunnel from a point near the river, and expect to tap the ore body after reaching a distance of 230 feet, at a depth of 150 feet from the surface. They have already run 40 feet. The ore is low grade, said to average $4 a ton.

The shaft of the Zeila is in bad shape. It is expected another shut-down will be necessary next fall in order to repair the shaft. The directors are considering the question of sinking another shaft.

The Anita and Alma shafts are still in hard rock.

The Argonaut shaft is in soft gouge. Sinking will be continued until they reach harder ground.

T. W. Jeffries, superintendent of the Oleta drift mine, reports to the *Record* office considerable activity in mine development in Oleta district. At his mine, located on Loafer Hill, the hoisting plant is completed and an incline sunk from the surface to the bedrock, a depth of 90 feet, which taps the channel. A tunnel has also been run a distance of 125 feet to the bottom of the incline, which drains the mine. A crosscut has been run across the channel a distance of 70 feet, the pay gravel being about three feet in thickness and prospects an average of 3 cents to the pan.

### Butte.

At the Golden Summit a drift is being run on the 300-foot level. At present ten men are at work. The snow is reported to be 15 feet deep. As the season advances the present force will be doubled.

### Calaveras.

The Utica mine is now running 186 stamps: the ore mills $15 per ton, free gold.

George C. Tryon of Angels has sold to the Thorpe Mining Company for $11,000 a one-fifth interest in the Thorpe quartz mining claim, together with a ditch and water right, conveying water from the South Calaveras to the mine.

A twenty-stamp mill is to be erected on the Thorpe mine, near San Andreas.

The ten-stamp mill on the Rose Hill mine, near El Dorado, has been started up.

### El Dorado.

The Boulder Mining Co., sixteen miles southwest of Placerville, are re-opening an abandoned property. One old tunnel 700 feet in length, and another of 300 feet, are in perfect working order. A new one is over 300 feet, and being continued. A contract has been let for a 10-stamp mill.

G. W. Harvey of Shingle Springs, is authentically reported to have sold the Pyramid mine under two years' bond, to C. B. Rixford and Mr. Gilman of Santa Rosa for $80,000.

The Starlight Co., are erecting a 10-stamp mill on their property seven miles west of Placerville. It is said to be a matter of. record, made by J. Ross Browne, that thirty years ago this was an extraordinarily rich property, three tons of ore having produced $20,000.

Lumbering and teaming to the mines is becoming quite lively. The town is taking on a new appearance in business generally, since the revival of mining interests has begun.

Marshall Bros. are developing the extension of the old Flagstaff mine, four miles west of Grizzly Flats. They are sinking a shaft on a 4-foot ledge of high-grade ore.

Millar and McCuen are developing a claim a half mile above Big Canyon mine, seventeen miles west of Placerville.

The Co-operative Mining Co. has been organized to operate near Indian Diggings. This is a gravel proposition containing about 100 acres. The officers are: J. M. Taylor, president; Chas. F. Weed, vice-president; J. McComb Jr., secretary; Dr. E. B. Robinson, treasurer; D. Shakespear, general manager, all of San Francisco.

The machinery on the Salisbury started on the 20th.

### Inyo.

*Register:* L. Lee, in charge of the Pacific Coast Borax Co's works at Amargosa, a resident for twenty-five years, says that the desert hobo is a peculiar specimen of the genius tramp. His method is to get some one to back him with a "grub stake," as much as he can load onto a couple of jacks, and then strike out. Crossing the desert, he reaches some watered place, like Ash Meadows for instance, and there camps for the season. He never leaves the road a hundred yards, and avoids the mountains as being altogether too dangerous. When beans and bacon run short, he visits the dump of some mine or mill and selects a piece of ore with which he returns to the outfitting point, and reports having found rich "float," and has no doubt whatever about finding the ledge if he could only get another supply. Of course he is as careful as the gold brick swindlers of running against any well-informed assayer, who could not be fooled with ore from any operated mine. The hobo and his jacks are on hand the next year.

### Mariposa.

A Boston paper speaking of the Merced mines reports that "A Californian versed in mining and familiar with the Merced and other mother lode properties, has reached these conclusions regarding the Merced proposition: That the Merced company owns a large and prospectively valuable property. That speculation carried its shares far beyond its relative value in the absence of any known bonanza strike. That it has a large quantity of low-grade ore, and that $5 ore, even if cheaply mined, will not pay to work, despite all assertions to the contrary, and that it is a question whether its present stamp mill and saving process have been successfully demonstrated. That it is unreasonable to suppose that bonanzas of good and rich ore will not be found in the company's mines, and that at least deep work should have been prosecuted for the finding of a bonanza—i. e., an ore shute—before a mill was completed and run. That it may be questioned if an abundant supply of water power has yet been established for large milling work. That a successful saving of the percentage of sulphurets in the ores will be essential to the profitable workings of its ores and conjunctive chlorination works. That the present cash capital of the company, estimated at less than $100,000, and allowing that no impairment of this amount shall occur from present indebtedness, will be entirely inadequate for the company, and that several hundred thousand dollars will probably be required for the expenditure before the property will be put upon a profitable basis. That the working management of the property, subject to careful supervision, should be put under an experienced mining engineer, familiar with the local features of mining and milling of ore from other mines on the mother lode, where such notable successes have been secured. That the connection of Mr. Bigelow with the property has been entirely loyal to his associates, and that the Merced property can most likely be made very profitable for its owners."

### Mono.

About 400 feet of 11-inch pipe is on the road from San Francisco, to be used in the hydraulic claims at Mono lake.

The Bodie southend cyanide plant, the largest in the State, started up in full blast last Monday, with Lester Bell in charge.

R. N. Graves has arrived in Bodie to start up the hydraulic works near Mono lake. About 20 men will be put to work.

### Nevada.

Supt. Coflin tells the *Telegraph* that work underground in the Electric mine will be resumed on completion of the new hoisting machinery. It is the intention to reach the north chute as soon as possible.

The last crushing of ten tons of ore from the Brunswick mine is reported to have yielded at the rate of $81 to the ton.

The Red Hill Mining Co. has received its dynamo and will hereafter run its mine by electricity.

The Brunswick is turning out good ore. The pay chute has increased from 10 to 18 inches in width.

A 200-horse power electric motor has been ordered for the Gold Hill mine.

*Union*, 19th inst.: The Spanish mine, owned by R. R. Colgate of New York, will resume operations to-day. The mine closed down last fall on account of an expected transfer of the property. A. L. Begbie will again act as superintendent of the mine and Henry Fuller will be foreman. The mine before it shut down had bright prospects and employed between 30 and 40 men.

*Union*: Schubert & Co., working the Doolittle gravel mine in Willow valley, are putting up a five-stamp mill to crush the gravel. A hoisting rig is also being erected.

### Placer.

At the Hogsback country the French company recently organized by W. C. Ralston is about to work about 30,000 acres of ground located by Messrs. Ralston and Grayson in the upper end of Placer county. Mr. Ralston tells the *Herald* that he believes that the Breece and Wheeler channel runs in that locality, and boring will be the mode of prospecting. Active work will begin this summer.

From the Central Tunnel in Ophir mine six tons of $30 ore was taken last week.

### San Bernardino.

Nearly 150 notices of record were filed last week for mining for coal and petroleum in San Timoteo, five miles south of San Bernardino, and several companies have been incorporated.

A strike is reported in the Queen of New York mine at Vanderbilt, north of Needles, near the Colorado river, at a depth of 90 feet, which is 3½ feet across the ledge.

George Thompson, a mining engineer, whom the Holcomb Valley people have employed, thinks it advisable to deepen the shaft on the claim 50 feet, and arrangements have been made with that view. He estimates the cost of collecting the gold as not likely to exceed $1 per ton, leaving a profit of $1.50, says the *Mining World and Engineering Record* of the 9th inst.

### San Diego.

At the La Fortuna mine, R. M. Straus has twenty 1350-pound stamps dropping. The ledge has been developed to a depth of 225 feet, drifts have been run for sixty feet each side of the shaft, all in ore, and a cross-cut of the ledge shows it to be twenty-five feet.

Yuma *Sentinel:* On the California side of the Colorado river are a number of large square timbers for the Buena Vista mine, six miles above the Potholes, where a 10-stamp mill will be built on that promising mine. The shaft on the Buena Vista is down 150 feet.

### Shasta.

An Igo correspondent of the *Courier* says a meeting of mine owners of South Fork, Muletown and Sunny Hill districts are considering the erection of a smelter on Clear creek below Muletown. They estimate that in the aggregate they could furnish from 70 to 85 tons per day.

*Free Press:* The Mountain Mines, Ltd., are about to resume extensive operations. The number of miners employed in the mine at Iron Mountain will be increased and contracts will be let for the construction of a ditch from the famous Horseshoe Bend tunnel on the Sacramento river to the smelter at Keswick, where a large electric plant will be put in. A large force of men will be required to do this work, and this city will again be overrun with men.

The Redding *Free Press* says the work of reopening the Niagara mine near French Gulch is progressing rapidly. W. T. St. Auburn, sold the Niagara mine to a syndicate of Dutch capitalists, composed of a number of the members of the royal family of Holland: Their American representative of the syndicate is James De Fremery of New York city. The entire property, consisting of a number of claims, is under the direct management and superintendency of R. E. Hanley. A short time before the sale of the mine was made a 2100-foot tunnel was run into the mountain with a view of tapping the ledge at a depth of 800 feet, but the ledge could not be found. The tunnel cost $25 per foot. For the following four or five years considerable prospecting and development work was done in the upper levels with a view to relocating the ledge. Supt. Hanley concluded that the 2100-foot tunnel had passed under the ledge, which slopes off down the mountain in a westerly direction. He commenced to run a 300-foot crosscut from the long tunnel. The ledge, which was soon encountered at a depth of 800 feet, has since been followed for a distance of 300 feet and measures from 6 inches to 4 feet in width. A shaft was sunk on the ledge in the crosscut to a depth of twenty feet, but as the mine is very wet, the water soon drove the miners out of the shaft. A pumping plant will have to be put in to rid the shaft of the water when sinking is again resumed.

Much development work has been done on the properties by lessees, who secure leases from the company, run drifts and take out the ore, which is worked in the company's mill.

The free-gold milling plant now in operation consists of two 4 and two 5 stamp batteries, making eighteen stamps in all. The 4-stamp battery is run exclusively on ore taken out by the lessees, and the 5-stamp battery is kept constantly at work on the company's ore.

The mill crushes about thirty-six tons of ore per day and about twenty tons of the rock belongs to the company and averages $25 per ton. About a ton of sulphuretic ore per day is taken from the ledge and shipped to the Selby Smelting and Lead Company at Vallejo Junction. This ore runs as high as $500 per ton, and thirty tons which were shipped during the month of April averaged $236 per ton.

An effort has been made to have this ore worked at the smelter of the Mountain Mines, limited, at Keswick, but the ore is too rich to be worked satisfactorily by the last named company, as they require low-grade gold ores to combine with their high-grade copper ore for smelting purposes.

Mr. Hanley now has forty miners employed, and there are twenty-six independent lessees who are at work for themselves. The lessees get three-fourths of the net proceeds of the ore which they take out. Among them are Hoskins & Co., who have a lease on the Scorpion claim and have gotten out 120 tons of ore, which is now being crushed at the mill and is expected to yield $100 per ton. Nearly all of the lessees have made money, and a few of them have struck it rich.

One of them—a man named Murphey—took a lease on a piece of ground in the upper workings. He struck a vein of ocher ore and worked industriously for fourteen days, averaging a ton of ore per day. The rock was shipped to Selby and netted $3760. Mr. Murphey received $2820 as his share, or at the rate of over $200 per day.

The lessees on the Scorpion will do almost as well, as their ore is being worked at the mill. Mr. Hanley deserves credit for his efforts in reopening the property. The property is now yielding a net output of $9000 in gold bullion per month.

*Searchlight*: At Harrison Gulch within the past six weeks Fowler & Rhoades have taken $4,000 from the Gold Hill and Lucky Baldwin mines, with only two men at work. The ledge in the Gold Hill has a width of 3 feet, while the ledge recently discovered in the Lucky Baldwin is 12 inches wide.

On May 16th articles of agreement were filed with the Country Recorder over the bonding for six months of a group of claims in the Harrison Gulch mining district, by Fowler, Rhodes & Benton to J. W. Frank of Red Bluff for $37,500. A 50-inch water right is also included in the bond.

### Sierra.

*Messenger:* The Crœsus Gold Mining Company (formerly the Plumbago) at Minnesota employs twenty-two men. As soon as supplies can be brought in the force will be doubled.

The Dutch company at Forest City took out 348 ounces; last week, 342 ounces. The Buckeye, Live Yankee and Empire companies average from 30 to 40 ounces each per day. A short time since, a nugget was found in the Forest Hill claim weighing 44¼ ounces. At Rock Creek the prospects are represented as very encouraging. One company "dry digging," without water, are picking out of the bedrock three or four ounces a day.

At the old Kruse ledge, two miles from Downieville, Mr. Barnes has crushed at the Gold Bluff mill five tons of quartz which yielded an average of $12 per ton. The company is about to build a 20-stamp mill.

At the Blue Banks, Gaton & Co. took out of their tunnel 131 ounces last week and 130 ounces the week before. Hoskins & Co. make from 30 to 49 ounces weekly. The Blue Banks flume is now in operation. About three-fourths of a mile of the bed of the stream is completely dried, and the several companies are busily engaged clearing away the sand and gravel deposited in the bed of the stream by the sluices on the bank during the winter. There are six derricks in operation by water power.

At Cox's Bar the Strike Co. took out last week 102 ounces; this week up to Friday morning 66 ounces. The Ravine Co., joining the above, have recently struck the same channel, having run their tunnel 320 feet and are doing well.

*Enterprise:* At Forest the South Fork mine employs nine men, and the tunnel is in 1150 feet. Gravel is expected after July 1st at North Fork; 2200 feet has been run. Thirteen men are employed. Five men are working at the Lucky Dog. The rock still continues hard but good progress is being made. The channel is 160 feet from the mouth. The Hope mine has followed the ledge for 650 feet and employs seven men. Oscar Jones is superintendent of these four mines.

### Siskiyou.

*Journal*: At the Mabel mine, on the divide between Oak Bar and Scott Bar, Chamberlain & Timmons have taken out fifty tons, which they expect will average as good as that taken from the mine last season.

Billups, Quigley & Humphrey brought over sixteen pounds of gold from their Barkhouse mines last Friday.

Three of the Distlehorst dredging boats are nearing completion at Klamath river, just above Quigley's ferry, and will soon be ready to launch. One of them is at least 75 feet in length, and two others nearly the same length. They will be anchored in the stream where they are being built and also secured by stout lines stretched out towards the banks on each side.

Some of the miners on the divide between Scott Bar and Oak Bar complain of too much water, saying it interferes with their work. They also say it has been a common occurrence during the past few months to find several inches of snow on the ground on getting up in the morning.

A few tons of quartz from the Wademan mine, on Greenhorn, were crushed at Lamb's mill, on Yreka creek, the first of this week, which yielded good returns.

### Tuolumne.

The *Democrat* hears of a strike at the Jumper. The lumber is ordered for a new 20-stamp mill, and the figures for the iron-founder's work will be handed in and the contract let next week.

At the Dutch mine Supt. Trittenbach reports a new chute of ore in the 200.

Hayward & Preston are reported to have sold the Mooney, McCann and Trio gold quartz mines at Whisky Hill to a Boston company for $150,000. B. M. Newcomb will be the superintendent.

*Independent:* In Summersville mining district the Sunny South & Wallace mine has sunk a 75-foot shaft and reports good prospects.

At the Deadhorse & Consolidated Eureka they are sending up ore from the 1400-foot level. The mill is constantly at work and shows good results.

At Soulsbyville mining district the Mountain Belle is drifting to the south from the 60-foot level.

Arrangements have been perfected for the resumption of work at the Old Draper mine.

At the Belle View they are stoping from the 600-foot level. The 10-stamp mill is going night and day.

*Democrat:* At the Soulsby Supt. E. W. Hebard is sinking a perpendicular shaft and drifting north and south on the 100-foot level. The hoist and air compressor are both run by water power; power drills are used. The shaft house is almost in the center of the town of Soulsbyville.

At the App the mill has been started a double shift since the old workings on the 200 have been reached, where the ledge shows up fine about fifteen feet in width. Over 100 tons were shot down in one blast during the week. The number of men has been increased to 45 and over 60 tons of rock are being crushed daily, all of which comes from the 200. The stamps are the largest in the county, weighing 1012 pounds each.

William Sharwood has bonded the Walling Ranch. A working shaft will be sunk on the vein.

At the Seminole group J. Coles has two contracts, one a 200-foot tunnel contract on the Mayflower to tap the chute of ore; the other to sink the working shaft on the Seminole 100 feet, to open another level.

At the Dead Horse Supt. Thomas reports the ore in the mine improving in character. Twenty stamps are kept dropping steadily and thirty men are employed. This is the mine much of whose product is credited to Calaveras county, as they have all their sulphurets shipped to Angels to be treated.

## NEVADA.

### STOREY COUNTY.

Of the West country Dan de Quille, in the Salt Lake *Tribune*, says: The new prospecting venture in the Brunswick lode having proved a decided success thus far, with every indication of a continuance of favorable developments with the pushing forward of future explorations, it is hoped that our leading mining men may now feel sufficiently encouraged to undertake the opening up of the mining section known on the Comstock as the West country. This "west country" is the region lying immediately west of the main Comstock lode. It is a belt of country showing mining veins, several of which exhibit huge masses of croppings. In 1860, when it was supposed that the Comstock lode dipped to the west into Mount Davidson, these veins were all claimed and cuts and short tunnels were run on a number of them, showing them to be gold-bearing in and about the croppings. But when it was presently found that the dip of the Comstock was to the east the West country

veins were looked upon as having been left out, as the main vein with all the rich ore was going away from them. When it was found that the dip of the Comstock had changed to the east on the 500 level of the Ophir there was a great commotion. Men who had located on the west pulled their stakes and went off to the east. Nobody would look at a west vein. Thus it happened that the West country was deserted. It seems strange, but in all the years that have since passed no mining has been done to the west of the footwall of the main line of the Comstock—all the work has been to the eastward. At times there has been some scratching about the croppings of the West country veins by men of no means, when good prospects in gold have been obtained, but there was no real mining in all these years. Originally the West country was very wet. The footwall and west clay of the Comstock seemed to have held back and dammed in the water on that side to such an extent that it rose almost to the surface, but the Cob tunnel drained the ground to the depth of 300 or 400 feet, and now, by connections with the deep Comstock levels, it might easily be drained to the depth of 1600 feet. One of the west veins—the Cob—yielded several hundred thousand dollars in gold from grouud near the surface when a drain tunnel was run. This tunnel tapped such a big stream of water that the owners gave up running and turned their attention to distributing and selling water, which was at that time very scarce and dear. The present water company finally bought this Cob tunnel, but nothing was done with the mine, which must have been drained to the depth of at least 300 feet. Thus all this West country lies undeveloped, but now that good strikes have been made in the Brunswick our people may feel encouraged to try their luck among the gold veins of the western belt.

Men who were sluicing in Seven-Mile canyon, near the old Winfield mill site, cleaned up over $400 after a two weeks' run. It is amalgam and sulphurets, very little pure gold being found.

The Danderburg Company has raised the wages to $4 per day. Each miner is charged $1.50 per day for board and lodging.

Last week Savage worked 60 carloads of ore, assaying $66.37 per ton; Seg. Belcher 13 carloads of ore, assaying $18.10 per ton; Belcher 31 carloads of ore, assaying $23.58 per ton. Crown Point ore was worked at one point worth from $8 to $12, at another point from $2 to $5 per ton.

HUMBOLDT COUNTY.

The New Era Company at Kennedy tell the *Silver State* that the electrical plant for the reduction of ores will start up next week with James Sutherland as superintendent.

ELKO COUNTY.

The Dexter mine at Tuscarora, fifty-two miles from Elko, formerly paid dividends aggregating $100,000. It is now in control of the Dexter Mining Co., which has resumed ore shipments and is going to build a stamp mill. R. G. Legg is manager.

LINCOLN COUNTY.

A correspondent of the De Lamar *Lode*, writing from State Line, the new camp on the line between Utah and Nevada, says the discovery of gold in paying quantities has caused all properties to enhance in value rapidly.

## OREGON.

It is announced in southern Oregon that John Bouse, whose connection with the Black Channel Co.'s mines has elicited so much comment, has left that section "for good."

Sheriff Hiatt of Josephine county will sell the property belonging to the Hammersly Mining Co., in Jump-off-Joe precinct, Josephine Co., on June 15th, under an execution issued in favor of Jones & Otten.

W. H. Miller, owner of the Denver City mine on Soldier creek, Josephine county, has entered into a contract with San Francisco parties whereby, in consideration of $10,000 in cash, they are to be allowed to prospect the ledge for a period of sixty days, the amount to be credited on the purchase price of $75,000 if the property is taken. The deed has been placed in escrow with the Grant's Pass bank.

C. A. Hogoboom of Baker City, writing to his brother, W. Hogoboom of Marysville, Cal., under date of May 6th, says: "Twelve miles from Britten station is located the Eureka & Excelsior mine. Last Monday they took out and milled ninety cars of ore, from which they got $45,000—all in one day. This mine has been paying $25,000 per month clear of all expenses for the last year. The Bonanza is close to Parker station. They have just finished enlarging the mill to twenty stamps. On a run of nine days they cleaned up $10,000. They have taken out $150,000 in the last year. The Virtue mine, twelve miles east of town, brought in two cleanups last week, one of $30,000, the other of $34,800, for twenty-eight days' run with a 20-stamp mill. Besides these there are many smaller mines whose earnings are kept a secret." (Ninety cars of ore taken out and milled all in one day is considerable.) This sounds somewhat scopy.

LINN COUNTY.

*Tidings*: W. B. Lawler, who has developed mining properties in Quartzville district, has returned from London and Paris. A 20-stamp mill erected early in the year has been running, and until the present has paid all expenses. Arrangements are now being made to add twenty stamps to the mill and also to put in a full line of machinery necessary for the concentration of some portions of the ores. During his visit in London, Mr. Lawler placed twenty-six mines in the Quartzville district with the London Bankers' Development Company, and preliminary work will commence about June 1st. He also secured from another syndicate 5000 guineas for the purpose of investigating other Oregon mining properties, with a view of purchase and permanent operations.

## WASHINGTON.

At Boundary the International Mining Co. has the old ditch, built in 1861 for placer mining its grounds in and around the town, repaired from Cedar creek, and will soon begin ground sluicing.

E. F. Boyle and ten men have gone to Northport to develop the Grey Cliff, seven miles from there on the reservation.

At Boundary there was on the 14th a successful test of the machinery department of the Kootenai water supply plant. The hydraulicking work has been under the supervision of J. Coulter, with three shifts a day of 24 hours. Manager Goodhue says the company will wash the gravel on about 1100 acres of land owned by them at Waueta, at the mouth of the Pend d'Oreille river. They will also furnish power and put in an electric plant.

## BRITISH COLUMBIA.

W. Pellew Harvey tells the *Spokesman-Review* that at Alberni, Vancouver's Island, the Consolidated mines, chiefly owned by the Dunsmuirs, have a 50-foot shaft, with favorable showing as to width of vein and grade of ore.

E. Blewett is working copper properties on Texeda island, and Victoria capitalists have made investments. Around Phillip's Arm, off the north coast of Vancouver island, there are several properties showing quartz carrying all the way from $4 to $60 in gold per ton.

In the Kamloops, Adams lake and North Thompson districts there is a large amount of prospecting being done, with encouraging results. The Adams lake group—viz., the Homestake, Troublesome, Lytton and others—show ore running $22 to $40 in silver and $3 in gold.

The cinnabar mine is situated at Savonas Ferry. Col. Lightner, formerly of the Almaden mines in California, is in charge, and everything runs in a satisfactory manner. There are large bodies of sulphide, which can be retorted at a small cost. This will run from 2 to 25 per cent mercury. About 120 bottles of mercury have been shipped.

At Golden, in East Kootenay, ore from the Windemere, Spillimacheen and Jubilee mountain contains all the way from 20 to 50 percent copper, 10 to 20 ounces of silver and traces of gold. Shipments are now being made to the Nelson smelter.

The Big Bend, in the Revelstoke district, is a dry ore belt. Outside of the placers, the quartz reefs so far discovered are considerable in width, and mill tests have shown $10 to $50 in gold. There are also ledges of arsenical pyrites containing gold.

The Nelson *Tribune* says the Hall mines smelter runs as if it had been in operation for years, instead of a few weeks. Four shipments of matte were made during the week. Three hundred tons of the coke shipped from Wales has arrived at Vancouver and will reach Nelson next week.

The Northern Belle group, near Kaslo, including the Northern Belle, Kootenay Star, Dublin Queen and Ophir, was sold last week to George Alexander for $60,000.

## ALASKA.

The Apollo mine on Unga Island, Alaska, this week sent down $87,500, the product of a three months' run.

## IDAHO.

Concerning the strike in force at the Yellow Jacket mine, the Salmon City *Recorder* says; "The employees of the Idaho Yellow Jacket Company went out on a strike Wednesday night, and at last accounts the difficulty was no nearer settled than at first. Notices have been posted everywhere requesting all miners and laborers to keep away from there. The men claim that P. J. Cirkel, the general manager, has violated the agreement in regarg to the hours the night shift were expected to work, the manager requiring ten hours after agreeing upon nine hours. The union had notices posted requesting all non-union men to join the union after the first pay-day. These notices were torn down and replaced by the following, signed by the company: 'On and after this date the Idaho Yellow Jacket Mining Company will be under new management. All men in said company's employment, whether union or non-union, will be treated with equal consideration, the only requirement being a good shift's work. When the company deem it expedient, contract work will be done.' This precipitated the strike. A great many of the strikers are in town and will in all probability find their way out of the country."

At Gem the Poorman lessees are putting the Granite mill in order and building a tramway from the Northern Pacific siding to the ore bin.

The new Formosa flume will be half a mile long with 70 feet fall. The Standard flume is now finished for 6500 feet.

At Burke the new plant of the Poorman-Tiger mine is fast being built. Contracts have been awarded for all of the concentrating machinery, power and hoists and repairs to the compressors. The company will also put in a repair shop of its own.

In the placer mining district near Pierce City reports are to the effect that the season is fully thirty days behind last year. One of the owners in one of the large placer companies says that his company was unable to commence work from the fact that their ditch and flume were filled with slush and ice.

## UTAH.

Director W. S. McCornick, who spent Sunday in the underground workings of the Bullion-Beck, tells the *Tribune* it is now productive of about thirty tons of concentrates daily, in addition to the crude ore, and that the mill is working perfectly. There is, he adds, a great deal of ore in sight, but the grade is low and to explore virgin ground, the drill has been raised from the eighth to the seventh level, where it will now be operated.

The *Tribune* says that Park City is at present hoisting more ore, and employing a greater number of men, than at any time since it began its career as a producer—more than twenty years ago.

The *Tribune* is told that the Mammoth, which has distributed $1,000,000 among its stockholders, will resume the payment of dividends next month, and that blocked out in its levels were ores that will enable it to pay dividends for an indefinite period. The Mammoth has not been a dividend-paying investment since 1891, when in November it paid ten cents a share on $40,000.

## MONTANA.

The Butte & Boston Company have leased the Blue Jay mine down to the 500-foot level to Messrs. White and Parry.

On the 15th the Iron Mountain paid a May dividend of $5,000. It has advertised for bids for running a 5600-foot tunnel.

Helena *News*: The Golden Cloud property under the superintendency of Prof. Kerr, employs fifty men. It is practically a mountain of ore. It is being pulverized in Bryan mills, and the tailings are treated by a solution process. At the last clean-up $12,000 was obtained, though only about $9,000 was expected.

Deer Lodge *Northwest*: There are many evidences of improving conditions in the State. No more active season in mining was ever promised than the present, and the forecast is for the largest output in this field in all classes than has been known for years. An immense plant is being erected by the Parrot Company at Gaylord, to cost $1,000,000; new works are to be added at Anaconda and Great Falls; the new camp of Quigley is showing signs of becoming a second Cripple Creek; the Porphyry Dyke district is opening favorably; the East Helena smelter is to be doubled in capacity; a dam is to be built across the Missouri river near Helena, which will develop a large extent of placer ground, and everywhere there are signs of an energetic movement in every branch of mining and its subsidiary interests.

Dillon *Tribune*: The Meade Brothers are operating the Underwood mine in Bannack and are using the Archie Gilson mill to treat the ore.

Messrs. Zorn and Smith on Steel creek have entered into a contract with Anaconda parties to build a 5-stamp mill, to be furnished early in June.

Articles of incorporation of the Bannack Mining and Milling Company were filed with the Secretary of State at Helena last week. The incorporators are T. M. Hodgins, et al., of Butte. The capital stock is placed at $25,000.

The Golden Leaf mill and mines, owned by the Western Mine Enterprise Company, will be operated this season by Mr. Hand and others, of Butte. The group of mines to be worked contains the Excelsior, Wadams, Golden Leaf and Blue Grass.

*Miner* 14th inst.: The differences between F. Aug. Heinze and his employees in the Rarus mine were, according to Manager McGinnis, settled yesterday, when a petition signed by about 300 miners was presented to Mr. Heinze. Manager McGinnis stated last night that this petition asked that the Rarus employees be reinstated, on the grounds that they had withdrawn their demand concerning the engagement of the old superintendent and bosses. Mr. Heinze replied that he was willing to employ such men of the former force as he might select, but gave the petitioners to understand that the Rarus would not resume with as many men as it had before the shut-down. Manager McGinnis said that the mine would be started at 7 o'clock this morning, when the new force would be picked out of the old men.

The Bloomington mine, near the Royal, in Deer Lodge county, has been bought by Schar and Sadler, of Chicago, who will immediately erect a 10-stamp mill and employ 20 men in developing the mine. Peter Scherr, of Deer Lodge, is superintendent.

## WYOMING.

Casper reports the oil business active. The refinery is turning out a carload of refined oil a day and has contracts with a number of railroads which will keep the plant worked to its full capacity for some time. Work on the French syndicate oil well will be resumed at once, a carload of casing for the well having arrived. It is expected that oil will be struck with several hundred feet of additional boring.

Dr. J. Meyer of St. Joe, Mo., and A. F. Washington of Sheridan, at Bald Mountain, Big Horn range, have a two-stamp mill from which they recover only $6 per ton, losing about seventy per cent of the assay value, as assays can be had from $36 to $126 per ton. They propose to build a twenty-stamp mill and put in a fifty-ton cyanide plant. They are sixty miles from Sheridan and at an elevation of 9500 feet. The winters last eight months, and at the present time the mountains are covered with snow to a depth of four feet.

## COLORADO.

DENVER, May 19, '96.

(Special Correspondence.)—The Washington, Washington Extension and Bonanza mines, located in Lake district, have been sold to Chicago parties for $55,000.

The Elkton Consolidated Mining Company, of Cripple Creek, is the latest addition to the dividend payers of the district.

Saw Pit ore shipments are steadily increasing.

Idaho Springs mine owners are anxious for the establishment there of both chlorination and cyanide plants.

Hahn's Peak is coming to the front as one of the rich camps of the State.

E. R. Holden, of Denver, closed a deal last week for twenty acres of ground at Florence, where he will immediately commence the erection of a large chlorination plant.

A streak of $10,000 per ton ore was uncovered by Bob. Porteous in the Lloyd lode on the northwest side of Hayden's Peak, San Juan district, last week.

More properties are being operated in the Ophir district this year than last. The principal gold properties there are owned by the Buffalo-Globe Company, and their output is treated at a 40-stamp mill of the company which is located at Ophir. The ore is conveyed to the mill by two aeriel tramways, one of which is 4700 feet in length and the other 7000 feet. The company employs about 70 men and the output runs about $18 to $25 per month.

The State Ore Sampling Company, of Denver, is looking over the ground at Alma, with a view of erecting sampling works and possibly adding thereto a pyritic smelter.

The statement is made from Idaho Springs that there is not an idle miner in the district.

The immense new plant of machinery on the Portland mine was started up for the first time last week. The equipment is all of modern type and is sufficient for the needs of the mine for many years.

Ground is being cleared for a new mill of fifty tons capacity for the Mineral Creek Mining Co. at Ice Basin, Silverton district.

Shipments of ore from the Mollie Gibson to the smelter, without sorting, average from 250 to 300 ounces per ton.

There is great activity in mining operations at Silverton.

For nineteen years Leadville has been a producer, the quantity ever on the increase, until now the tonnage of the camp is the first in the country and greater than ever before.

The continued activity in development work by mine operators of Central City is giving employment to hundreds of miners.

Conservative estimates based on the results of the first four months place the gold product of the Cripple Creek district at $10,000,000 for 1896.

The Golden Fleece Co. has purchased the Governor Pitkin, a contiguous property, which has developed an ore body similar in character to the Fleece.

The Little Annie, on Richmond hill, near Aspen, has been drowned out. A heavy flow of water broke into it recently and the pumps were unable to handle it. The men were taken from the lower workings and will be idle until larger pumps can be put in place.

Reports from Greeley are to the effect that there is much excitement over the rich finds in the gold camp of Moody, on the Buckhorn. The development on the Mammoth and two other adjacent properties show such excellent ore bodies as to cause a rush of prospectors, and the territory for miles has been staked off in claims.

Many properties in Pine Creek are making an excellent showing. A rich strike was recently made in the Gilbert group, on Michigan hill, the property of H. A. Butler and S. A. Gilmore of Denver and H. B. Gilbert of Pine Creek. The find was made in the Side Issue shaft at a depth of 20 feet, the vein matter being 6 feet wide, with 18 inches of honeycomb quartz. Average assays give a value of $150 to the ton.

The Banker Co. is now shipping some very rich ore. A recent return on 7880 pounds shipped from their Grouse mine was $1997.18, or $506.90 to the ton.

Empire is to have another concentrating mill. Mr. Craig of Denver will soon begin the erection of a fifty-ton plant at Empire station.

The old Summit mill at Gillett has been started up by J. L. Moffet and associates and is running through the dump of the Iron Clad and some old tailings left in the mill when it was closed down two years ago. Four batteries are in operation and the full thirty stamps are dropping.

The Golden Fleece paid its regular monthly dividend of $18,000 on the 10th inst. Recently single carloads of ore shipped to the smelter have yielded as high as $50,000. The May payment to its stockholders is the thirty-first consecutive dividend.

The Robert Emmet mine in Chaffee gulch, near Central City, has encountered a strong lead in their deepest workings. The smelting ore runs from $75 to $100 to the ton.

T. A. Rickard, Colorado State Geologist, claims that the San Juan region is to be one of the greatest gold-producing districts in the State. He presents figures showing the increase of the gold product of San Juan county from $155,624 in 1892 to $536,967 in 1894. Satisfactory figures for last year are not obtainable, owing to the jumble in the mint reports wherein large amounts are accredited to the San Juan "region," which covers a much wider area than the county. About $1,000,000 in gold, however, would be a fair estimate for the county for 1895.

Cripple Creek district claims the distinction of having a greater number of dividend-paying gold mines than any camp in the world.

Recent developments are bringing the Tin Cup region into prominence as one of the important gold districts of the State. The mining centers of the Tin Cup region are Tin Cup, La Croix, Forest Hill and the old camp of Hillerton. Some of the finds are extraordinarily rich.

The Portland mine, Cripple Creek district, has resumed the payment of its regular one cent per share dividend.

The American Reduction Works at Florence, which had been shut down for three weeks for the purpose of enlarging the plant, has resumed operations. They will now treat seventy-five tons of ore per day.

Above Twin Lakes, the Crystal Lake Mining and Milling Co., are actively preparing for a summer's work in opening up their placers. They have 130 acres on either side of the mouth of Echo canyon, below Larimer. They have tunnels, drifts and shafts to the extent of 1800 feet and 1200 feet of track and will immediately add an electrical plant at an additional cost of $25,000.

The Prospect Gold Mining Co., of Cripple Creek district, is doing a large amount of development work. The Prospect and Pine Ridge tunnel, on the Prospect, has been driven in 230 feet and a shaft sunk 130 feet and 100 feet of drifting has been done from the shaft all in ore. The Pine Ridge has been

exploited by two tunnels 40 and 80 feet respectively and shafts and drifting to the extent of 200 feet. On the Pine Ridge property assays show values of $2 to $80 per ton, while the average of the Prospect ore is $28.50 per ton. H. C. Brown, of the Brown Palace Hotel, is one of the officers and a heavy stockholder in the company.

Town lots in the burned district of Cripple Creek are higher than before the fire.

The Allen Gold Mining Co. are about to start up their mill in Basin Gulch, near La Plata, on ore from the Little Kate mine. The mill has 20 stamps and is operated by water power. The ore is free milling.

Denver *Republican:* Ore buyers and samplers agree in declaring that the Cripple Creek district is now producing more ore than ever before in its history. While this is true, there is a difference in the grade that reduces the total value to probably $700,000 monthly. The monthly output appears now to be about 6500 tons of smelting ore, worth on an average $80 a ton, and 250 tons of milling ore, averaging $25 a ton. There are more men working in the opened mines and more on prospecting work than at any previous time and the camp in a mining way was never in so good shape as it is to-day. There is a strong demand for properties from outside buyers and the outlook is good for much eastern and European capital coming in for investment throughout the remaining half of the year.

The increase in low-grade ores can be directly attributed to the reduction in charges for milling and smelting, allowing the marketing of any reserve bodies that have been left in the vein by owners and lessees. Ore that would not pay at a $14 treatment rate can now be transported for $5 and treated for $3, giving a saving of $6.

The Colorado Springs *Investor* of the 16th declares that it "is in a position to state authoritatively that a strike of considerable importance has been made in the Mollie Gibson mine at Aspen. The ore is where it was expected to be found and is an extension of the Smuggler chute. A shipment of several cars has already been made, which shows the ore to be of good grade, the average value being about 100 ounces to the ton."

T. Freeland, manager of the Isabella mine, Cripple Creek, gives the production of that property for the month of April at 980 tons, from which was extracted 2,800 ounces of gold, having a gross value of $56,000. One hundred and fifty miners are on the pay-roll, and are working in a fine body of ore in the south levels. As compared with April of last year, the output of the Isabella has doubled. The production is now about $2,000 in value per day, and the outlook is favorable for an increase of this production.

During the week the Elkton company shipped ten cars of ore, six to the smelter and four cars to the cyanide works at Florence, from the Walter mine. The water in the bottom of the Elkton shaft has all been pumped out and the connections made with the drill pipe. A drift has been started at the 400-foot level. The six drills the company recently purchased are now all in operation. The introduction of steam drills to take the place of hand work will probably reduce the grade of ore a little.

*Republican:* It is very gratifying to see that the great fires in Cripple Creek have not had even a temporarily injurious effect upon mining. Mine owners have gone ahead with development and the output of the camp for May will almost equal that of last December. It looks now as though the product of the closing months of this year would far exceed that of the same months of 1895. Development will be pushed rapidly and it will be done in a more effectual and extensive way than formerly. Deep shafts are needed to show what different properties contain, and yet there are but few such shafts in the district. But they will be put down this year.

At Ward a few weeks ago the manager of the Dew Drop crosscut from the vein, when a large ore body of good value was encountered.

At the Utica, the mine that is netting its owner $25,000 a month, the drift was being run along the vein in the 575-foot level, the foot wall of which was porphyry. A crosscut was run into this wall. When the wall was gone through another vein was encountered, in which they have a streak of smelting ore 2½ feet wide, besides a large body of mill dirt. The smelting ore is said to be the finest ever taken out of the Utica.

Another strike is reported from the Modoc. A crosscut was run in the 300-foot level and an ore body encountered, through which the miners have now gone 42 feet. As with the most of the ore in the Modoc, it is low grade, but with the enlarged milling facilities now being put in it should afford a handsome profit.

### NEW MEXICO.

The Las Vegas *Optic* says there are ten or a dozen mines in Cochiti district which, were the grant question settled, would guarantee to supply 1000 tons of ore daily for milling purposes. At present, despite the decision of the United States Land Court in favor of miners and against the grant claimant, J. P. Whitney, capitalists decline to invest in mill plants and the industrial life of the camp is seriously handicapped. During the past three weeks petitions have been circulated in Santa Fe, Cerrillo, Bland, Las Vegas and Albuquerque, and more than 2000 citizens have signed them, praying Attorney General Harmon to come to the rescue of this bonanza camp and push the grant case for hearing in the United States Supreme Court as rapidly as possible.

The foundation has been put in for a cyanide mill at Hematite, of 30-ton daily capacity. The MacArthur-Forrest process will be used.

At Hanover the company has 30 men assorting the old dumps on the Romero mine belonging to the Santa Rita Copper Company. Pay ore is being taken out of the waste discarded when richer ore was worked years ago.

### ARIZONA.

The Congress mill has forty stamps. No attempt is made to plate the gold, the values all being left in the concentrates. About 100 tons of ore goes through daily. The first-class ore is shipped without concentration. The company has bought forty miles of P. & A. C. Ry. rails to be used in their underground works. The capacity of the mill is to be doubled. The cyanide plant is running steadily on tailings from the early mill runs with good results. About 300 men are employed in the mill and mine. Upon the completion of the proposed new plant the working force will be doubled.

Suit has been brought in Maricopa county by the State Trust Company of New York against the Phœnix Mining Company for $75,000, interest and costs. The Phœnix Mining Company has a 100-stamp mill.

In the Florence *Tribune* appears the following in double-column display:

"Copper and gold mines bought and sold. Parties or owners of free-milling gold or high-grade copper prospects that will stand investigation, that are developed, have all the machinery, etc. to work the plant, with mill and smelter records, undisputed title, etc, can apply to ——."

Would it be presuming, says the *Orb*, to ask if the advertiser wants anything else? It is barely possible he has his ideas a little elevated. If Arizona's mineral wealth is to be developed by such investors, the Lord save us. It seems hardly credible to an unbiased person that anybody who had been able to get his mining property into the condition required by this person, has any need to sell, though the chances are that a sale to such a party would be more of a gift.

Under an order of court at Tucson work is to be resumed on the Old Glory mine at Oro Blanco. Stilson Hutchings, chief creditor of the company, is granted permission to erect a 30-stamp mill and operate the mine at his own expense, the product to go toward discharging all the debts. Work will be commenced at once.

A Flagstaff dispatch reports the Arizona mine, Cherry Creek district, sold to Kennedy, Smith and Stein. Development work is to commence at once.

The Commonwealth Mining & Milling Co. has incorporated to work the Pearce mine, Cochise Co., Arizona; capital stock $2,000,000; J. Brockman, R. A. F. Penrose, Jr. and D. M. Barringer.

At Mineral Hill, ten miles north of Florence, the Great Northeastern Lead & Silver Company, under the superintendency of L. S. Tibbals, is developing some lead-silver properties recently bonded by T. F. Weedin, district clerk of Pinal county. A sixty stamp-mill will be built.

The old Belcher mine on Big Bluff creek, Arizona, has been sold to Kansas City and Nashville capitalists. In its day the mine has produced $100,000 in gold. It has been opened up by over 2000 feet of development work.

At Chemehuevis mountain Messrs. Harshberger and Gill recently picked up a three-ounce nugget, and Messrs. Lattin and Defrance secured another yellow piece weighing $40. There are eleven men running dry washers within eleven miles of Franconia, and all making good money. The quartz veins are showing up well also.

O. F. Kuencer has ten men at work on the Esmeralda mine at Campbell, and has cleaned out the shafts and drifts and is prepared to stope out the large bodies of ore recently opened up. The ore will be hauled to the Ark mill where it will be concentrated and shipped to the Colorado smelters. The ore runs well in gold, and will make a high grade of concentrates.

Prescott *Courier*: Mr. Dodge, of Cleveland, Ohio, who bought the Blue Dick mine, is preparing to start up that property. He also bought the Ella mine, on the head of the Groom creek divide, and is preparing to sink a 200-foot shaft on same.

### MEXICO.

What is probably the largest hoist in the republic of Mexico, and possibly the best, has just been received at Minas Prietas for use in the Creston mine. It is designed for a triple compartment shaft 2000 feet deep.

The *Oasis* reports that Howell Hinds has bought the Esmeralda mine at Minas Prietas for $75,000 gold.

A Durango, Mexico, dispatch says: "It is announced here that the Promonterio mine, situated 100 miles west of here, has been by its owner, Damu, sold to an English syndicate, the purchase price being $2,500,000 in gold. This mine is one of the richest producers in Mexico. All the workings are lighted with electricity, and hundreds of thousands of dollars have been expended in improvements."

### SOUTH AFRICA.

*Mining Journal:* At the Robinson the output for March is as follows: Stamps at work, 120; net running time, 29 days; tons crushed, 16,350; tons per stamp per diem, 4.7; gold won from above, 10,098 ozs. 14 dwt.; chlorination and cyanide works—gold from own concentrates (by chlorination), 960 ounces; bullion from tailings (cyanide process), 1,638 ozs. 12 dwts.; bullion from slimes (recovered by Rand Central Ore Reduction Company), 1,591 ozs. 17 dwts.; total from own ore, 14,289 ozs. 3 dwts.; gold from bought concentrates (by chlorination), 1,977 ozs. 6 dwts.; grand total, 16,266 ozs. 9 dwts.

The Johannesburg *Mining Journal* of April 11th says the output of gold for March was 173,952 ounces.

A Johannesburg dispatch of the 19th inst. says: "The mining and industrial outlook here is very bad, owing to the decision of the Government in fixing the penalties of the Reform Committee prisoners. Barney Barnato has postponed the threatened sale of mining and other property pending political developments."

## Coast Industrial Notes.

—The Sunset Telephone Co. have completed their line to Georgetown, Cal., and will soon commence on their branch to the Forest hill divide.

—Work on the new railroad to connect Congress, Arizona, with the Santa Fe, Prescott & Phœnix road is making progress. Twenty-five men and sixty teams are employed.

—The Seattle, Lake Shore & Eastern Railroad was sold at Seattle, Wash., this week to H. G. Struve, representing the bondholder's committee, for $1,000,000.

—Parties are reported at DeLamar, Nevada, negotiating for the purchase of the railroad grade built a few years ago by the U. P. Company in Lincoln county.

—The Placer *Herald* says that for the South Yuba's electric plant the poles are all up from Newcastle to the American river bridge near Sacramento, and the wire has been ordered.

—The Nevada Southern railroad has passed sheriff's title under the control of the California Eastern Company. The road is about fifty miles long and runs from Blake on the Atlantic & Pacific to Manvel, near the State line.

—San Diego's City Council has fixed the $1,500,000 water contract satisfactorily to the wishes of the Southern California Mountain Water Company, and adopted an ordinance calling for a special election to vote for this scheme on June 27.

—Pacific coast trade with Ecuador, via San Francisco and Guayaquil, is reported threatened with destruction, from competition of the Chileans, due to high charges made by the steamship company which no longer has to meet competition.

—The Market Street Railway Company now proposes to operate the Omnibus Cable Company routes by electricity, changing the Howard street cable line and equipping the cable cars now in use with motors, to be placed in the front end of the cars.

—This season there will be shipped from Tucson, Arizona, 600 cars; from Willcox, 1200; from Benson, 500; from Geronimo, 200 and San Simon 200 cars of cattle. The average capacity of a car is 35 head, so the total shipments will amount to 94,000.

—General Manager Copman, of the Standard Oil Company in Japan and China, recently returned from the Orient, says Japan will soon be a competitor with Europe for the Oriental trade in many kinds of manufactured goods. This competition, he says, will affect Europe more than this country.

—Representatives of Seattle trades report that an extensive business can be done with Guatemala and Salvador, but that it will take some time to fully develop it, since the people there are slow to move or accept innovations. About all the flour used there goes from Washington, the flour mills having their agents on the ground.

—Secretary of the Treasury Carlisle instructs J. R. Crowley, agent for the seal islands, that he may permit the North American Commercial Company to take male seal skins the coming season to the number of 30,000. Last year the company was allowed to take 15,000 skins, but the secretary has concluded that as the seals after leaving the rookeries are slaughtered in great numbers by poachers and hunters outside the sixty-mile zone, the Government might as well realize profit on skins as private parties.

## Commercial Paragraphs.

THE hoisting engines for use at the Corral Hollow mines, near Stockton, were made by the Rix Compressed Air Machinery Co.

THE Colorado Iron Works recently shipped two sets of 40-ton rolls, 14x27; one revolving dryer; two revolving screens; two steel cyanide tanks and an elevator to Red Rock, Montana.

THE Victor Amalgamator Co., 703 South Main street, Los Angeles, Cal., manufacture a machine that they claim will save the fine flake gold found in various placer mines, and in black sand.

H. H. SCOVILLE & Co., Chicago, have about ready for shipment one of their 10-stamp mills to San Marcial, New Mexico, and are building a special copper conveyer which goes to Salt Lake, Utah.

A PERMIT has been granted to the Washburn & Moen Manufacturing Company to rebuild its wire factory recently burned at Worcester, Mass., and build a new addition 248x234 feet in rear, 119 feet deep and 24 feet high adjoining its present iron works.

AMONG recent sales made by the Parke & Lacy Co., 21 and 23 Fremont St., S. F., are a three-drill Ingersoll-Sergeant compressor plant to the Oneida G. M. Co., Jackson, Cal., a complete hoisting plant including engines, boilers, heaters, etc., to the Amalie Mining Co., Kern Co., and a 100x14 foot Ropp straight-line furnace to Philip Argall, for the Metallic Extraction Co., Cyanide, Col.

THE Fulton Engineering and Shipbuilding Works have sent a complete 10-stamp mill, including concentrators, crusher and water wheel, to the Berners Bay district, Alaska. The machinery arrived at Juneau on the Mexico on the 7th. The claims are three miles from tide water, 750 feet up the mountains, in a heavy timber belt. C. H. Pearce, recently "underground boss" at Treadwell's, will have charge.

FOR some time the Penberthy Injector Co., of Detroit, Mich., have been looking forward to the rounding out of their first 100,000 injectors. They had anticipated reaching that number about the 1st of July, but the demand for their goods has been so heavy that they have turned out a larger number than anticipated, and have just reached the number 100,000, which was placed on a ½-inch injector on May 12th. In honor of this event the company will give their employes a holiday and excursion next month.

THE M. C. Bullock Manufacturing Co., Chicago, report the following orders: Two 20x60 Corliss engines, steam reverse with driving. 2x13 feet diameter reels with reel capacity of 2,500 feet of 6⅜-inch rope for the Daly West mine at Park City, Utah. A duplicate order for a 360-horse power engine for the electric street railroad at Terre Haute, Ind. One 400-horse power engine which goes to San Francisco. A duplicate order of two 200-horse power engines for the Chicago Eclectric Railroad Co., Chicago. All of the above engines are of the Willaus central valve pattern.

THE Fulton Engineering and Shipbuilding Works is putting in machinery at the Pioneer mine, Placer county. Mr. Dyer has charge of the installation of the plant, which is a temporary one. The original idea of the Pioneer company will be eventually carried out of having an extensive air-compressor plant at Towles, where water-power to the extent of 3000-horse power will be available. The compressed air will be conveyed by a pipe line to the mine, seven miles distant, where it will be reheated. The machinery now being transported from Colfax includes two sets of 12x16 Duplex air compressors; two sets steam engines, 14x16; a pneumatic hoisting plant, etc.

**If you want to buy or sell a Mine, Mining Properties or Mineral Lands, it will be to your advantage to correspond with or consult.....**

# E. N. BREITUNG,

**Marquette, Mich., U. S. A.**

Operator and Dealer in

**Mines, Mining Properties and Mineral Lands,**

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MONEY LOANED ON BONA-FIDE MINES.

WILL EXAMINE on reasonable terms all kinds of Mines, Mining Properties and Mineral Lands as to their value, method of working and the condition of their titles.

WILL GIVE Options, Leases, Bonds and Contracts on all kinds of Mines, Mining Properties and Mineral Lands.

**Assay and Chemical Work Done on Reasonable Terms.**

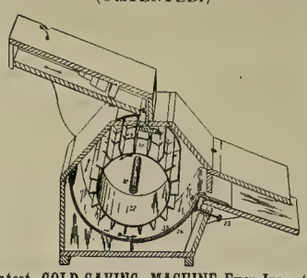
Have best of bank and other references. Use McNeill's or A B C Telegraphic Codes.

DO ALL OUR OWN EXPERT AND CHEMICAL WORK.

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**(PATENTED.)**

FOR MILL OR PLACER USE.



**Greatest GOLD-SAVING MACHINE Ever Invented.**

It will come nearer saving every color of free gold than any gold-saving device made up to the present time. Whether the gold is fine, flake or flour, its work is perfect. The only machine that works the black sands of the ocean perfectly, saving the fine flake gold contained therein. Our machines are now running on beach sand and on tailings from some of the best mills in California, and they are working successfully. We give guarantee with each machine. In working over old tailings from a stamp mill that contains free gold, amalgam and quicksilver, this machine has no equal. Send for catalogue and particulars. Manufactured only by the **VICTOR AMALGAMATOR CO., 703 S. Main St., Los Angeles, Cal.**

# THE KINKEAD MILL.

**The Latest and Best.**

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| **CAPACITY** | 10 to 15 tons. |
| **POWER REQUIRED** | only 2-horse. |
| **TOTAL WEIGHT** | only 2½ tons. |
| **TOTAL COST F. O. B.** | only $1000 |

This includes Automatic Self Feeder, Mill, Silver Plates, Mill Frame Timbers, Foundation Timbers, etc.

**NO NOISE—NO VIBRATION—NO JAR.**

More than double screen surface with one-quarter power and less than one-half wear and tear of ordinary Stamp Battery. **Can be set up in 24 hours.**

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**V. BLANC,** Analytical Chemist. Assayer. Graduate from Paris. 1620 California St., Denver, Colo. Gold and Silver Bullion, Old Gold, Placer Gold, Jewelers' Sweeps and Rich Ore Refined. Melted and Assayed or Purchased. Gold and Platinum Refined for Jewelers and Dentists. All work carefully done. Samples by mail will receive prompt attention.

Wide-Awake Mining Men Will Note the Following Up-to-Date Specialties:

# THE DOBLE IMPROVED COMPRESSED AIR ROCK DRILL.

The Latest and Best in the Market and Designed Especially For EFFICIENCY, DURABILITY and CAPACITY.

# THE DOBLE AIR COMPRESSING MACHINERY.

Operated by Steam, Gasoline or Water Power, Either Direct Connected or Belt Driven.

## HYDRAULIC PRESS FORGED SHOES AND DIES,

Manufactured by THOS. FIRTH & SONS, Ltd., of Sheffield, England. Forged in Dies from CRUCIBLE CAST TOOL STEEL BARS, under their 5000-ton Gun and Armor Press.

These Forged Shoes and Dies have secured the South African and Mexican Trade through their Great Wearing Capacity and other superior qualities over those of other makes.

## CRUCIBLE CAST DRILL STEEL,

Made by the Old English Blister Process from Pure Dannemora Swedish Iron by Thos. Firth & Sons, of Sheffield, England. The Standard of Excellence on the Pacific Coast for Forty Years.

THE ONLY STEEL WHICH IT IS PROFITABLE TO USE FOR DRILLING IN **HARD ROCK.**

## John Wright's Celebrated PICKS, made of Best Norway Iron Eyes steeled with one pound of Best English Tool Steel in each point.

*Our ENGINEERING DEPARTMENT makes a Specialty of Manufacturing and Installing the following Complete Plants of Highest Efficiency:*

**ELECTRIC STREET RAILWAY SYSTEMS,**
**COMPRESSED AIR and ELECTRIC PUMPING and POWER TRANSMISSION FOR MINES, MILLS AND FACTORIES.**

## HIGH DUTY MINE PUMPS.

# ABNER DOBLE COMPANY,

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IMPORTER OF AND DEALER AND MANUFACTURER IN

# Iron, Steel and Metals.

ELECTRICAL AND MECHANICAL ENGINEERING AND CONTRACTING.

STRICTLY FIRST-CLASS WORK.

## Personal.

HENRY JANIN has returned from London to New York.

HAMILTON SMITH of London is visiting Butte, Montana.

F. DAWSON will have charge of the Gold Hill mine, Nevada Co.

GEO. W. DICKIE, of the Union Iron Works, has returned from Japan.

M. B. KERR, superintendent South Paloma, Calaveras Co., has returned to Valley Springs.

HERBERT LANG of Shasta, Cal., is in the city for a few days, preparing plans for his new furnace.

A. A. ABBOTT, manager of the Santa Rosalia mine at Santo Domingo, Mexico, has returned from a visit to California.

PROF. JOSEPH LE CONTE of the University of California will spend the remainder of this year in the East and Europe.

CECIL RHODES' income as managing director of the Consolidated Gold Fields Company last year was more than $1,650,000.

W. E. DARROW of Nevada City goes to Australia under engagement as assayer for the Anglo-German Mining Co.

TIREY L. FORD will return from Washington, D. C., next Wednesday. R. I. Thomas has got back from the national capital.

C. F. MCGLASHAN, the chief instigator of the Truckee *Republican*, has received the Populist nomination for Congress in his district.

THE *Free Press* says Alexander Hill, superintendent for the Mountain Mines, limited, is expected to return from London, England, on May 23d.

HERBERT C. WHITEHEAD, long time auditor for the Southern California Railroad Company, has been appointed general auditor of the Santa Fe system.

MR. MONTGOMERY, of the Denver Whim Co., recently returned from a business trip through Mexico, where he arranged for the placing of several large plants.

W. J. MILLER, president of the Denver Engineering Works, has returned from Old Mexico, where he arranged for installing some large electrical plants in Mexican mines.

THE *Independent* hears that C. H. Holbrook, secretary of the Good Hope Mining Co., will have charge of the Young America mine, Sierra City, recently purchased by S. M. Green.

MR. ALF TREGIDGO, manager of the Nevada County Electric Power Company at Grass Valley, is delivering an interesting series of lectures there on the practical advantages of electricity.

J. PARSONS who put in the wire rope tramway at the Hall mines, B. C., has returned to this city. He says the tramway is working successfully, and can take down ten tons of ore every hour.

GEORGE W. DUNN, the oldest naturalist on the Pacific coast, has been employed by Baron de Rothschild to make collections of butterflies from this State and the peninsula of Lower California.

THE *Transcript* says that Prof. Kimball and F. Hiller, who have been conducting experiments in locating pay chutes of ore in the mines at Nevada City by the use of what they term a magno-electric battery, have surprised the mine owners by some of their locations.

A PRIVATE LETTER from Matabeleland, South Africa, says that Mr. Cavill, who recently went from here to take charge of a Buluwayo mining property, narrowly escaped being murdered in a recent onslaught on the part of the natives. The letter states that the hostility of the natives to Americans and Englishmen is largely due to the efforts of the Dutch.

THE *Union* learns that E. R. Abadie, formerly of Grass Valley, has resigned the superintendency of the Bufflesdorn mines, about 100 miles south of Johannesburg, in South Africa. The mines have not been doing well of late, the ore being low grade and unprofitable to work. No explanation has yet been received of the cause of Mr. Abadie's retirement. He had about 1,000 men employed under him.

THE American Institute of Electrical Engineers, in session at New York, last Wednesday elected the following officers: President, Dr. Louis Duncan, Baltimore; Vice-Presidents, C. P. Steinmetz, Schenectady, N. Y., Prof. Harris J. Ryan, Ithaca, N. Y., and Prof. William M. Stone, Chicago; Treasurer, George A. Hamilton; Secretary, Ralph W. Pope, New York; Managers, L. B. Stillwell, Pittsburg, Prof. W. L. Puffer, Boston, J. W. Lieb, Jr., and F. A. Pickernell, New York.

A NOTED manufacturer and mine owner, Carl Weisshuhn, of Vienna, is at present visiting San Francisco. Mr. Weisshuhn has inspected the gravel deposits of the Picacho district, near Yuma, and after having for some time studied the auriferous black sands of Germany, now proposes to make himself familiar with our gold-bearing gravels, with a view of adapting his methods, if practicable, to the extraction of gold from our black sands. He is accompanied in his travels in California by Major Ruiz de Rojas, of Vienna, a prominent officer in the Austrian service.


M. H. WALSH. Secretary and Manager. C. G. BACON, President.

**Sonora Land and Mining Abstract Bureau.**

Sonora, Tuolumne Co., Cal.

Abstract of Titles to all lands in Tuolumne County made under the Durfee Self-Correcting and Adjusting System.

Mining properties for sale or bonded on desirable terms. Correspondence invited from principals desiring investments in quartz mining properties or in the development of promising claims. Reliable information given on all matters.

THE HARRINGTON & KING PERFORATING CO. CHICAGO.



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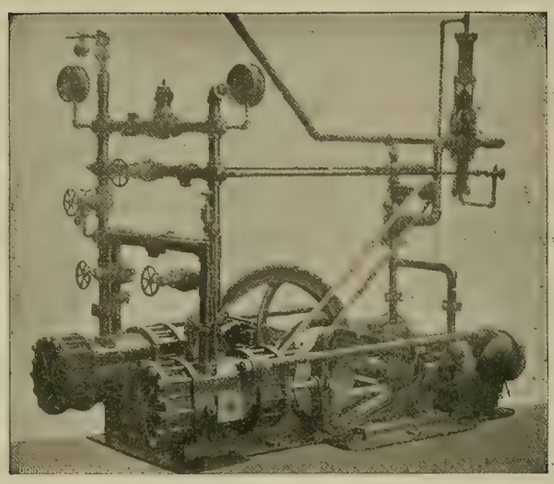
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This is a cut of the Double Pipe AirCompressor, the Compressor that is guaranteed to save 30% in power over any other make. It is cheapest to buy, cheapest to carry about and cheapest to run. If your fuel or water costs you anything, you want this Compressor. If you can get railroad freights free, and can carry machinery to your mine without cost, and your power costs you nothing, any make of Compressor will do you. You will be under no necessity to write to us at 306 Pine St., San Francisco, Cal. We could save you money though in cost of foundations, as our Compressors are half the size of other makes.



THE WORLD RENOWNED **PENBERTHY AUTOMATIC INJECTOR**

Has Won Its Present High Position

By MERIT, HONESTY AND STEADY IMPROVEMENTS.

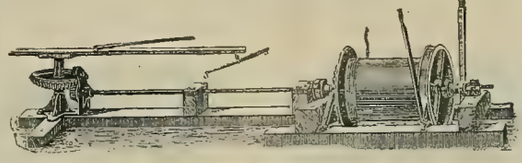
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PENBERTHY INJECTOR CO., 130 Seventh Street..... DETROIT, MICH.

PARKE & LACY CO., 21 & 23 Fremont Street . SAN FRANCISCO, CAL.

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Successors to The San Francisco Tool Co.'s Mfg Dept., builders of Engines and Centrifugal Pumps for Irrigation and for Mining and Water Works. These pumps can be operated by horse power, water power, steam, gasoline or electric motors.



Horse Power Mine Hoist.

Horse Powers!

Triple-Acting Pumps, Deep Well Pumps, Cornish and Jack Head Pumps for Deep Mining, Horse Power Mining Hoists, Water Gate Valves up to 40 inches diameter, and Link Chain Elevators. Pipe and Pipe Fittings at lowest prices. Hydraulic Presses. We also manufacture Cyanide Tanks and Centrifugal Sand Pumps for filling and discharging them. These Pumps work the tailings to perfection and are made to handle small or large quantities.

Office and Works: 51 BEALE STREET and 9 to 17 STEVENSON STREET, SAN FRANCISCO, CAL.

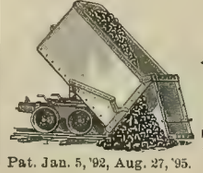
**THOUSANDS** Now in Use Over the World.

TRUAX Patent Improved **Automatic Ore Cars.**

Prices, $35 and Upwards.

THEY ARE THE BEST AND CHEAPEST.

TRUAX M'F'G CO., Denver, Colorado.





Pat. Jan. 5, '92, Aug. 27, '95. *Send for Catalogue.* Agents Wanted Among Dealers in Mining Machinery.




**MERCUR.**

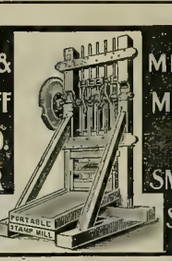
UTAH'S NEW EL DORADO.

Wonderful Development of the Camp Floyd Mining District.

The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Crippie Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1890 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis. The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $300,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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Highest Efficiency and Accurate Regulation.

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Manufacturers of the Finest Quality of

Sweetened and Unsweetened

Condensed Milk

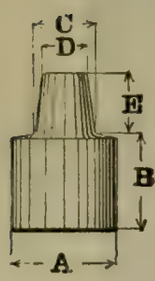
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226 MARKET ST., N. E. Corner Front (Up Stairs), SAN FRANCISCO. Experimental machinery and all kinds of models. Tin and brasswork. All communications *strictly confidential.*

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**Office and Works: Cor. Beale and Howard Streets, San Francisco, Cal.**




A= .inches.
B= "
C= "
D= "
E= "

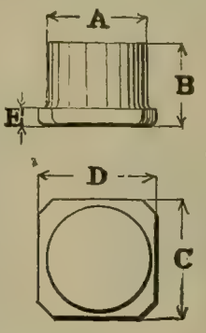
## MINERS, ATTENTION!

We beg to call attention to our "RISDON HAMMERED" Shoes and Dies, which are made of a special quality of steel, are hammered and then compressed in moulds so as to give the greatest possible density.

These Shoes will outlast any other make and will not chip or cup.

We have attached a sketch showing sizes; fill in the size of your Shoes and Dies, and order a trial set.

Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.




A= .....inches.
B= "
C= "
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# Kansas City Smelting and Refining Co.

Incorporated Under The Laws of New York.

**Capital paid in.....$2,700,000.**

**Buyers of All Classes of**

**GOLD, SILVER, LEAD AND COPPER ORES,**

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**GOLD BARS, SILVER BARS and MILL PRODUCTS.**

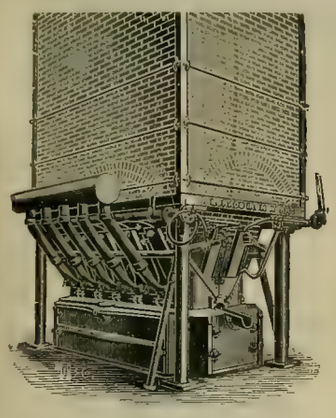
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Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No cracks.

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FOR THE REDUCTION OF GOLD, SILVER, LEAD AND COPPER ORES.

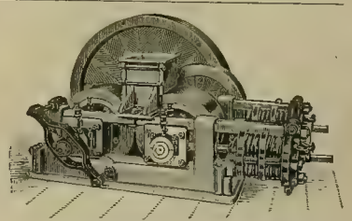
.....We can furnish on Short Notice MACHINERY and GENERAL EQUIPMENTS for.....

**Cyanide, Chlorination, Bromine, Concentration and Amalgamation Plants,**

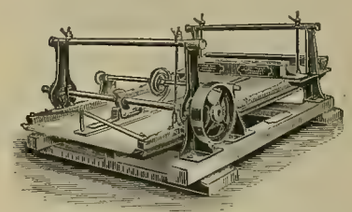
COMPLETE, OR IN PART.

*Catalogues on application.....*

NOTE.—We have a Testing Plant (Mill) on our premises and test ore by Concentration and Amalgamation in ten-ton lots or more, to arrive at best possible method to save values, machinery to be selected accordingly.



CAZIN'S IMPROVED CRUSHING ROLLS.
"Superior to all others."
LARGE CAPACITY. FINE CRUSHING.



PERFECTION CONCENTRATOR.
Capacity 5 to 15 tons in 24 hours. A machine that will do the work.



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## For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

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SEND FOR CIRCULARS.

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# RIX COMPRESSED AIR MACHINERY CO.

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## AIR COMPRESSORS AND ROCK DRILLS,

OFFICE AND WORKS — 11-13 FIRST STREET, SAN FRANCISCO.

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING MAY 12, 1896.

559,882.—BRUSH RAKE—W. C. Anderson, San Jose, Cal.
559,996.—BICYCLE BRAKE—C. F. Choate, Benicia, Cal.
560,086.—FIRE ESCAPE—J. A. Dobkins, Lebanon, Ogn.
560,135.—THILL COUPLING—C. W. Filkins, Riverside, Cal.
560,093.—TELEGRAPH CALL BOX—W. H. Garven, Portland, Ogn.
559,975.—HARROW AND ROLLER—M. Gottshall, Oakland, Cal.
560,159.—SPLIT PULLEY—G. M. Hancock, Portland, Ogn.
559,798.—WAVE POWER—T. Harding, San Jose, Cal.
560,063.—WINDOW—E. Hipolito, San Jose, Cal.
559,980.—CRUSHING MILL—J. H. Kinkead, Virginia, Nev.
559,982.—WINDOW LOCK—W. Madison, Los Gatos, Cal.
560,044.—CHAIR—E. I. Nichols, San Francisco.
560,068.—VEHICLE TOP—P. Pellefigues, San Francisco.
560,147.—SHINGLE EDGER—H. G. Richardson, Tacoma, Wash.
560,149.—VAPOR ENGINE—A. F. Rober, Ilwaco, Wash.
559,986.—AMALGAMATOR—A. C. Rumble, San Francisco.
560,177.—INHALER—S. J. Tedford, Los Angeles, Cal.
560,178.—BICYCLE REST—Thomson & Burke, Portland, Ogn.
559,879.—ELEVATOR STOP—R. J. Wilson, Seattle, Wash.
559,834.—BED COUCH—J. C. Wood, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BRUSH RAKE.—William C. Anderson, San Jose, Cal. No. 559,882. Dated May 12, 1896. This invention relates to that class of brush rakes in which an approximately vertical rake operates in conjunction with an inclined or slanting guard or shield. Its object is to provide a simple and effective brush rake, adapted to be easily operated to place it in position for collecting the brush or to relieve itself from said brush in the act of dumping. The device consists of shafts having a fixed cross-bar, a rake having arms hinged to the cross-bar, an inclined guard or shield having bars playing between the rake teeth, and a head hinged to said cross-bar, and means for depressing or raising the rear ends of the shafts.

COMBINED HARROW AND ROLLER.—Martin Gottshall, Oakland, Cal., assignor of one-third each to Leopold Kiefer and Andrew Krueckel, same place. No. 559,975. Dated May 12, 1896. This invention relates to an apparatus for cultivating the soil either independently or in connection with a seeding device. It consists essentially of a longitudinal bar having a frame fixed to its rear end, crushing rollers journaled in the frame transversely to the bar and comprising independently turnable sections, a castor wheel by which the front end of the bar is supported, a vertical stem or shaft of the castor wheel passing through a sleeve upon the bar or frame and being adjustable so that the frame may be raised or lowered upon the wheel. A pair of harrows having their meeting edges hinged together is connected with the bar by chains which extend from the harrows to rollers or drums journaled above the shaft, so that by turning them the harrows may be raised or depressed about their hinges. A draw bar is connected with a central longitudinal bar, to which draw bar the team is attached, and it is also connected by chains with the front ends of the harrows.

WINDOW LOCK. — William Madison, Los Gatos, Cal. No. 559,982. Dated May 12, 1896. This invention relates to an improved device for locking the sashes of windows to limit the amount of opening or altogether to prevent their being opened. It consists of a case secured to the top of the lower sash, having a sleeve or collar at its front provided with a segmental slot or channel, sockets fixed to the upper sash in the line of travel of the case, a bolt movable through the case having a locking head upon the inner end adapted to engage corresponding slots in the plates of the opposing sash, and turnable to lock within the slots, said bolt having also a pin to engage the segmental slot or channel, a vertical sliding plate with a rectangular channel and a correspondingly shaped enlargement upon the bolt, which is engaged when the plate is moved upwardly, a lug or stop on the plate, a spring pawl adapted to engage it when it has has been raised to lock the bolt, and a key whereby the plate is raised or depressed and the spring pawl forced out of engagement to allow the plate to be depressed when the device is unlocked.

BICYCLE BRAKE.—Charles F. Choate, Benicia, Cal., one-half assigned to A. Robinson, same place. No. 559,996. Dated May 12, 1896. This invention relates to a brake which is especially adapted to be used upon bicycles. It consists of concentric rollers, the inner one of which is fixed between the arms of a fork, and the outer one is turnable loosely about the inner one. The fork is so connected with the machine that the roller may be depressed against the tire of the machine, and this causes a friction between the two rollers, which increases with the pressure of the outer roller on the wheel rim, thus retarding the rotation of this roller and correspondingly checking the movement of the wheel to which it is applied.

AMALGAMATOR.—Alexander C. Rumble, San Francisco, Cal. No. 559,986. Dated May 12, 1896. This invention relates to an apparatus for amalgamating and saving valuable precious metals. It consists of a cylinder formed in two segments, having flanges along the edges of each and hinges by which the flanges upon one side are connected, while the other side is provided with clamps to lock the two together when closed. A tight joint is made upon both sides by electric gaskets, to prevent leakage when the apparatus is in use. The cylinder is journaled at a slight inclination from the horizontal, and has interior radial plates formed with the lining of the cylinder, so that the plates project toward the center, the whole being heavily coated with silver plating. At one end of the apparatus is a feed tube and distributor to deliver the material and pulp into the cylinder, and at the other end is a discharge opening and trap.


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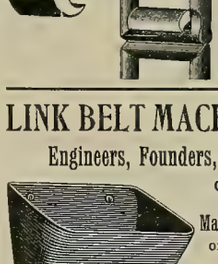
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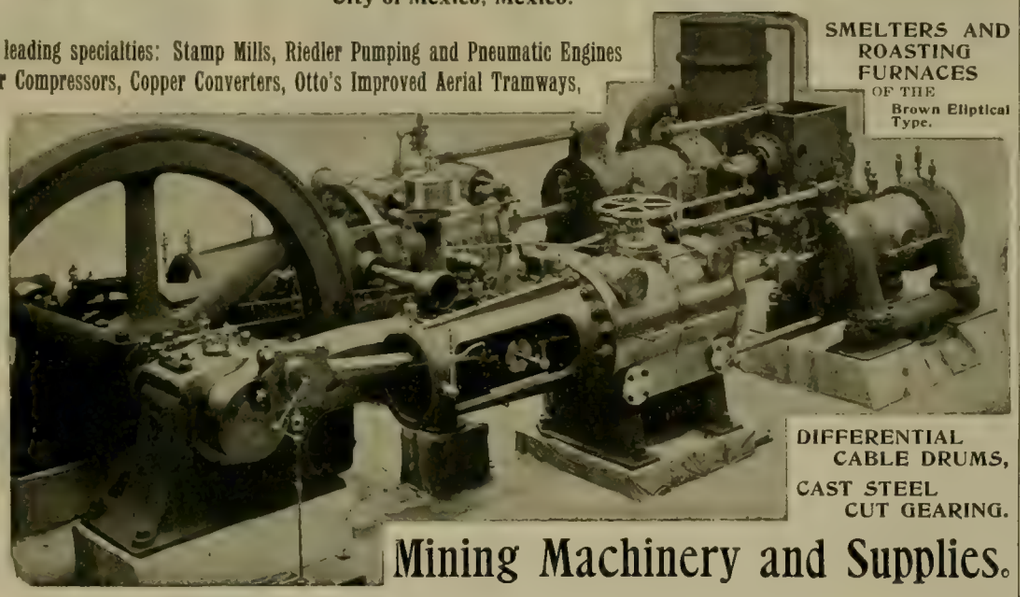
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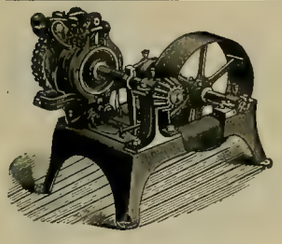
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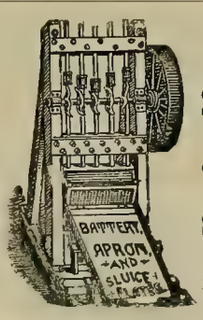
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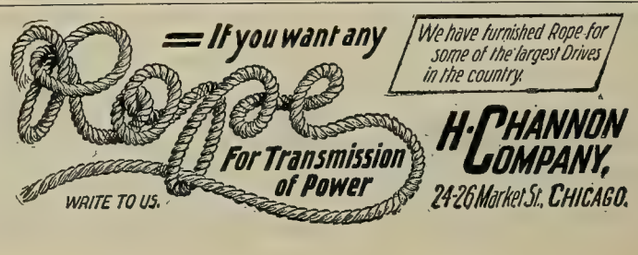
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This process has a well-demonstrated merit in treatment of low-grade Gold and Silver Ores, especially those of a complex character, talcose and clayey combinations or slimes, which class of ore, as is well known, cannot be treated by leaching or lixiviation.
Gold and silver values, both fine and coarse particles, are by the PELATAN-CLERICI PROCESS recovered direct from ore without roasting as pure amalgam, and the precious metals are saved in the form of fine bullion without any refining costs.
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**The Kinkead Quartz Mill** will do the work of five stamps with less than half the power, and can be built and put into operation for less than half the cost of stamps. The only wear is the shoe and die, which is less than that of one stamp. The cheapness in first cost and operation of this mill makes it possible to work with profit ores so low in value that they have heretofore been treated as waste. Each mill will crush 10 tons in 24 hours through a 40-mesh screen.

It requires only a 2-horse power Daniel Best Crude Oil Engine, to operate this Mill and one concentrator. Engine and Mill can be set up and running in 48 hours.

**Price of Mill $1,000, f. o. b. San Francisco,** including Self-Feeder, Ore Hopper, Frame and Foundation Timbers all framed, and one Silver Copper Plate. Weight, 2¼ tons; heaviest piece, 1350 pounds.

One ordinary mortar for a 5-stamp battery will weigh more than our whole Mill. This Mill can be made in 300 lb. sections, if desired, at extra cost. Send for Catalogue.

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**FIRST: There is Saved by the Use of This Mill a Large Bill for Heavy Timbers, in Many Instances Obtained at Great Expense and Loss Of Time.**

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Late improvements in the amalgamation and concentration of ores enable us to offer to the mining public, in connection with our Self-Contained Mills, an apparatus which amalgamates and concentrates at the same operation and provides a perfect trap for escaping quicksilver. Write to us for information.

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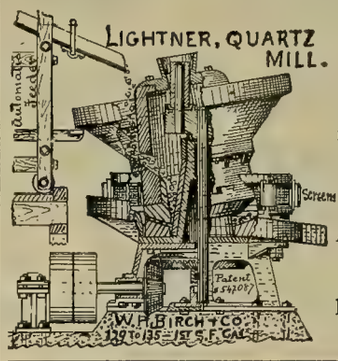
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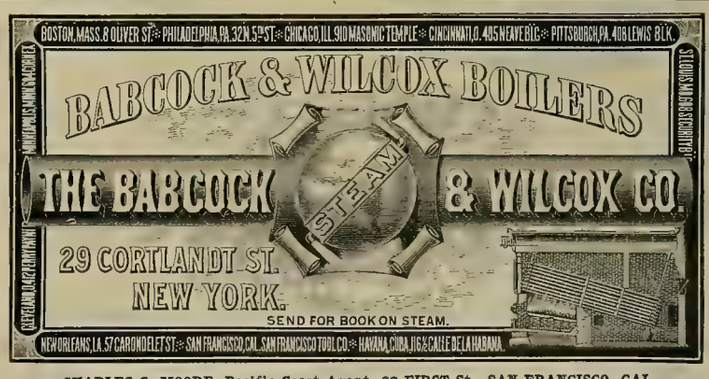
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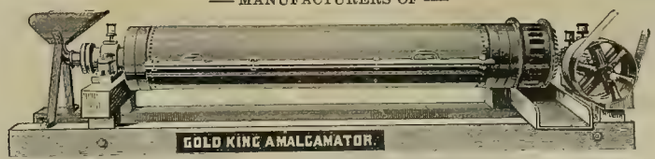



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Represents the highest development yet attained in water wheel practice and affords the most simple, efficient and economical means of utilizing water for power purposes.

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Aggregating over 400,000 horse power. Adaptation made to all conditions and every variety of service.

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PELTON WHEELS are the recognized standard for electrical work and are running a majority of the stations of this character in all parts of the world.

Catalogues furnished upon application. Address

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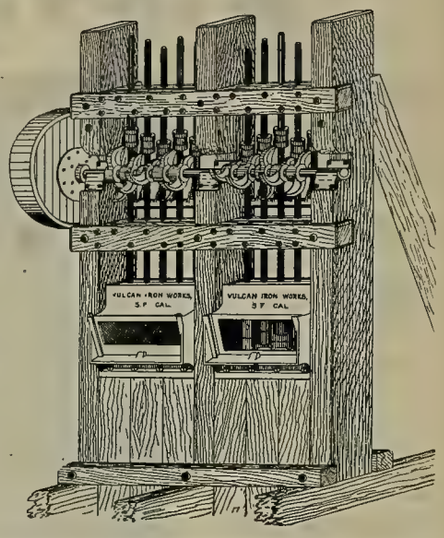
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## Stamp Mills

Of the Latest Improved Design for

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## VULCAN WIRE ROPEWAYS

For Conveying Ore, Etc.

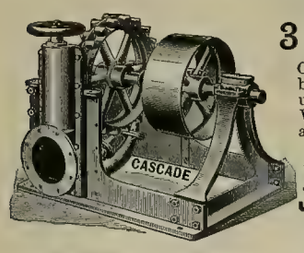
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TWENTY-SEVEN YEARS' CONTINUOUS SERVICE in the great Mines, Steamships, Railroads and Mills all over the world prove it to be

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STAMP SHOES

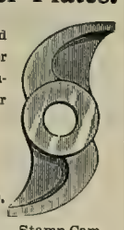

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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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Rock Drilling, Air Compressing, Mining and Quarrying

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LIGHT STEEL RAIL.

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The Largest and Most Completely Equipped Electrical Manufacturing Establishment in the World.

POWER, INCANDESCENT AND ARC LIGHTING, FROM THE SAME CIRCUITS.

We have purchased and are the SOLE OWNERS of the patents issued to Nikola Tesla for the POLYPHASE ALTERNATING SYSTEM, now recognized to be the most successful system for ghting and power purposes.

We furnish complete lines of apparatus for the perfect equipment of ISOLATED PLANTS for Hotels, Office Buildings, Flats and Factories.

STANDARD SYSTEMS

for distribution of light and power in LARGE MANUFACTURING ESTABLISHMENTS, MILLS and MINES.

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MANHATTAN ARC LAMP: Life of 12-Inch Carbon, 150 Hours; Current, 5 Amperes, 2000 Candle Power.

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# RISDON IRON WORKS,

SAN FRANCISCO, CAL.

READ WHAT MINERS THINK OF THE BRYAN IMPROVED ROLLER QUARTZ MILL AND JOHNSTON CONCENTRATOR.

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO. {
SAN DIMAS, DURANGO, MEXICO, October 25, 1888. {

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.

One set of tires will crush 1500 tons.

One ring plate will crush from 2200 to 2300 tons.

The mills require very little attention. At our mill an ordinary peon," earning one dollar per day, has complete charge.

In regard to slimes, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a much less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY. {
EUREKA, UTAH, August 24, 1895. {

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK. Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY. {
EUREKA, UTAH, Aug. 24, 1895. {

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK. Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY. {
S. BAMBERGER, President and Manager. {
SALT LAKE CITY, UTAH, October 10, 1895. {

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,

[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO. {
C. C. MCIVER, President; D. CUSHMAN, Secretary. {
MISSION SAN JOSE, CAL., Oct. 17th, 1895. {

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. McIVER, President.

# The Edward P. Allis Company, Milwaukee, Wis.

Established 1860.

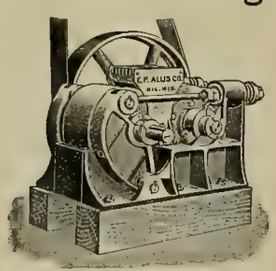
The Reliance Crushing Rolls.

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## Mining, Milling and Smelting MACHINERY.

Crushers, Rolls, Jigs, Concentrators, Screens, Stamps, Pumps, Compressors, Hoists, Boilers, Etc., Etc.

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New York City.....26 Cortlandt Street.
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Work the Best! Prices the Lowest! The Best in the World! Write for Our New Catalogue.

# The McGlew Ore Concentrator Company.

PATENTED SEPTEMBER 19, 1893. CHEAPEST, SIMPLEST, MOST DURABLE AND CLOSEST SAVING CONCENTRATOR IN USE. FRANK BARRERE, Secretary and Manager

Can be seen in operation at the Company's works, 132 Main Street, San Francisco.

Office, 116 Davis Street.

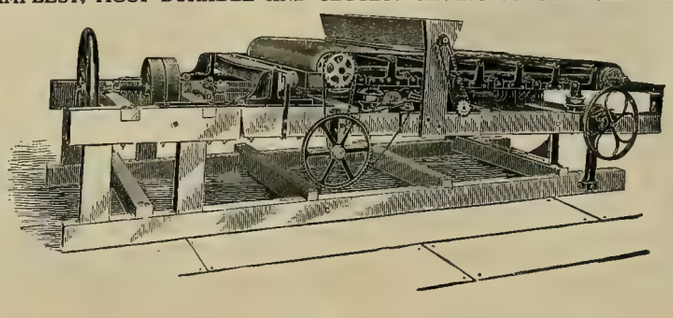
NINETY-FOUR AND ONE-HALF PER CENT
—SAVED—
ON ORES DIFFICULT TO CONCENTRATE.

A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.

SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION

CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
Including prepared canvas belt 4 ft. 6 ins. wide.



FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.

THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,

E. L. BALLOU, Propr. Ballou Reduction Works.

# Market Reports.

## The Markets.

SAN FRANCISCO, May 21, 1896.

Cold and unseasonable weather has interfered with trade in dry goods lines, but for groceries and hardware there has been a good trade demand, chiefly from mining districts. A general canvass among the trade in all branches of business discovers the fact that there is a pronounced feeling of confidence in the future. The concensus of opinion is that the fall consumption demand for goods will be the largest for several years past. This belief is largely predicated on confirmed advices that in the agricultural districts consumers have been buying in a hand-to-mouth way for many months past, and if farm crops turn out well, which it now looks as if they will, and fair to good prices rule, farmers and their dependents will be liberal consumers. The merchants also say that the influx of people into the gold mining districts is unprecedented within the past ten years, and in consequence the call for goods will be very large. Of necessity, one branch of business cannot improve without helping others. It is affirmed that in all manufacturing lines the favorable influences are already felt. Foundry men and machine men report running on orders in hand, while bids are asked for new work. The work is structural, machinery and railroad materials.

The local money market does not present anything new worthy of special mention. As confidence returns and business improves, there is a growing disposition to place idle funds but as yet the banks do not shade much in their rate of discounts, but some private parties will. The speculative movement in mining shares has not drawn out much outside capital, but if it should be found that the higher prices have something more to rest on than prospects in the mines and interested or paid writeups in the daily papers, history in Comstock dealings will repeat itself and considerable money be drawn out and put in circulation which will unquestionably help all branches of trade and business in general. New York mail advices are to the effect that money shows a gradual hardening tendency, notwithstanding a higher demand. Evidently the shipment of gold out of the country has its influence, as has the near approach of the time for holding national conventions by the three political parties for nominating presidential candidates. After the nominations have been made and platforms adopted a much better feeling is not unlikely to set in.

**New York Silver Prices.**

NEW YORK, May 21.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. |
|---|---|---|
| Friday | 31⅛ | 68 |
| Saturday | 31 1-16 | 67⅞ |
| Monday | 31 1-16 | .... |
| Tuesday | 31 1-16 | 67⅞ |
| Wednesday | 31 1-16 | 67⅞ |
| Thursday | 31 1-16 | 67⅞ |

| | Copper. | Lead. | Iron. | Tin. |
|---|---|---|---|---|
| Friday | 10 95 | 3 05 | 10 75@13 50 | 13 45 |
| Saturday | 10 95 | 3 05 | 10 75@13 50 | 13 45 |
| Monday | 10 95 | 3 05 | 10 75@13 50 | 13 45 |
| Tuesday | 10 95 | 3 05 | 10 75@13 50 | 13 50 |
| Wednesday | 10 95 | 3 02½ | 10 75@13 50 | 13 55 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 6@7 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | 12½ |
| New York Telegraphic Transfer | 15 |
| London Bankers' 60 days | $4.88¼ |
| London Merchants | $4.86¼ |
| London Sight Bankers | $4.90 |
| Refined Silver, per oz., 1000 fine | 67⅞ |
| Mexican Dollars | 54@55c |

SILVER.—The market has held remarkably steady, not changing the fraction of a point the past six days. The East continues to report a light export movement for the season of the year. London advices are essentially unchanged. The demand while fairly steady is less than usually rules at this season of the year. In our market there is a light inquiry. Orders for silver are distributed in such a way as to avoid competitive buying and consequently values are not run up on purchasers. The steamer for China took out $91,300 in bullion.

MEXICAN DOLLARS.—The market has been fairly steady the past week. While New York quotes 53½ cents, ours is quoted at 54 cents from first hands, but in the absence of any marked demand, no large quantities can be placed. The steamer for China took out 19,863 Mexican dollars and 32,000 Peruvian soles.

COPPER.—The market is steady with a fair movement in a jobbing way. At the East the markets shaded off about 5 cents per 100 lbs. The receipts at Atlantic tidewater continue exceptionally large, but the heavy export shipments keep values from steady to firm. From all we can learn, the extraordinary consumption abroad is likely to continue through the calendar year. The demand in Europe is for shipbuilding, electrical purposes and cartridge manufacture.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

QUICKSILVER.—The market is practically unchanged.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| Distant points up north | 38 00 |
| West coast of Mexico, for export | 34 00 |

TIN.—All kinds of plate are said to be firmly held, but with no advance reported. This strength is due to higher cost of iron and steel plate and also slightly better prices for pig. The markets at the East and abroad for pig have strengthened under a good consumptive demand and slightly smaller stocks.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

ANTIMONY.—The market is quiet and weak at 8¼@9c cents in a jobbing way. New York mail advices quote 7½@7¾c for Cookson's, 6⅝@6¾c for Hallett's and 6½@6⅝c for Japanese, from store.

LEAD.—Business is light at unchanged quotations. Eastern advices are to the effect that the demand is light, but an improvement is looked for. While a better business is looked for, no special advance in price is expected to set in.

The monthly report of the Bureau of Statistics gives the following data of imports of lead into the United States during the nine months ending with March:

| From— | 1896. Pounds. | 1895. Pounds. |
|---|---|---|
| Mexico | 103,242,226 | 92,022,321 |
| Belgium | 22,623,946 | 19,730,391 |
| British North America | 15,664,980 | 5,512,828 |
| United Kingdom | 4,552,215 | 7,508,057 |
| Other Europe | 1,897,437 | 1,904,927 |
| Other countries | 1,109,503 | 324,936 |
| Total | 149,090,307 | 127,003,520 |

The stock in bonded warehouse, March 31st, 1896, is returned as 16,015,553 pounds, against 14,659,284 pounds at corresponding date last year.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " | 1 65 |

LUMBER.—There is a continued free home and export movement. The market is steady.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 14 00 | @ | 19 00 |
| Spruce | 26 00 | @ | 31 00 |

POWDER.—There is a continued good demand. The market is strong at unchanged quotations.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " " | 8¼c |

BORAX.—The market is quoted as follows

| | |
|---|---|
| Refined, in car lots | 6⅛ |
| Refined, in sacks | 5⅞ |
| Powdered, in car lots | 6⅛ |
| Concentrated, " | 5⅝ |

NAILS.—Jobbers report a good demand at quotations.

The market is quoted as follows:

| | |
|---|---|
| Wire, carloads, basis per keg | $3 22½ |
| " jobbing, " " | 3 35 |
| Cut, carloads, " " | 2 97½ |
| " jobbing, " " | 3 10 |

IRON.—Our market is practically unchanged. New York advices state that there is more or less underselling on late combined prices, which has an unfavorable effect.

Our market is quoted as follows:

AMERICAN.

| | To Arrive. | Spot. |
|---|---|---|
| Sloso | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |

ENGLISH.

| | | |
|---|---|---|
| Barrow | $21 00 | $23 50 |
| Gartsherrie | 21 50 | 23 50 |

COAL.—The market is steady at current quotations. The consumption of both steam and household is quite free but supplies on spot and to arrive are ample.

SPOT FROM YARD—PER TON.

| | | | |
|---|---|---|---|
| Wellington | $7 50 | @ | 8 00 |
| Greta | 6 00 | @ | 6 50 |
| Nanaimo | 6 50 | @ | 7 00 |
| Gilman | 5 50 | @ | 6 00 |
| Seattle | 5 00 | @ | 5 50 |
| Coos Bay | — — | @ | 4 50 |
| Cannel | — — | @ | 8 00 |
| Egg, hard | — — | @ | 13 00 |
| Wallsend | — — | @ | 6 50 |
| Scotch Splint | — — | @ | 7 50 |
| Brymbo | — — | @ | 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 25 |
| Liverpool Steam | 6 25 |
| Scotch Splint | — — |
| Cardiff | 6 25 |
| Lehigh Lump | 9 00 |
| Cumberland | 13 50 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 10 00 |
| " in sacks | — — | @ | 10 50 |
| Cumberland | — — | @ | — — |

## Mining Share Market.

SAN FRANCISCO, May 21, 1896.

From Thursday to yesterday morning the market hung heavy, with short-lived rallies in one or more of the shares. The closing bids each day did not show the falling off in values which the action of the market would have led dealers to believe, for the variations did not change more than 5 to 10 per cent. Take Friday's closing bids and compare them with Tuesday's closing bids and there were no material changes, except in Hale & Norcross, which showed an advance. It was the way in which the market was made to look that disgusted operators and caused the large majority to sell, in expectation that the time for a "big break" was at hand. This would have taken place had not the manipulators taken the shares thrown on the market. Under this buying it was only reasonable to expect a turn for the better, which took place yesterday under bull reports from the mines. While the news is of an encouraging character, yet it is not such as to cause buyers to enter the market for an investment only for a gamble. There is nothing so uncertain as mining in the Comstock district, and therefore the shares are at all times a gamble, both on the long and short side. The shares that have the run at present are those of the mines having ground on the Brunswick lode, and the vagaries of their movements make them attractive to professional traders. There is no denying that even at present values they are a gamble, for the prospects in them are of such a nature as to justify the belief that the shares will be subject to radical changes for some time to come. So far the work done on the Brunswick lode does not warrant asserting that the finds on that lode are such as to justify the belief that a large deposit has been run into; but they do warrant, as above stated, gambling dealing, for it may result in something good, or else in nothing more than has, as yet, been found good prospects. Under such a condition the market should be a good trading market, particularly in shares of the mines working on that lode, until further work demonstrates whether they have something good or else nothing more than stringers or bunches of good to high-grade ore.

During the past week the Gold Hill shares have done comparatively little, only moving up and down in sympathy with the shares in the middle group of mines. Official letters from them are not of an encouraging character, while more assessments are sure to come in the near future. Yet, in prosecuting the work under way, ore may be run into which might, if conditions are right, have a favorable effect on the market values of the shares. Bodie made one of its usual skyrocket moves. After selling up to $1.10, it broke slightly more than 30 per cent, and then began to react.

The news from the Comstock mines, except in one of them, is practically the same as heretofore made public. In the Alta group work is only reported in Alta, but it does not indicate anything of an encouraging character. In the Gold Hill group repair work is still the order in Overman. Seg. Belcher and Belcher report that a few tons of ore is being raised, but from what level it is extracted or on what level or levels work is being done the letters are as dumb as an oyster. It would seem that the managers ought to give instructions to have more definite information reported so as to conform to the laws under which the companies are incorporated. In Crown Point the usual exploiting work is reported, but nothing to encourage shareholders is given out. No work is reported being done in Kentuck and Yellow Jacket. In Confidence they are still working on the level heretofore reported. Work has been resumed in the joint Challenge, Confidence and Con. Imperial west crossdrift, but official letters do not report any change in the formation of material encountered. In Alpha they are prosecuting work on the 500-foot level, while in Bullion the long west crossdrift is being slowly pushed ahead. In the middle group there is no essential change reported from Chollar and Potosi. In Savage the work is of quite an encouraging character. At one point on the 850 foot level they have run into several feet of good ore. Reports give the assays from $65 to $85 a ton. They raised the past week about seventy tons, which assayed, as per car sample, over $64 a ton. In Hale & Norcross they are running for this ore. The returns of the ore milled by this company show very little loss, comparatively, from the car sample and battery assays. Work is still being done on the long west crossdrift in Gould & Curry, while in Best & Belcher work is being done on the same level as heretofore reported. Con. Virginia continues to raise and mill enough ore to more than pay all running expenses, including active exploiting work. The work in Ophir, Mexican, Sierra Nevada, Union, Utah and Andes is carried on on the same levels as those heretofore reported, with no essential change in the material encountered.

Attention continues to be centered on the work under way on the Brunswick, where there is encouraging prospects. Experienced miners are quite hopeful that they will develop one or more bodies of good ore, but it will take time to do so. In Occidental active exploiting on a lower level has been started. In Chollar they will soon start a cross-drift on the 300-foot level. It is stated that they will have to run about 200 feet before they can expect to strike the downward continuation of the ore found on the 200-foot level. Hale & Norcross had not started work at last advices. In Gould & Curry work has been commenced to run for the continuation of the ore found in the Chollar ground. Miners are quite hopeful of good results, but we have seen them deceived more than once. It looks as if the work on the Brunswick lode will be the attractive feature for the next month or two.

From the Bodie district nothing new of importance is at hand. The usual exploiting work is still the order, with no particular change reported.

The market opened at lower figures this morning under realizing sales and some short selling. After the call it began to strengthen, with Gould & Curry in demand. The advance ranged from 5 to 15 per cent on call prices. Towards noon a weaker tone set in, causing a decline of from 5 to 10 per cent. At the regular afternoon call the market was generally firmer and active, with an advance in Gould & Curry, Hale & Norcross and the Gold Hill shares.

The following illustrates the changes of the week:

| Mines. | May 14. | May 21. |
|---|---|---|
| Alpha | $ 31 | $ 28 |
| Alta Consolidated | 20 | 11 |
| Andes | 55 | 43 |
| Belcher | 1 10 | 75 |
| Best & Belcher | 1 90 | 1 70 |
| Bodie | 1 00 | 77 |
| Bullion | 40 | 32 |
| Challenge | 75 | 50 |
| Chollar | 2 85 | 2 65 |
| Confidence | 1 80 | 1 45 |
| Consolidated California and Virginia | 3 35 | 3 10 |
| Consolidated New York | .... | .... |
| Crown Point | 95 | 70 |
| Exchequer | 17 | 10 |
| Gould & Curry | 1 80 | 1 85 |
| Hale & Norcross | 2 05 | 2 50 |
| Justice | 14 | .... |
| Mexican | 1 25 | 94 |
| Ophir | 2 50 | 2 05 |
| Overman | 34 | 18 |
| Potosi | 1 65 | 1 30 |
| Savage | 1 20 | 1 55 |
| Sierra Nevada | 1 50 | 1 15 |
| Union | 1 35 | 1 10 |
| Utah | 27 | .... |
| Yellow Jacket | 88 | 73 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, May 21, 1896

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 300 Alpha | 28 | 200 Exchequer | 10 |
| 500 Alta | 11 | 200 Gould & Curry | 1 60 |
| 200 Andes | 43 | 1500 | 1 65 |
| 450 Belcher | 70 | 800 H. & N | 2 25 |
| 1100 Best & Belcher | 1 50 | 300 | 2 15 |
| 100 | 1 55 | 200 Mexican | 93 |
| 400 Bodie | 77 | 150 | 94 |
| 350 Bullion | 32 | 100 Occidental | 1 80 |
| 150 | 31 | 50 | 1 85 |
| 200 Bulwer | 40 | 1200 Ophir | 2 00 |
| 100 | 41 | 1000 Potosi | 1 30 |
| 200 Challenge | 50 | 400 | 1 25 |
| 850 Chollar | 2 60 | 2000 Savage | 1 35 |
| 450 | 2 65 | 300 S. B. & M | 20 |
| 630 Con Cal & Va | 3 05 | 500 Sierra Nevada | 1 15 |
| 100 | 3 00 | 200 | 1 10 |
| 200 Con Imperial | 04 | 450 Union Con | 1 00 |
| 50 Confidence | 1 45 | 100 Yellow Jacket | 69 |
| 100 | 1 50 | 500 | 68 |
| 500 Crown Point | 70 | | |
| 300 | 68 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 500 Ophir | 2 05 | 200 Alpha | 25 |
| 500 Mexican | 95 | 200 | 24 |
| 200 | 94 | 1000 Belcher | 75 |
| 250 Gould & Curry | 1 80 | 200 Exchequer | 10 |
| 200 | 1 85 | 400 S B & M | 20 |
| 100 Best & Belcher | 1 70 | 100 Overman | 18 |
| 250 C. C. & Va | 3 50 | 150 Union | 1 05 |
| 100 | 3 10 | 50 | 1 10 |
| 550 Savage | 1 25 | 100 Alta | 10 |
| 200 | 1 55 | 700 | 09 |
| 250 Chollar | 2 65 | 200 Julia | 20 |
| 1000 Bullion | 30 | 100 Occidental | 1 80 |
| 300 Potosi | 1 30 | 100 Andes | 42 |
| 100 | 1 25 | 400 Mono | 13 |
| 200 H. & N | 2 50 | 100 Con Imperial | 03 |
| 100 | 2 45 | | |
| 350 | 2 40 | | |
| 350 Yellow Jacket | 70 | | |
| 100 | 72 | | |
| 350 | 73 | | |

## Obituary.

FRANK W. CHAMBERLAIN was killed by a cave in the Hoosier mine, in Globe, Arizona, on the 8th inst.

W. H. LOWELL, chief accountant for the Con. Virginia Mining Company, died at his residence in this city last Tuesday evening.

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied, | Delinq't and | Sale. | Secretary. |
|---|---|---|---|---|---|---|
| Alaska-Willoughby G M Co, Alaska | 1 | 20c | Apr 6 | May 25 | June 29 | T Pollard, 22 California |
| Alpha Con M & M Co, Nev | 16 | 5c | Apr 7 | May 12 | June 2 | C E Elliot, 309 Montgomery |
| Alta S M Co, Nev | 52 | 10c | May 4 | June 9 | June 30 | J E Jacobus, 309 Montgomery |
| Burlington G M Co, Cal | 2 | 3c | Apr 23 | May 27 | June 17 | W C Ralston, 331 Pine |
| Caledonia S M Co, Nev | 46 | 5c | Apr 1 | May 6 | May 27 | A S Groth, 414 California |
| Crown Point G & S M Co, Nv | 67 | 20c | Apr 2 | May 6 | May 26 | J Newlands, Mills Building |
| Inyo Marble Co, Cal | 28 | 10c | Mar 30 | May 4 | June 4 | M A Cahn, Phelan Bldg |
| Mexican G & S M Co, Nev | 54 | 20c | Apr 23 | May 28 | June 18 | C E Elliot, 309 Montgomery |
| Occidental Con M Co, Nev | 22 | 10c | Apr 2 | May 6 | May 28 | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 3 | 2c | May 11 | June 18 | July 6 | F L Olmsted, 315 Montgomery |
| Overman S M Co, Nev | 75 | 10c | May 2 | June 5 | June 25 | G D Edwards, 414 California |
| Peabody G M Co, Cal | 6 | 10c | Apr 28 | June 3 | June 24 | B Natorp, 124 Sansome |
| Potosi M Co, Nev | 45 | 20c | Apr 9 | May 14 | June 4 | C E Elliot, 309 Montgomery |
| Savage M Co, Nev | 89 | 20c | May 1 | June 3 | June 23 | E B Holmes, 309 Montgomery |
| Silver King M Co, Arizona | 14 | 25c | May 7 | June 16 | July 14 | J W Pew, 310 Pine |
| Utah Con M Co, Nev | 22 | 5c | Apr 3 | May 6 | May 27 | A W Havens, 309 Montgomery |


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## Recent California Mining Incorporations.

California Mining Development Company, San Francisco; capital stock, $1,000,000; $2500 subscribed; P. McAuslan, Nevada City, G. E. Robinson, W. G. Mizner, B. F. Louis, M. Levingston, San Francisco.

Nonpareil Quartz and Gravel Mining Company, Sacramento; capital stock, $100,000; $76,400 subscribed; W. Gardner, F. C. Hyde, C. A. Palm, W. A. Root, Sacramento, S. Rodini, Iowa Hill.

The Defiance Mill and Mining Co., San Francisco; B. G. Smith, M. M. Smith, E. B. Cushman, H. H. Ferns, F. H. Price; capital stock $100,000; $500 subscribed.

River Bedrock Mining and Manufacturing Co. of California, San Jose; capital stock $1,000,000, $15,076 paid up; J. M. Thorpe, J. J. Cherrie, E. E. Cothran, H. Dreischmeyer, Jr., G. K. Hostetter, M. Phillips, C. W. Quilty, G. F. Salisbury, F. D. Wolfe.

Humboldt Placer Mining Co., Blocksburg; capital stock, $10,000,000, $1,300,000 subscribed; E. W. Dyke, J. E. Wood, of Harris: W. A. Stowers, P. Asbill, J. Van Matre, Minersville; W. S. Carless, Blocksburg; W. P. White, Hoaglin.

Laguna Mining and Milling Co., San Diego; capital stock, $500,000; subscribed, $262,500; G. H. Hubbs, G. J. Magly, A. B. Cairnes, H. J. McCain, T. J. McCain.

## Recently Declared Mining Dividends.

THE Calumet and Hecla, of Michigan, this week paid a dividend of $500,000; Moon-Anchor, $6,000, and Victor, of Colorado, $20,000.

THE Boston and Montana mine, of Montana, paid a dividend of $300,000 on the 20th inst.

THE Homestake Mining Company paid a dividend of 25 cents per share on the 25th inst.


WANTED.—A young man with literary ability, having had practical experience in mining and metallurgy, for the editorial staff of a first-class trade paper. Applications will not be noticed unless stating full particulars as to experience, compensation, references, etc. Address "Charter," P. O. Box 2718, New York, N. Y.

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Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

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## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 3) levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| Chas. A. Moore | 102 | 7,222 | 361 10 |
| Chas. A. Moore, Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6,000 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore, Trustee | 130 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 160 | 6,667 | 333 35 |
| N. L. Bell, Trustee | 128 | 250 | 12 50 |
| A. U. Rugg | 16 | 1,000 | 50 00 |
| A. U. Rugg | 17 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 155 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg, Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg, Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 109 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 141 | 1,667 | 83 35 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 133 | 3,195 | 159 75 |
| E. C. Godfrey | 134 | 4,000 | 200 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Nos. 37 and 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

### POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until SATURDAY, May 9, 1896, at the hour of 2 P. M., at the office of the Company, Room 38 Crocker Building, San Francisco, Cal.

E. C. GODFREY, Secretary.

### POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until MONDAY, June 8, 1896, at the same hour and place.

E. C. GODFREY, Secretary.

Office, No. 38 Crocker Building, San Francisco.

## DELINQUENT SALE NOTICE.

INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business, San Francisco, California. Location of works, Marmol, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 28) levied on the Thirtieth (30th) day of March, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| W. W. Sargaent, Trustee | 482 | 1,250 | 125 00 |
| W. W. Sargaent, Trustee | 485 | 1,000 | 100 00 |
| W. W. Sargaent, Trustee | 488 | 745 | 74 50 |
| W. W. Sargaent, Trustee | 505 | 1,000 | 100 00 |
| W. W. Sargaent, Trustee | 514 | 500 | 50 00 |
| W. W. Sargaent, Trustee | 516 | 600 | 60 00 |
| W. W. Sargaent, Trustee | 518 | 1,000 | 100 00 |
| G. W. Luce | 310 | 5 | 50 |
| G. W. Luce, Trustee | 369 | 9 | 90 |
| Geo. Dillman | 530 | 980 | 98 00 |
| Israel Luce, Trustee | 397 | 1,000 | 100 00 |
| A. F. Thane, Trustee | 447 | 500 | 50 00 |
| Percy Beamish, Trustee | 494 | 500 | 50 00 |
| Percy Beamish, Trustee | 495 | 225 | 22 50 |
| A. J. Hughes | 522 | 429 | 42 90 |
| H. H. Noble | 524 | 100 | 10 00 |
| F. H. Hilbert | 533 | 100 | 10 00 |
| F. H. Hilbert | 534 | 100 | 10 00 |
| F. H. Hilbert | 535 | 100 | 10 00 |
| F. H. Hilbert | 536 | 100 | 10 00 |
| F. H Hilbert | 537 | 100 | 10 00 |
| F. H. Hilbert | 538 | 500 | 50 00 |
| F. H. Hilbert | 539 | 500 | 50 00 |
| Voss Conrad & Co | 541 | 301 | 30 10 |

And in accordance with law, and an order from the Board of Directors, made on the 30th day of March, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at their office, Room 323 Phelan Building, San Francisco, California, on THURSDAY, the 4th day of June, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

M. A. CAHN, Secretary.

Office, Room 323, Phelan Building, San Francisco, California.

TO THE STOCKHOLDERS OF THE SOUTH PALOMA GOLD MINING COMPANY, LIMITED:

Notice is hereby given that by resolution of the Board of Directors of the corporation, adopted on the 21st day of March, 1896, a meeting of the stockholders of the corporation was called for the purpose of increasing the capital stock to the amount of two hundred thousand dollars, to be divided into one hundred thousand shares of the par value of two dollars per share, and of determining the disposition to be made of the increased capital stock; and it was resolved that such meeting shall take place at the principal place of business of the corporation, being the same building where the Board of Directors usually meet, to wit: No. 212 Sansome street, room 17, in the City and County of San Francisco, on WEDNESDAY, the 10th day of June, A. D., 1896, at 12 o'clock in the forenoon of that day.

Dated San Francisco, 2nd of April, 1896.

JOHN A. WRIGHT, President.
CHAS. WEBB HOWARD, JR., Secretary.


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COMMON SENSE STEEL WHIM
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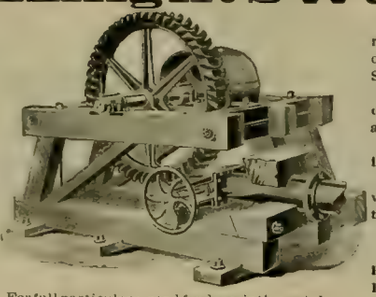
Over 2800 now in use, which is more than all others combined. We make them for all purposes, all sizes and prices. **Steel Ore Buckets,** all sizes from a windlass to a ton. We press "'em out" 'cause hammer dents make holes, "savy?" **Common Sense Easy Dump Ore Cars.** Center of car body over center of truck, equal weight on each axle, makes equal wear on all the wheels. Incline turn table makes the car dump itself when you press the latch. Send for Catalogue showing dozens of styles of cars for all purposes.

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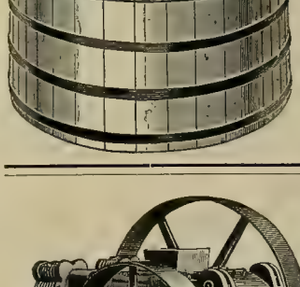


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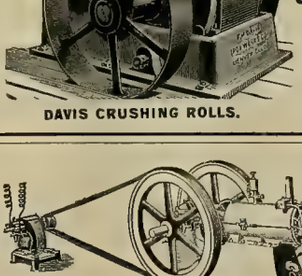
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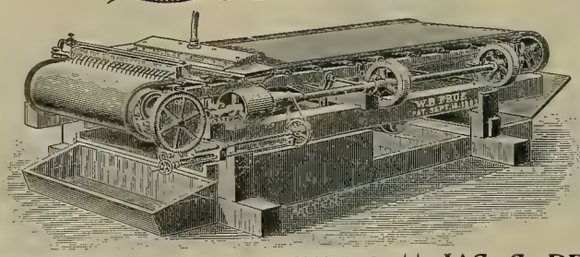


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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1873.—VOLUME LXXII. Number 22. SAN FRANCISCO, SATURDAY, MAY 30, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

## A California Production.

California is variously represented as the land of sunshine, flowers, wine, fair women, brave men and other desirable attributes of life. It is further noted as being the greatest gold-producing area in the world. It is also possessed of the sterner attributes of war, as well as the valuable elements of peace, as was abundantly proved last week when the biggest and best battleship in America came in, in triumph from her official test off Santa Barbara, where she developed an average speed of 16.88 knots and won $175,000 extra bonus for her enterprising builders, the Union Iron Works, beside a million-dollar advertisement for the State. Herewith is a representation of the queen of the American navy as she arrived in this city with the finest record ever achieved by any American vessel of her class. All emblems of supremacy in this line, all prestige of victory, passed with her that bright May afternoon from the shipbuilders of the Atlantic coast to those of San Francisco, fairly won and well deserved. Whether in a fight or a fast chase, whether in speed, strength, offensive or defensive qualities, the product of California—the great battleship now lying in San Francisco bay—has shown her superior efficiency, and should the cloud of conflict shadow the land, those who man the armament of the Oregon can well feel that the great vessel is fitted to uphold the dignity and honor of the nation. The Oregon has been described before. She is 350¾ feet over all, 69¾ feet beam, has a displacement of 10,298 tons and cost $4,500,000. She is so far the latest and greatest vessel built by the Union Iron Works, which has already built the United States war vessels Charleston, San Francisco, Monterey and Olympia.



U. S. BATTLESHIP OREGON.

The official speed requirement was fifteen knots per hour. For every quarter knot in excess the Government agreed to pay the builders $25,000. The 1.88 extra knots thus earns them $175,000, and .13 of a knot to spare. A speed of 16.75 knots would have secured the $175,000, and as the extra .13 is in excess of one-half of another extra quarter, it may be that they will secure another $25,000. The Government takes this method of getting the maximum in a cheaper way than by setting the requirement higher. Had the official requirement been, say, 16.75 knots, it would have entailed a bid in excess of the accepted contract price of several hundred thousand dollars; but by making the requirement 15 knots, and then offering a bonus for anything in excess of that, the Government gets a superior vessel at less cost. In this connection a word as to "knots" and "miles" is not amiss. As a matter of fact, there is no such distance as a "knot." Miles, leagues, etc., are regularly defined distances, but the term "knot" can only be correctly used in determining the rate of speed at which a vessel moves through the water. The distance between two knots on the logline is 6082 feet. A mile is a mile, regardless of time; a "knot" is always correctly spoken of in connection with time. The official speed record of the Oregon is, in miles, 19.4438 per hour. This is reckoned on the basis of 16.88 knots. A Washington dispatch reports Admiral Beardslee as officially stating that the record of the Santa Barbara trip for the Oregon is 16.791. On this basis, the speed would be 19.34 miles per hour. When her vast weight and great depth in the water is considered, the force with which she is propelled appears tremendous, moving such a mighty mass at a speed once deemed unattainable by a railway train.

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A DEPOSIT of magnesite is reported from the headwaters of the Sacramento river, at Flat Creek, Shasta Co., Cal. Its extent is still uncertain. The mineral is known to exist in Alameda, Fresno, Mariposa, Monterey, Placer, Napa and several other counties, but so far has been mined for commercial purposes only in Alameda and Napa, these two localities being believed to be the only two magnesite mines in the United States. In '91, 761 tons were produced in this State, with a spot value of $5397; in '92, 1402 tons, worth $9814; in '93, 1143 tons, $8000; '94, 1370 tons, $4864. Last year 2200 tons were produced, valued at $17,000.

The largest worked deposit of magnesite is near Rutherford, Napa Co., where the white carbonate of magnesia is about six feet thick, imbedded at an angle of about 65° between walls of serpentine and talcose schist. It is used in the manufacture of paper, for hearths of basic steel furnaces, stone paint and furnace linings.

There is a duty of 20 per cent on the calcined article; the raw ore is free. As taken out it is picked over, then calcined and shipped. Better transportation facilities will doubtless result in a greatly increased product of this mineral, in which California holds the monopoly of production.

## That New Gold Process.

Considerable inquiry has been received at this office since the publication in the issue of the 9th inst., regarding M. Rigaud's new "gold process," wherein he claims his ability to successfully extract all the gold from any ore at a total cost of $1.80 per ton. Till the result of the experiments by the Tancarville Co., at Havre, France, are announced, a suspension of judgment is just; but it appears from the details furnished by the originator of the process that, like many other new process men, M. Rigaud claims too much.

A noticeable feature of the comment by English mining engineers, metallurgists and assayers is the unanimity with which they decry the new process and the complaisance with which some of them make equally extravagant claims. One gentleman, writing in a London journal, says:

> There have been a long series of experiments, some of them on the ton scale, which have proved to satisfaction to be capable of extracting not only the whole of the gold, but the whole of every other metal contained in the ores, and this is done at a cost considerably below M. de Rigaud's statement of 9 francs per ton, as in the case of his treatment — in fact, the case of the process I refer to is not above one-ninth of his—viz., 1 franc.

That is, this gentleman, who is a mining engineer of some repute, claims to know of a process whereby "not only the whole of the gold, but the whole of every other metal" in the ore can be extracted at a total cost of twenty cents per ton! This is too precious a secret for one human breast to hold. Its custodian should take pity on the mining world and divulge the details of how all the gold and every other metal in a body of ore can be extracted at comparatively no cost at all. The resultant wealth from the possession of such knowledge would make the richest man in the world seem a pauper by comparison; this apart from the glory and fame accruing to the alleged discoverer. Another metallurgist, in the same issue, in discussion of the Rigaud process, epigrammatically says: "What is now more needed is a process to treat hitherto untreatable ore." Just so.

Other gentlemen—one a major-general in the British army—take up arms in defense of the Zymean process of the gallant naval hero, Admiral Selwyn, whose teachings were exploited and exploded in these columns in September, '93, and assert that the admiral's process is proved to be a success, and that it "bids fair to even more than double the value of every gold share in the market." All of which is "important if true." Meanwhile, when British military heroes on land and sea and London metallurgists can, over their signatures, seriously make such extravagant statements, it were invidious to express surprise when an Arizona prospector thinks he has $75 ore when it only assays $40.

# MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

San Francisco, May 30, 1896.


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## Chiefly Commercial.

In its issue of the 7th inst. the Denver *Republican*, a newspaper which is to Colorado what the Salt Lake *Tribune* is to Utah, has some kindly references to this journal. It notices especially what *Printers' Ink* says. In these days of business effort the circulation of a publication is considered of considerable importance. While an advertisement in this paper is justly considered to be of great value because of the quality of its circulation, yet it is gratifying to know that in the matter of quantity, so eagerly sought, this paper also enjoys distinguished pre-eminence.

The proprietors of the journal for advertisers called *Printers' Ink* publish annually a classified list of all the publications in the country, a regular newspaper directory, giving name, location and (most important of all to the business advertiser) circulation. Many years' issuance of this directory and care exercised in compiling it give it a standing that makes its statements authoritative. In its issue of April 22nd, 1896, in talking of papers devoted to engineering and mining, etc., and giving some extracts from the forthcoming issue of the American Newspaper Directory for 1896, *Printers' Ink* says:

> Among the engineering and mining papers of California, none has credit for so large a regular issue as is accorded to the MINING AND SCIENTIFIC PRESS, published weekly at San Francisco. In fact, it fully equals five times the combined issue accorded to all the others, and the publishers of the American Newspaper Directory will guarantee the accuracy of the circulation rating accorded to this paper by a reward of one hundred dollars, payable to the first person who successfully assails it.

Again, discoursing of scientific publications, it says:

> Among the scientific papers in California none has credit for so large a regular issue as is accorded to the MINING AND SCIENTIFIC PRESS. It fully equals three times the combined issue accorded to all the others, etc.

Likewise, in speaking of electrical journals, it says:

> Among the electrical papers in California none has credit for so large a regular issue as is accorded to the MINING AND SCIENTIFIC PRESS.

Again in its issue of April 29, 1896, further reference is made, as follows:

> In all the States of the far West and the Pacific slope, consisting of California, Oregon, Washington, Idaho, Montana, Wyoming, Colorado, New Mexico, Arizona and Utah, the largest circulation credited to any publication devoted to engineering and mining is accorded to the MINING AND SCIENTIFIC PRESS, a weekly, published at San Francisco, Cal., and the publishers of the American Newspaper Directory will guarantee the accuracy of the circulation rating accorded to this paper by a reward of $100, payable to the first person who successfully assails it.

All these statements appear in the current issue of the Directory, and are made the subject of complimentary reference on the part of our Denver contemporary, which, enjoying like preeminence in its field, evidently appreciates the value of such a standing.

In view of all this, it is perhaps not too much for this paper to say that while it believes everyone engaged in business in any way related to the mining industry thoroughly understands that in no way can a business announcement be better made to reach those whose business is desired than through the advertising columns of this paper, it is satisfactory to also know that this fact is recognized and widely stated by those who are experts on the subject of newspaper circulation.

## Mining Legislation in the 54th Congress.

What the miners of California and the few journals that have espoused their just cause have to fight was during this week well exemplified in the attitude of the Speaker of the House of Representatives, who, in two or three important legislative respects, is the most powerful man in the country, in determining what shall or shall not be a national law. When Senator Mitchell of Oregon (who with Senator Stewart of Nevada and the entire Interior Department is hostile to the bill) injected an amendment in the Mineral Land bill ostensibly to include Oregon in its provisions, but really intended to kill the measure, the House Public Lands Committee, with honest intention to aid the effort, agreed to the amendment. This compliance was not expected, and when Speaker Reed found that a member of the California delegation was to favorably report the bill as received, amended, from the Senate, he promptly ruled that it could not be so brought up for passage, as it was not "a privileged question," and could not be called up any time, having been referred back to the House committee from the House. So that on this miserable subterfuge of a technicality the Speaker of the House of Representatives did his powerful best, or worst, to prevent the passage of a just bill, which has so long been striven for by a few in California who realize its necessity. Meanwhile a swift and silent Government approving of railroad lists is going on. Since the 7th inst. the General Land Office has approved the issuance of patents to the railroad company for over 300,000 acres in this State of the very lands under discussion, a large part of the area the character of which it was the province of the commission to be appointed under the Mineral Land bill to determine.

Had Senator Mitchell of Oregon refrained from putting in that amendment, the bill would now be a law. The Senator's railroad cases in the Supreme Court of the United States are personally profitable in the large sums received purely for legal services therein, he usually appearing as corporation counsel and defense. Of course it is not to be assumed that he would prostitute his high position as a Senator of the United States from the great commonwealth of Oregon to aid his powerful railroad client in blocking the passage of a law obnoxious to it. Yet it would have looked better had the senior Senator from Oregon delegated that disagreeable duty to some one else, especially in face of the fact that his colleague, Senator McBride, had honestly introduced a separate bill, which would have given Oregon miners more than the Mitchell amendment to the California bill possibly could.

The MINING AND SCIENTIFIC PRESS originally directed attention to the threatened corporation absorption of California mineral lands, and two successive conventions of the California Miners' Association declared unanimously for such a measure as the bill introduced last January. This paper takes the displeasure of corporation parasites as a high compliment. Praise or congratulation from such sources would be to it grave cause for concern, for their friendship is always fatal to the life or integrity of any publication. The silence of so many California papers on this subject is eloquent, and it is a matter of regret that they should so fail in their plain duty.

In common with a large number who hoped for success in this session of Congress, this journal deplores the trickery in high official places that has temporarily defeated the wishes of the California miners. We have little hope of seeing the bill pass this session. True, the California delegation has had the House Public Land Committee reconsider its previous action in agreeing to the Senate amendment, report its disagreement and ask for a conference, which restores the matter to the status of a "privileged question" and brushes away Speaker Reed's cobwebs; but as Congress will adjourn in a few days, and long before the parliamentary procedure of formally rescinding previous agreement, disagreeing, asking for a conference, appointment by the Senate of its members, and of the House by its members of the proposed conference committee, the meeting of that committee, its deliberations and final action, its report and joint action of both houses on that report—long before all this tedious rigamarole can be got through with, Congress will have adjourned.

It is due to the entire California Congressional delegation, and to T. L. Ford, who spent four months in Washington in the interests of the miners, to say that every one of these ten men worked faithfully for the interests entrusted to them, labored diligently and harmoniously, and they cannot be justly blamed for any failure or delay.

The River and Harbor bill with the $250,000 appropriation asked for by California miners passed both houses, and had it received the President's signature, would now be a law. As President Cleveland has never signed a river and harbor bill, always vetoing it or allowing it to become a law without his signature, it is not likely he will sign this one. The magnitude of the items and the coming party fight over Presidential nominations and elections will doubtless influence him in vetoing the bill, but he has not the power of Speaker Reed; he can not block legislation, he can only delay it a few days. Congress will undoubtedly pass the bill over the veto, for there is more than the necessary two-thirds majority.

No other national legislation concerning miners has received Congressional attention. In accordance with the desire of the California Miners' Association, Senator Perkins and Congressman Johnson introduced simultaneously in the Senate and House, early in the session, three bills, one amending Chapter 6, Title 32, U. S. Revised Statutes, one appropriating money for the construction of works to impound mining debris, and one amendatory of the Camenetti Act. The last mentioned was not pushed, being subsequently deemed unwise and impolitic; the second was passed in a modified form; the first was not acted upon. Senator Stewart, of Nevada, considers himself the only man in the United States competent to formulate legislation on that subject and has a perennial bill which he introduces, every Congressional session, securing by "Senatorial courtesy" the exclusion of other mining bills looking to necessary changes. However, he cannot live forever, or, some day Nevada may tire of two corporation Senators and surprise itself by for once sending some one to the U. S. Senate who owns himself.

"TO THE progressive scientist nothing is considered impossible." Some "impossibilities" of a generation ago are now in daily general use, and familiarity dulls the wonder with which they were at first received. In the domain of electrical progress, as weekly portrayed in these columns, great advances have recently been made. During this month interest in the newly discovered "Roentgen rays" is eclipsed by the announcement that Nikola Tesla has about perfected the vacuum-tube system of electric lighting without wires, of which he first spoke in '92, and Thos. A. Edison believes that, by means of a vacuum tube of his own construction, he can change the shadow rays recently discovered by Roentgen into ordinary white light, capable of refraction and separation into primary colors. In these sunset years of the nineteenth century is shadowed forth some of the wonderful possibilities of the twentieth century.

NOW THAT A San Francisco institution has built the finest battleship on the continent, the Secretary of the Navy makes further substantial recognition of California's importance. The recent passage of a bill by Congress creates a naval training school at Goat Island. Secretary of the Navy Herbert, to further the work, has ordered that, till the new institution is ready, the Independence at Mare Island shall be constituted a receiving ship for 100 apprentices, thus virtually making the practical life and usefulness of the institution begin with the passage of the bill creating it.

AFTER several annual attempts, it now seems certain that at this session of Congress those who favor the addition of naphtha launches of fifteen tons or over to the list of vessels subject to Government inspection in the harbor will succeed in their effort.

## Concentrates.

THE Pueblo and Victor, Colorado, Mining Exchanges have suspended.

A SIERRA COUNTY mining company has levied an assessment of one mill per share.

DEADWOOD, S. D., gets a Congressional appropriation for a Government assay office.

THE April gold yield of the Witwatersrand, South Africa, district was 174,518 ounces.

IT costs a member of the De Lamar, Idaho, Miners' Union $30 fine for "a plain drunk."

THE Sunny South, Placer Co., Miners' Association, a model local organization, has bought a $100 organ.

THE Feliciana mine, Sweetwater, twelve miles from Mariposa, Cal., is sold to E. S. Davis, of Fresno.

THE Rossland, B. C., Miners' Union wants a Government mine inspector appointed for that Province.

YREKA, CAL., is now in telephonic communication with many of the principal mining towns of Siskiyou county.

THE hour schedule has gone into effect at the Ajax, Utah, mine, the men working ten hours at 25 cents per hour.

AT the San Cristobal mine, Zacatecas, Mexico, reduction works and a 20-stamp mill are to be erected this summer.

A MINERS' DRILLING CONTEST for $150 and the British Columbia championship was held at Rossland, B. C., on the 24th inst.

THE *Echo* says that 130 miners are employed in the Sutter Creek district and 500 in the Jackson district, Amador county.

DURING this week Mining and Stock Exchanges were organized at Los Angeles, Cal., Prescott, Arizona, and Rossland, B. C.

THE Gillespie mine, an extension of the Congress, is reported sold to the Congress, Arizona, Gold Mining Company for $30,000.

IT seems odd, says the Bodie *Index*, to see a plow running near the Standard slum-pound, digging up tailings for the cyanide plant.

SATISFACTORY arrangements have been made by Supt. Lipman, Eagle Bird mine, Washington, Nevada Co., to resume work this week.

THE management of the Mercur, Utah, mine will push the incline shaft, now 190 feet deep on the dip of the vein, to a depth of 1000 feet.

BUTTE'S, MONTANA, new directory estimates that city's population at 44,662. It calculates that 6400 men are there employed in mining.

THE Western Federation of Miners, which recently closed its convention in Denver, has 76,500 members and $740,000 cash in its treasury.

THE Slocan Star Mining Company in Milwaukee last week declared a dividend of 10 cents a share on the capital stock, aggregating $100,000.

AT Chili Gulch, near Mokelumne Hill, Calaveras Co., Geo. Emerson is sinking a double-compartment shaft 500 feet. The hoist is run by water power.

MANAGER MAITLAND of the Trinity Gold Placer M. Co. is going to run a 525-foot tunnel, 6x8, in the company's property at Coffee Creek this summer.

"THE invasion of foreign capital" so dreaded by some silurian meat dealers of this city is not similarly viewed by the mining men of the State.

TWENTY THOUSAND Johannesburgers have signed a petition and forwarded it to Pretoria asking for the release of John Hays Hammond and associates.

TRINITY COUNTY is unaffected by the anti-debris restrictions and offers in its unworked deposits one of the most promising fields for investment in hydraulic mining.

WICKENBERG, the pioneer mining camp of central Arizona, is waking up again; and if all that adjacent prospectors report is true, that section will soon be a lively one.

THE labor troubles and political turmoil in the South African mine districts have closed the Pacific coast lumber trade, which for a while was large in that direction.

IN these renewed days of life in the Comstock shares a good many seem in or going in on the proposition, "Sell what you have if you wouldn't buy it if you didn't own it."

MONTANA papers are publishing numerous notices of forfeiture signed by co-owners who have done their proportion of the annual work required to hold an unpatented claim.

THE Pioneer mine, Plymouth, Amador county, listed on the stock board, is about twelve miles from the Kennedy. It is incorporated for $2,000,000. There are several "Pioneer" mines.

WHITELAW REID has bought a gold mine in Mariposa Co., and when he next meets Chauncey Depew can tell him more than the latter now knows about "nuts and oranges" in California.

ANACONDA, MONTANA, is beginning to ask why it is necessary to send its great copper output to Eastern factories, and looks to see a time when it will be a manufacturing as well as a mining center.

WHITLOCK, WELLS AND SNYDER are sinking a double-compartment shaft on the San Andreas quartz mine, Calaveras Co. They claim that the ore will pay $40 to the ton in free gold besides the sulphurets.

AN estimate of the life of the Wemmer, South Africa, mine, the superintendency of which Emil Abadie, formerly of Grass Valley, recently resigned, concludes that in eight years time the pay ore will be exhausted.

AUSTIN CORBIN proposes to give $1,000,000 for the War Eagle mine, Trail Creek, B. C., and $500,000 for the Iron Mask, to be paid on Aug. 1, '96. The shareholders of both companies have voted to give him the desired option.

AN increasing percentage of copper and silver in the ore of the Apollo mine at Unga, Alaska, has caused the owners to close their chlorination works, they determining in future to ship their sulphurets and not attempt the continuance of any process at the mine.

FROM the Stanislaus to the Mokelumne in Calaveras county is a mineral belt averaging four miles in width that has never been wholly explored and which will be heard from. It is one of many such regions in California rich in mineral, but so far passed over or overlooked.

"THE biggest gold mine in the United States" is now variously located in Arizona, Colorado, Alaska, Utah and elsewhere. There are three or four in this State that are believed, apart from size, to be the most profitable of any similar enterprises in the Union.

E. C. LOFTUS, who made the Golden Gate mine at Sonora, Tuolumne Co., a dividend-paying mine, is now developing the Keystone mine, Railroad Flat, Calaveras Co., where he has built a hoist and mill run by water under a 200-foot pressure. The shaft is now over 200 feet.

IT is understood that a British syndicate is negotiating for the purchase of the De Lamar mine, De Lamar, Nev., for $2,500,000. The present output of the mine is about $100,000 per month; it has considerable ore in sight, is thoroughly equipped and has been intelligently managed.

SINCE the article on the first page on Manganese was printed, a report is received from Monroe, Sevier Co., Utah, to the effect that large deposits of manganese ore have been found there by Messrs. Loring & Christie, who figure on a daily production of 200 tons at a profit of $25 per ton.

THE Oregon *Mining Journal* thinks if the people of Gold Hill would quit talking about their gold pockets and would develop some of their quartz ledges, they might induce capital to buy some of their many good prospects. People are looking for mines to buy, not pockets with $10, $50 or $100 in them.

J. BROWN of this city met his death in a singular manner last week while visiting his mines near Colville, Wash. While driving a band of horses he struck one with the butt of his rifle. The horse kicked, striking the trigger and firing the rifle. Brown fell dead, the bullet having pierced his heart.

A PETITION for the voluntary dissolution of the Oneida Mining Company has been filed by Ignatz Steinhart, P. N. Lilienthal and the other directors. The property of this corporation was transferred to a new company some time ago, and dissolution is asked for the purpose of ending the corporate existence.

A JOHANNESBURG, South Africa, dispatch says: Twenty-three companies have seceded from the old Chamber of Mines and will form a new chamber. These companies won't have anything to do with the companies controlled by the others, since the attempted revolution. They announce a separate output of gold each month.

SINCE its start last January the water-jacket furnace at Nelson, B. C., has smelted between 8,000 and 9,000 tons of Silver King ore. A recent day's work was 340 charges run through, a total of 300,000 pounds of ore, 34,000 pounds lime rock, 34,000 pounds slag, and 51,000 pounds coke—150 tons ore and sixty tons fluxes and fuel.

THE Sulphuric Acid Manufacturing Co., Blacksburg, S. C., claims to produce sulphuric acid for use in the manufacture of fertilizers, with gold as a sort of a by-product. It owns a gold mine, and its process is said to recover 97 per cent of the gold in the ore. The production of sulphuric acid for manure is a new feature in the metallurgy of gold.

JOHNSON AND WILLOUGHBY have sold eleven mining claims, the Mountain King Group, adjoining the Alaska, Willoughby property, Funter Bay, Admiralby Island, Alaska, for $50,000. Geo. Garside, representing the purchasers arrived here on the Mexico to buy a ten-stamp mill, a saw mill, and other requisite machinery for development work.

NEAR San Andreas, F. J. Horswill is running a 1200-foot tunnel to tap the ancient channel at a depth of 350 feet. It is expected that will open a gravel bed 2100 feet wide at the junction of the old Craner channel, and the bed of the prehistoric Calaveras river, and is interesting as illustrative of one of the many forms of California gold mining.

COLORADO papers say considerable work will be done in the Gunnison country this season. That section attracted considerable interest sixteen years ago, but the prospectors then were looking for nothing but carbonates. Gold indications justify vigorous prospecting, and reports from there say gold discoveries are confidently expected this summer.

THE Cripple Creek *Mail*, the first number received since the fire there, reappears. It has 232 advertisements of notices for application for patent, and room for one column of editorial, in which it furnishes figures from a local geologist arguing that the temperature at the recent fire was the highest of any similar event in the world's history—2000 degrees. Returns on this subject are, however, incomplete.

FOLLOWING is the report of the Robinson, South Africa, mine for April: Mill: 120 stamps at work; 13,505 tons of ore crushed; yielded in smelted gold, 10,118 ozs.; from concentrates (by chlorination), 750 ozs.; from tailings (cyanide process), 2216 ozs.; from own ore, 13,084 ozs.; from concentrates bought (by chlorination), 2059 ozs.; from slimes, 784 ozs.; total gold recovered, 15,927 ozs. Profit for month, 27,500*l*.

LAST Saturday Secretary Smith approved as basis for patent list 28 of the selections by the Southern Pacific Railroad Company on account of its main line grant, embracing 58,737 acres in the Visalia land district. The mineral land bill slumbers, and the pliant cabinet officer is rapidly approving railroad patents to some of California's mineral area. To those who have taken up and carried on the fight for the preservation of mineral lands to the State the spectacle is a shameful one, but general indifference permits the existence of the present situation.

GOLD MINING is now fast becoming a regular legitimate business that is being worked with the same careful attention to income, outgo and details that characterizes any other form of business, yet it differs some from many other kinds of business: if a man has a paying property no one threatens to start another mine alongside and divide the business: there is no competition: the buyer seeks the seller, instead of the producer looking for a purchaser: there is little likelihood of overproduction: the price does not fluctuate: the terms are always cash: the transportation problem never troubles, freight rates being reduced to a minimum. Taken altogether, the gold producers form to-day the most independent class of workers in the United States.

THE gold brick industry is languishing in Oakland, Cal., and elsewhere, at present. In Idaho an old trick is being revived. Last week, at Idaho Falls, a man presented to the bank of Anderson Bros. a ball of amalgam, asking them to weigh and send to the mint on his account. As the stuff looked well, Anderson Bros. did not hesitate to advance a small sum of money on it, a note being taken for the money advanced, signed George Hanson. He was an innocent-looking fellow, about twenty years of age, and represented that he and two others were working a claim up the river, about fifteen miles from Idaho Falls. The ball of "amalgam" was an iron ball well covered with gold, the fact having been disclosed very soon after it fell into the hands of the assayer at Boise City.

A MESSAGE from Abraham Lincoln to the mining men is worthy at this day of a prominent place. The very last words Lincoln delivered on the afternoon before his assassination—last of those great utterances that for six or seven years electrified and enlightened half the world—were a message of suggestion and encouragement to the miners of the nation. Schuyler Colfax was coming out here and was paying his final call at the White House. Lincoln said to him: "I want you to take a message for me to the miners. I have large ideas of the mineral wealth of our nation. During the war, when we were adding $2,000,000 a day to our national debt, I did not care about encouraging the increase in the volume of our precious metals; but now that the rebellion is overthrown, and we know pretty nearly the amount of our national debt, the more gold and silver we mine makes the payment of that debt so much the easier. Now, I am going to encourage that in every possible way. Tell the miners for me that I shall promote their interests to the utmost of my ability, because their prosperity is the prosperity of the nation." These were the last public words of the immortal, and they were as prophetic and true as the rest.

THE San Francisco dailies are doing good work in aid of the mining industry of the State by publishing items of news collected from the local journals. Time was when it was difficult to find an item from a California mine in a San Francisco daily, but of late each one of the six dailies devotes considerable space to the subject. The most recent to recognize the value of the matter is the *Examiner*, which has now begun a mine department edited by Mr. Chas. G. Yale, statistician of the Mint. Since the *Call* passed under new control, that paper has also given considerable attention to collecting mine news. Too much publicity cannot be given facts regarding California's mineral wealth, and an advertisement of the State's gold resources in its newspapers is as much of an aid to the commonwealth as any one thing can be.

SUPT. HUNTLEY, of the Tom Boy at Telluride, Colo., says the company loses $200 or $300 a week by stealages of ore. He says "occasionally one of the men comes into the office and tells us that So-and-So last week pounded out a couple of hundred dollars from some rock from his claim down the mountain. At the same time we find that the same man had just a few days before asked for a leave of absence. He wanted to go down the hill to rest up—felt sick on account of the altitude. Well, the fellow's name comes off the payroll, and possibly he is searched, but it stops the leaks for a few hours. Then, if we are in good ore it begins again, and in a few days some other fellow is removed and a new man goes on. But occasionally we get hold of a man we feel we can trust. That fellow is taken care of and there is nothing too good for him as long as he stays with us."

THE *Investor* thinks it will probably never be known how much mining stock was burned in the Cripple Creek fires. Many owners kept their stocks in desks and trunks and when the fire broke out were either in the hills, out of town or beyond the reach of their holdings, and in many cases trunks, desks and all burned together. The custom of trading in stocks signed in blank now arises as a bar to the owner ever recovering from the loss of his certificates. Few kept any record of the numbers of the certificates or to whom they were originally issued, and it will be next to impossible to convince the companies that a loss has been sustained or to guarantee against duplicate issuing. Other brokers can trace back their certificates sufficiently well to get a reissue, and in cases where the stock was in first hands it will be comparatively easy to replace them.

LAST Tuesday Senator Dubois of Idaho succeeded in having inserted in the deficiency bill the item for lead sampling which was made a part of the administrative bill pending in both Houses. Should the amendment inserted become a part of the law, it will fully meet the dishonest competition of Canadian and Mexican ores crossing our frontier. The amendment in full is as follows: "The Secretary of the Treasury is hereby authorized to expend from the appropriation for collecting the revenue from customs a sufficient sum, not to exceed $45,000, to provide for the purchase of the necessary land and for the construction and equipment of sampling works thereon, or for the leasings of suitable buildings and equipment for the sampling and assaying of imported silver ores and other ores containing lead at the ports of El Paso, Tex., North Port, Wash., and Bonner's Ferry, Ida., and at such other ports as in the judgment of the Secretary of the Treasury the interests of the revenue demand; and the Secretary of the Treasury is hereby authorized, in case of importation of said ores at ports at which no facilities as above are provided, to send a portion thereof to a port having said facilities, at which port said portion may be sampled and assayed. In no instance shall a less portion than one-fifth of any importation of ores be sampled and assayed."

THE frauds in the mining world are not confined to those who attempt to foist worthless stock on credulous purchasers, or sell a mine on the strength of a spurious assay. All great industries have their parasites, barnacles and blood suckers, and the present activity in the mining industry has brought out several who advertise in such mining journals as admit their announcements. These fellows play a double game. They swindle the publisher of the paper, for they never pay a bill, and they swindle the customer they secure by sending him inferior apparatus. Two concerns in particular are now scattering advertisements wherever they can induce the publisher of a paper to unconsciously aid in their nefarious scheme. One is the notorious Hartsfelt, who has been exposed over and over again: the other is a New York concern whose real name will be given as soon as it can be ascertained. In general, publishers will do well to decline publishing an advertisement from obscure or veiled sources that promises too much, and customers need to be chary about answering advertisers that offer too much. A cleverly worded announcement may cajole a prospector into sending good money for a snide outfit, but prudence suggests that would-be purchasers of supplies or outfit of any kind from this class of dealers should at least demand opportunity for inspection of what they propose to buy before parting with their money. The better way is to deal only with reliable firms that have reputations to maintain and who cannot afford to be caught in any trickery.

THE House Committee on Public Lands recommends the passage of the bill authorizing an annual appropriation out of the fund derived from the sale of public lands, of $15,000 to each State which shall establish schools of mines, that amount to be increased $1,000 annually until it reaches the sum of $25,000. A mining school entitled to the benefit of this appropriation must provide for instruction in mining, metallurgy, the English language and the various branches of mathematical, physical, natural and economic science, with special reference to their applications in the interests of mining and metallurgy. The bill has been along the lines of the Morrill and Hatch acts, which gave similar aid to agricultural colleges throughout the country, and it is intended that mining schools and the mining industry shall receive like recognition in this bill. Some time ago a committee interested in mining schools appeared before the Committee on Public Lands and were heard in advocacy of a measure of this kind. Representative Wilson of Idaho prepared the bill mentioned above, which practically gives mining schools the same advantages that agricultural colleges enjoy, and submitted it to the Committee on Public Lands. It is also provided in this bill that any State which may elect to apply said appropriation for the endowment and maintenance of normal schools in lieu of schools for mines, may have the option of so doing. A similar bill has been reported from the Committee on Mines and Mining, and there is a strong sentiment in the House for its passage. While the depleted condition of the treasury may prevent action by this Congress, the justness of the measure is such that its friends believe a report should be had and an effort made to secure its passage. Sooner or later a bill of this kind will undoubtedly be enacted. When it does become a law the fund thus divided in this State will probably be used to aid in defraying necessary expenses of the Mining Department of the State University at Berkeley.

## Matte Smelting.

NUMBER V.

Written for the MINING AND SCIENTIFIC PRESS by W. L. AUSTIN, Ph. D., Denver, Colorado

It has been the experience in most, if not all, of the Western mines that as soon as permanent water level is reached the ores become more heavily sulphureted. In some cases veins which have been quite free from sulphides above water level at that point suddenly changed their character completely, and within the space of a few feet were found to be altered from a free milling quartz into a massive sulphide containing comparatively little silica.

Thus as the mines deepen the amounts of sulphides which it becomes necessary to handle increase. In Leadville, Colorado, for instance, from 1878 to 1880 the ores were, as far as could be determined by the eye, wholly of an oxidized character, and the furnaces produced no matte of any consequence; but in the year 1891 oxide ores had become comparatively scarce, and the enormous ore bodies then exposed to view in that camp were mostly massive sulphides, so poor in silica that barren quartzite had to be smelted with them to afford the necessary acid for taking up the bases. Approximately the same state of affairs has been found to exist at Butte, Montana. In 1887 and 1888 iron was scarce at the Butte smelters and a premium was paid by some of them for iron sulphides to assist in fluxing their silicious ores; now the ores are heavily sulphureted. At Bisbee, in Arizona, in 1882 the ore was all oxidized and no matte was made in the furnaces, the product being black-copper bars; in 1895 the product of the blast furnaces was all matte, and a plant of Manhes converters had to be added to reduce the matte to crude copper in order to save on freight charges in shipping the final product to market.

Many other illustrations might be given to prove the prevalence of massive sulphides in the deeper levels of many of our prominent mines; but this is scarcely necessary, for that such is the case is common experience in nearly all mining camps where the ores are of a smelting character. In some places, however, the sulphides occur in massive bodies before permanent water level is reached; for instance, at several points in Shasta county and elsewhere in California, and at Trail Creek in British Columbia; and the relative percentages of sulphurets and gangue in the veins vary, of course, greatly in the different districts.

The occurrences of large bodies of massive sulphides (such as contain from 60 to 95 per cent of iron sulphide) scattered over North and South America, Spain, Italy, Norway, Australasia, India, Africa, etc., are too numerous to mention here. The writer, by means of a rather extensive correspondence carried on for several years past, has become informed of the location of hundreds of such deposits which are eminently suitable for treatment by the pyritic smelting process; that is, by the true pyritic smelting, where the iron and sulphur contents of the ore are used to furnish all, or nearly all, the fuel necessary for its reduction in the blast furnace.

It can be safely stated that there is now no scarcity of massive pyritic ores, and it is evident from the many samples received by the writer that most of them contain the percentage of iron sulphide necessary for economic treatment by this process. If large quantities of heavily sulphuretted ores are already developed in so many mines, it can be reasonably assumed that the amount will be increased as deeper workings are reached and other districts opened, and that the smelting process best suited to the reduction of such ores will become of more and more importance as time goes on.

Mr. Lang, in treating of the general character of the base metal ores of western mining districts which might be made amenable to pyritic smelting methods (see page 55 of his book), makes the following statement: "The bulk of the so-called base or refractory ores of gold, silver and copper will not exceed 15 per cent sulphur, and possibly will not average 10 per cent." Where the gangue ("stony matter") exceeds two-thirds of the material to be treated, Mr. Lang (see page 56) no longer considers it a smelting ore, but classifies it as "best adapted to water treatment." Possibly he may be justified in his statement that the "bulk" of mineralized vein matter included by those elastic and very indefinite terms, "refractory," "base"—or, as some prefer to call them, "rebellious"—ores (each user of such terms reserving to himself a private definition of just what he means) contains, on the average, not to exceed 10 per cent sulphur; but probably the majority of practical metallurgists will be astonished to learn that such 10 or 15 per cent material has been classified as smelting ore at all! Certainly it seems strange that one who advocates the smelting of 80 per cent quartz ores—as will be presently shown—should characterize as "somewhat radical" and "extraordinary" a method whose purpose is to use an ore mixture containing sufficient iron to flux off the silica associated with it; but this Mr. Lang does in his allusion to "Mr. Austin's idea of the proper functions of pyritic smelting."

A visit to Butte, in Montana, to Leadville and the San Juan in Colorado, to Sudbury and Trail Creek in Canada, to Ducktown in Tennessee, to Orange county in Vermont, to Shasta and Amador counties in California, or to many other known places on this continent, will amply demonstrate the fallacy of Mr. Lang's statement in regard to the scarcity of massive sulphide deposits. At all the points designated such ores will be found to exist in large quantities.

But Mr. Lang, having first settled to his own satisfaction that such ores do *not* exist in sufficient quantities as to warrant the introduction of a system of smelting which aims to use their own fuel qualities, then proceeds to elaborate in his book a "metallurgical plan which *is* adjusted to the treatment" of "so-called base or refractory ores of gold, silver and copper," which he tells us "will not exceed 15 per cent sulphur, and possibly will not average 10 per cent." At some future time the writer may take up the subject of Mr. Lang's "metallurgical plan" in detail, but first let us see what constitutes a smelting ore and makes profitable smelting, and then it will be easier to see how far the proposed plan is applicable to "existing conditions" in the mining regions.

In the first place, location has naturally a great deal to do with the method of treatment to be adopted in the case of any given ore. At large smelting centers, such as Denver and Pueblo, almost any class of ore may be smelted. Different mining regions furnish ores differing radically in their mineralogical and chemical characteristics, ranging from basic material such as hematite and calcite on the one side to quartzose ores and straight silica on the other, and therefore they may be advantageously mixed at such metallurgical establishments. Experience has shown that a diversity of ores can be collected at certain central points and that smelting at such places is more profitable than treatment at the mines would be, because these ores can be so mixed as to assist each other in the smelting process and require a minimum of dead fluxes.

But when an ore comes up for treatment in some district so far from the central smelting points that it is impossible for economic reasons to ship it away from the mine, then it will always pay to consult some experienced and competent metallurgist before committing the future of the enterprise to any metallurgical plan whatever. This caution is especially to be recommended in cases where any smelting process is contemplated.

It is safe to assert that a pyritic ore, carrying at the most 15 per cent and on the average 10 per cent sulphur, in the form of sulphide of iron, galena or blende, with a quartzose gangue, is not a self-contained smelting proposition, to begin with, and that an attempt to smelt such an ore by itself will in nine cases out of ten result in failure. For if 15 per cent of sulphur is combined with iron as bi-sulphide (ordinary iron pyrites) then the ore will contain only 28.12 per cent of that mineral; and if there is not over 10 per cent of sulpur in it, the percentage of pyrites will be only 18.78, leaving, respectively, 71.88 and 81.22 per cent unaccounted for! From the smelting point of view, it is of the first importance to learn what these other constituents are, because upon them depends the selection of a metallurgical process suitable to the reduction of the ore in question.

Quoting again from Mr. Lang's book (page 56): "We find a large proportion on the average of stony matter, perhaps not less than two-thirds, in those ores under consideration. * * * The gangue is prevailingly quartz, but in more favored localities is calcite, spathic iron (seldom), heavy spar (less seldom), and, not unfrequently, in some felspathic rock, usually somewhat decomposed." The instances in this western country where calcite occurs as the predominating gangue of pyritic ores are exceedingly rare. The writer can recall only two or three cases among the many hundreds of such deposits which he has examined, and the other minerals (except quartz) named as occasional gangue in pyritic veins, are too rare to deserve serious consideration, being very much rarer than the bodies of massive sulphides which Mr. Lang declares do not occur as a general rule. The usual gangue of pyritic veins is quartz—that is to say, practically straight silica—and in this Mr. Lang agrees, for he admits above that "the gangue is prevailingly quartz." Now, accepting Mr. Lang's statement that the general average of pyritic ores is 10 per cent sulphur (equivalent to 18.78 per cent pyrites, or 13.77 iron proto-sulphide), then, if such ore could be smelted down without the addition of fluxes, and all the pyrites contained in it were utilized to form matte, the matte-fall would only amount to 14.4 per cent. This would be equivalent to putting seven tons of ore into one ton of matte, assuming that the gangue is mostly quartz, and the loss in moisture, carbonic acid, etc., is inconsiderable.

A matte-fall of 14.4 per cent is none too large to effect a reasonable percentage of saving in the majority of cases, especially when copper is scarce, and the old text books will be found to be not so far wrong in the latter case in recommending a heavy matte-fall to protect the valuable contents of the charge.

But if 10 per cent is the average sulphur contents of Western pyritic ores, and if all of this element must be utilized to produce the necessary matte-fall in order to protect the valuable metals contained in the charge, and if the prevailing gangue of such ores is quartz, then there is in the great majority of cases about 81.22 per cent of silica to slag off in subjecting such ores to the smelting process. Fluxing off this amount of silica will in nearly every instance require the addition of great quantities of barren material to the charge, because in isolated districts no such advantageous ore mixtures can be made as at the great smelting centers.

If the iron of the pyrites could be used for fluxing purposes, then the question of slagging off the silica would be simplified; but it is evident that in ores averaging 10 per cent sulphur, when quartz prevails in the gangue, there is no possibility of employing the pyrites for any other purpose than to produce matte, for after the addition of the necessary fluxes the quantity of matte produced from such an ore will barely suffice to collect a reasonable percentage of the gold and silver contents. Therefore, it is evident that the necessity exists of adding other elements to the charge, to furnish the requisite bases with which the silica can unite to form fusible compounds, and such additions to the ore charge must greatly increase the amount of material to be treated.

Mr. Lang mentions in his book (see page 58) that in his metallurgical plan: "It becomes necessary to maintain such a composition that the slags are not greatly less fusible than the ordinary lead slags," and therefore it is assumed that the mono-silicates will be the ones employed. In forming such slags the following amounts of the more commonly occurring slag-building elements are necessary:

TABLE SHOWING AMOUNTS OF BASES AND SILICA NECESSARY TO FORM MONO-SILICATE SLAGS.

| | SILICA. % | BASE. % |
|---|---|---|
| Iron mono-silicate | 29.41 | 70.59 (iron protoxide) |
| Lime " " | 34.88 | 65.12 (calcium oxide) |
| Magnesia mono-silicate | 42.86 | 57.14 (magnesia) |
| Alumina " " | 46.68 | 53.32 (alumina) |

An inspection of this table shows that lime will go further towards satiating silica than an equal weight of iron will, and that magnesia and alumina go further still. Just how much of these various bases it is best to use in a given case is a matter to be determined by the experience of the metallurgist in charge; but on a basis of a mono-silicate slag it would require to flux a ton of the 81.22 per cent silica ore mentioned above about two tons of iron-protoxide, or a slightly larger amount of hematite, about two and one-fifth tons. Or, if lime were used as the base, it would require about two and seven-tenths tons of pure lime rock. These amounts of dead fluxes added to the charge will be found to reduce the matte-fall in either case to less than 7 per cent, which in the absence of copper will only effect a very low percentage of saving.

Now, as the most of such ore bodies as Mr. Lang has under contemplation in his "metallurgical plan" are low grade as to values, the number of places where such a scheme could be put into profitable operation is exceedingly limited. Of course, if fuel and fluxes can be provided, and if the values in the ore are sufficient to cover the great expense of them, there is nothing, metallurgically speaking, impossible about it; but as there would be no iron and sulphur to burn, the smelting system used in treating such an ore in the raw state could hardly be termed pyritic smelting, in the modern acceptation of the term, but would come under the head of the old German "roharbeit" (see MINING AND SCIENTIFIC PRESS of March 28th, p. 245).

Almost any one familiar with the best modern ore treatment would, in such cases, advocate some other method than smelting, or at least that some attempt should be made to bring the iron-sulphide contents up to a higher percentage before putting it in the furnace. For instance, such an ore could, in most cases, be cheaply jigged, and the sulphide contents of the result thereby brought up to almost any requirement; and in that case the necessity for Mr. Lang's metallurgical plan would be still less apparent, for the product could then be more economically handled by pyritic smelting pure and simple. The degree of fineness of the concentrates is of little moment in such treatment, because there are various expedients which may be adopted in such cases; and furthermore, no matter how coarse the pyrites is when charged into the furnace, it usually, as soon as it is hot, flies to pieces (decrepitates) and becomes a sand under any circumstances.

Now, in reducing Mr. Lang's proposition to figures, so that the uninitiated can estimate the approximate cost of smelting an ore containing about 10 per cent of sulphur in a quartzose gangue, we have the following results:

APPROXIMATE COST OF FLUXES AND FUEL REQUIRED IN SMELTING 100 TONS OF QUARTZOSE ORE CARRYING 10 PER CENT SULPHUR.

| | *Tons.* | *Cost.* |
|---|---|---|
| Amount of silica to be fluxed off, assuming the ore carries 18.78% pyrites | 81.22 | |
| Amount of hematite required | 166.66@$3 ₱ ton | $ 499 98 |
| " " limestone " | 90.00@$2 " | 180 00 |
| " " coke " | 50.68@$15 " | 760 20 |
| Total for fluxes and fuel | | $1,440 18 |

The cost of fluxes and fuel per ton of ore smelted,

provided pure hematite and limestone can be had at above rates, will be $14 40, and the total matte-fall, if no sulphur at all is lost, will be 8 per cent. In addition to the cost of fuel and fluxes must be considered the cost of labor, power for blast, transportation of the matte to market, refining charges, interest on cost of plant, sinking fund, insurance, office expenses, salaries of superintendent, assayer, etc. The metallurgical losses which are sure to be met with in operations of this kind must also be given due consideration.

There may be some few isolated mines scattered throughout the mineral districts of the great West to whose ores Mr. Lang's proposed smelting treatment could be advantageously applied. Indeed, it would be strange if this were not so. Such cases, however, are rare. Undoubtedly Mr. Lang's methods will appeal strongly to the inexperienced; but if those who may be entertaining such a proposition will take the pains to have made an accurate silica determination of their average ore, and then ascertain the amount and cost of the bases required to flux off that silica, they will be "wise in their generation," and their wisdom will undoubtedly save them, not only from mental worry incidental to having attempted the impossible, but also from serious financial losses.

It is not the purpose of the writer to decry any particular method of ore treatment. Every mining proposition which comes up must be considered separately from a metallurgical standpoint, and no one smelting process, even when the ore to be treated is manifestly of a smelting character, can be applied in all cases. In treating matting ores the ordinary water-jacketed blast furnaces will, in some cases, be found to give the best results; in others, the large modern reverberatories should be given the preference, while with many classes of material pyritic smelting presents substantial advantages. As remarked above, there *may* even be instances where Mr. Lang's "metallurgical plan" can be used to more or less advantage, but probably less.

W. L. AUSTIN.

Denver, April 4, 1896.

# Electrical Progress.

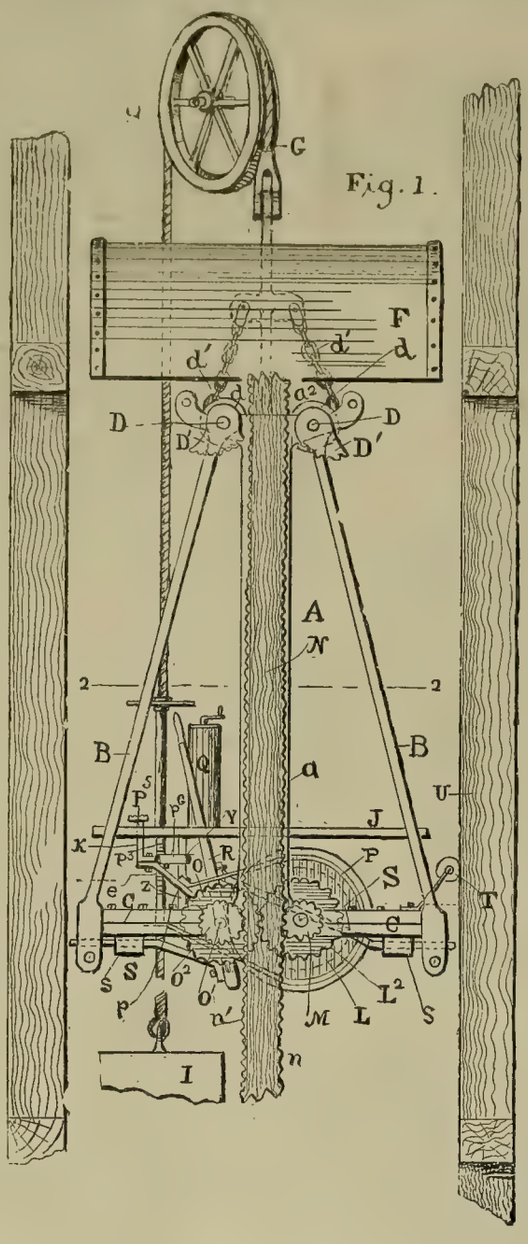
## Electric Mine Cage.

Chas. J. Cutler of Butte, Montana, thinks that electricity can be utilized to run a cage in a vertical shaft just as well as an elevator in an office or store building, and has patented a device that he thinks will be found practical wherever a cage or mine elevator is used. The power is had from a trolley wire. The inventor says that a sixty-horse power motor will thus raise a ton 1000 feet per minute; but by using as a counterbalance another cage or elevator a 120-horse power can be obtained which will raise one ton 2000 feet per minute. If there is one cage the regular weight counterbalance could be made 1000 pounds heavier, working on the plan of a Cornish pump.

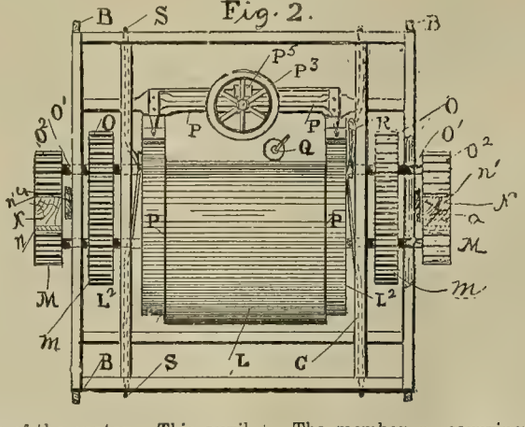
Figure 1 is an end view of the elevator cage, in position in the shaft. Figure 2 is a horizontal section on the line 2 2 of figure 1. Figure 3 is a view, partly in vertical and partly in side elevation.

*D D* are a pair of rock shafts journaled in the cross-heads *a2*, carrying near their centers pulleys *d*, to which are connected chains *d* depending from a swivel secured to the lower end of the lift-bar *E*, to the upper end of which lift-bar the counterbalance cable *G* is attached. On the outer ends of these rock shafts are toothed cams *D*. *F* is a cover portion through which passes the lift-bar *E*, connecting with the counterbalance cable *G*, which latter passes over the large sheave *H* and supports at its lower end counterweight *I*, of suitable form and size.

*J* indicates a platform mounted on the cage frame at a point above the motor frame *C*. Upon it is mounted or disposed the controlling lever, rheostat and brake mechanism. *L* is an electric motor having its shaft journaled in the frame *C* of the cage. Upon the outer ends of the motor shaft are cog pinions *M*, which are held to engage the racks *n* on one side of the guide timbers *N*, which are secured within the shaft at opposite sides of the cage. The motor shaft is provided at intermediate points near each end with cog pinions *m* of larger diameter than those on the ends. These pinions mesh with similar cog pinions *O* on an auxiliary shaft *O1*, journaled in frame *C* alongside of the motor. This auxiliary shaft is provided on its ends with smaller pinions *O2*, which engage the racks *n* on the opposite sides of the guide timbers *N*. The motor shaft is provided near the supported motor with enlargements or pulleys *L2 L2*, over which pass the steel brake bands *P*, having wooden brake blocks.

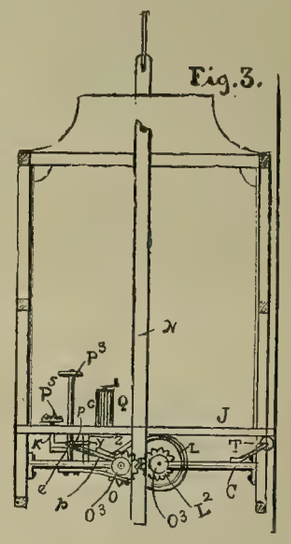



The lower end of each brake band *P* is secured on the under side of a fixed portion of the cage frame, as shown in figures 1 and 3, and its opposite or upper end is secured to the legs of the pivoted transverse member *p*, as shown in figure 5, whereby the bands may be clamped or tightened around the pulleys *L2 L2* or loosened when it is desired to apply or release the brakes.




The member *p*, carrying the upper ends of the brake bands, is depressed by either foot or hand power. To the center of its transverse portion is affixed a vertical standard *k*, projecting upward through the platform and terminating in a head or foot rest *v*, thus forming a foot lever *P5*, by means of which the operator is enabled to readily depress said member and clamp the spring brake bands with his foot. A transverse slot or opening *W* is also formed on the rear side of member *p* by means of projecting lugs *e e*, adjacent to each other, for the accommodation of the hand brake *P3*. This hand brake consists of a vertical screw rod surmounted by a hand wheel and extending down through the platform *J*, through the slot *W*, and having its lower end revolubly secured in the motor frame *C*. This rod is screw-threaded where it passes through the slot *W*, and upon the screw-threaded portion above the member *p* is placed a nut *p6*, designed to be forced down the screw-threaded portion of the rod and carry with it the member *p* when the rod is revolved by hand. In order to prevent the nut from turning with the rod, it is provided with a perforated shank *Y*, intended to fit over and move upon a vertical guide rod *z*.

*Q* represents a rheostat mounted on the operator's platform for controlling the motor. *R* is a hand lever fulcrumed on the shaft *O*, to which are secured—one above and one below the fulcrum—chair blocks or plungers *S S*, secured in guides on the under side of frame *C*, and projecting in opposite directions. These plungers are adapted to be projected outward through the medium of the lever *R*, so that their ends will engage a rack or openings in the sides of the shaft at any desired point for the purpose of arresting and sustaining the cage when ascending or descending.




*T* indicates a trolley or contact maker flexibly secured to the frame *C*, and which engages the wire or circuit plate *U*, secured to the side wall of the shaft, as shown.

By referring again to figure 1 it will be seen that the rack guides *N* occupy position between the toothed-faced cams *D D* when the cage is in position, said cams being held out of contact with the racks *n n* by the chains *d*, while the cage is suspended by the counterbalance cable *G*. Should the latter break, the inventor claims the rock shafts *D* would be caused to turn by the weight of the cams, throwing the toothed faces of the latter in contact with the racks *n n* on the guides N, and they would operate as automatic safety clutches, arresting the downward movement of the cage. At the same time the chair blocks or plunger rods *S S* might be forced outward by the lever and serve as an additional means of supporting the cage.

The lower ends of the pendent members *B* of the cage are provided with eye-holes for conveniently attaching a lower cage or compartment, it being the purpose in mining work to have a two-compartment cage—one above the other—the upper to be occupied by the operator.

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A COUNTERPART to the story of the college professor who was driven almost to a frenzy by the behavior of the galvanometer while he was mak-

ing some tests, and who on removing his hat, in the rim of which there happened to be a strip of metal, found that the needle swung true again, to his infinite relief, has been met in Berkeley, where in the electrical department of the girls' high school the professor in charge has for some time been grievously perplexed and disturbed. His delicate testing instruments would play him all manner of tricks, and experiments which he had always made with the certainty of a specific result would turn out in a most inexplicable way. These curious phenomena were exhibited only when certain of the students approached the galvanometer. The professor discovered that the disturbance was caused by the wearing of corsets with ribs of steel; the instruments were entirely unaffected by the proximity of the students who wore health waists or webbing braced with whalebone or other substitute for steel. The position was a delicate one, and the professor became strategic. He took counsel with two of the women teachers, who lectured the girls on hygiene and physical development, and warned them of the evils of corsets. But the real motive of the new crusade leaked out, and many of the girls found plenty of excuses for declining to make the sacrifice suggested. Finally the professor was obliged to issue a rule forbidding corseted girls from entering the electrical laboratory, and the governors indorsed the rule. Some of the girls who thought that they could surely succeed in gaining admittance to the laboratory without obeying the edict reckoned without the professor, and were promptly turned back. At the entrance to the department was placed a sensitive galvanometer, alongside of which the professor stands unobtrusively. On the approach of a girl wearing steel-ribbed corsets the needle gyrates frantically, and the wearer is respectfully but firmly reminded of the rule. It is impossible to beat the game and expostulations are useless.

SUMMARIZED REPORT OF SEVENTEEN ELECTRIC STREET RAILWAYS TO RAILROAD COMMISSIONERS OF STATE OF CONNECTICUT FOR YEAR ENDING SEPT. 30, 1895.

| Name of Road. | Miles of Track. | No. of Cars. | No. of Employes. | Repairs of: Roadway and Track | Electric Line Construction | Cars | The Electric Equipment of Cars | Buildings and Fixtures | Total of Repairs. | Electric Motive Power | Removal of Snow and Ice | Horse Fodder and Care of | Wages of Train Men | Salaries and Other Wages | Insurance, Loss, Damage and Gratuities | Sundries | Expense Account | Total Expense per Car Mile | Gross Earnings per Car Mile |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Central Ry. and Electric Co. of New Britain | 13.65 | 27 | 48 | $.0172 | ..... | $.0181 | $.0015 | ..... | $.0368 | $.0400 | $.0020 | $.0008 | $.0524 | $.0159 | $.0050 | ..... | $.0021 | $ .1550 | $ .2175 |
| Danbury and Bethel St. Ry. Co. | 11.15 | 30 | 45 | .0012 | ..... | .0029 | .0012 | ..... | .0053 | .0140 | 0012 | .0180 | .0443 | .0060 | .0059 | Construction. $.0013 | .0011 | .0971 | .1350 |
| Derby St. Railway | 6.29 | 25 | 38 | .0036 | $.0019 | .0076 | .0065 | $.0011 | .0207 | .0143 | .0009 | ..... | .0569 | .0197 | .0081 | Park. .0455 | .0075 | .1736 | .2477 |
| Fairhaven and Westville R.R. Co. | 20.50 | 99 | 169 | .0355 | .0023 | .0133 | .0019 | .0002 | .0532 | .0152 | .0011 | .0117 | .0697 | .0084 | .0024 | ..... | .0084 | .1701 | .2253 |
| Hartford Street Railway | 60.70 | 200 | 481 | .0130 | .0007 | .0082 | .0053 | .0013 | .0285 | .0175 | .0032 | .0222 | .0728 | .0027 | .0029 | ..... | .0082 | .1580 | .2046 |
| Hartford, Manchester and Rockville Tramway | 6.30 | 14 | 45 | .0153 | .0053 | .0095 | .0083 | .0062 | .0446 | .0343 | ..... | ..... | .0788 | .0300 | .0032 | ..... | .0153 | .2062 | .3663 |
| Hartford and West Hartford Horse Ry. Co. | 10.50 | 21 | 21 | .0018 | .0004 | .0023 | .0007 | .0001 | .0053 | .0267 | .0053 | ..... | .0437 | .0063 | .0016 | ..... | .0076 | .0965 | .1409 |
| Meridan Electric Railroad | 16.50 | 47 | 87 | .0012 | .0018 | .0043 | .0090 | .0001 | .0164 | .0193 | .0019 | ..... | .0653 | ..... | .0071 | Park. .0079 | .0062 | .1241 | .1721 |
| Middletown Street Railway | 4.50 | 14 | 15 | .0013 | .0002 | .0009 | .0004 | .0004 | .0032 | .0404 | .0019 | .0009 | .0618 | .0127 | .0073 | .0051 | .0034 | .1367 | .2022 |
| New Haven and Centreville St. Ry. | 11 40 | 20 | 33 | .0001 | .0009 | 0014 | .0005 | .0002 | .0031 | .0146 | .0005 | .0118 | .0628 | .0066 | ..... | ..... | .0009 | .1003 | .1936 |
| New London St. Ry. | 6.96 | 18 | 20 | .0089 | .0012 | .0066 | .0057 | .0001 | .0225 | .0414 | .0006 | ..... | .0497 | .0163 | .0075 | ..... | .0095 | .1475 | .2517 |
| Norwalk St. Ry. | 5 50 | 16 | 29 | .0003 | ..... | .0043 | .0040 | .0043 | .0129 | .0301 | .0005 | ..... | .0642 | .0191 | .0205 | ..... | .0308 | .1781 | .2333 |
| Norwalk Tramway Co. | 10.00 | 23 | 25 | .0051 | .0014 | .0025 | .0030 | .0002 | .0122 | .0322 | .0008 | ..... | .0482 | .0158 | .0069 | ..... | .0117 | .1278 | .1865 |
| Norwich St. Ry. Co. | 12.40 | 25 | 45 | .0138 | .0017 | .0078 | .0120 | ..... | .0353 | .0386 | .0011 | .0014 | .0605 | .0221 | ..... | ..... | .0132 | .1722 | .2766 |
| Southington and Plantsville Tramway Co. | 1.57 | 2 | 5 | .0062 | .0011 | .0031 | .0063 | .0070 | .0237 | ..... | .0011 | ..... | .0355 | .0355 | .0023 | ..... | .0305 | .1284 | .1178 |
| Waterbury Traction Company | 10.60 | 44 | 75 | .0051 | .0022 | .0040 | .0065 | .0002 | .0180 | .0342 | .0030 | .0009 | .0636 | .0071 | .0048 | Transportation. .0065 | .0058 | .1439 | .2361 |
| Winchester Avenue R. R. of West Haven | 16.77 | 81 | 125 | .0059 | .0019 | .0080 | .0064 | .0003 | .0225 | .0159 | .0007 | .0019 | .0687 | .0122 | .0069 | Transportation and Maintenance .0205 | .0173 | .1666 | .2730 |
| Totals | 225.29 | 708 | 1306 | $.1355 | $.0230 | $.1048 | $.0792 | $ 0217 | $.3642 | $.4287 | $.0258 | $.0696 | $.9989 | $.2364 | $.0924 | $.0868 | $.1795 | $2.4821 | $3.6802 |
| Average per Car Mile | ..... | ..... | ..... | $.0080 | $.00164 | $.00616 | $.00472 | $.00155 | $.0214 | $.0268 | $.0016 | $.0077 | $.0587 | $.0148 | $.0066 | $.0144 | $.0106 | $ .1460 | $ .2165 |

| | Average. | Highest. | Lowest. |
|---|---|---|---|
| Cars per mile, single track | 3.35 | | |
| Employes per mile, single track | 5.51 | | |
| Cost of repairs, per car mile | $0.0214 | $0.0532 | $0.031 |
| Cost of electric motive power, per car mile | 0.0268 | 0.0414 | 0.0140 |
| Wages of train men, per car mile | 0.0587 | 0.0788 | 0.0355 |
| Salaries and other wages, per car mile | 0.0148 | 0.0355 | 0.0027 |
| Total expenses, per car mile | 0.1460 | 0.2062 | 0.0965 |
| Gross earnings, per car mile | 0 2165 | 0.3663 | 0.1178 |

# Scientific Progress.

## Niagara Falls' Roar Heard in New York City.

Written for the MINING AND SCIENTIFIC PRESS by ORRIN E. DUNLAP, Niagara Falls, N. Y.

One of the truly novel features of the electrical exposition in New York city was the transmission of the roar of Niagara Falls by telephone. After investigation, it was decided that some point near the Cave of the Winds would be the best point at which to gather the sound. Here one can get closer to the falls than at almost any other place. So here the telephone was placed. To reach this point one descends the Cave of the Winds' spiral stairway and walks toward the Center Fall about 200 feet. There on the rocky ledge a wooden box about 3½ feet long, 3 feet high and 1½ feet wide was placed. In this box a telephone with a solid back-transmitter was placed and a sheet-iron funnel 20 inches long and about 14 inches in diameter at the fall was fitted to the transmitter. Three standard batteries were placed in the box, but two only were used. About the box white canvas was wrapped, to protect the apparatus from the constantly falling spray.

At the point where the telephone is placed there are two distinct sounds produced by the falling tons of water. One is a sharp, hissing sound, like escaping steam, made by the water as it curls over the rocks below and goes sweeping out into the river. The other is the deep-pounding roar made as the fall strikes the rocks or water below. First experiments made with the telephone placed some 12 or 15 feet further away from the falling water were successful in catching the sharper hiss of the waters. This sound was plainly heard in New York, but the deeper roar was not caught. It was for this reason that the change in location was made, and the roar as heard in the world-famed Cave of the Winds was dispensed in New York, 462 miles distant.

ASSOCIATED in small quantities with argon, which in turn occurred with its apparently inseparable companion, nitrogen, helium has been found issuing in a stream into the air in the gas springs of the Black forest; hence, according to Prof. Kayser, to whom the discovery is due, free helium must be found in the air along with argon. The spectroscopic lines, says Prof. Kayser, though very faint, are distinct enough to show that its presence in the air is a matter of no doubt. Prof. Ramsay, the actual discover of helium as now known to the world, states that the most searching attempts to demonstrate the actual existence of helium as a normal constituent of the air have failed.

THE report of the Commissioner of Patents, John S. Seymour, for the year ending December 31st, 1895, was submitted to Congress last week. It shows that aggregate receipts from all sources during the year were $1,245,247, expenditures $1,084,496. In every year since 1861 there has been a surplus over all expenditures. During the year there were issued 21,998 patents and designs, exclusive of 59 reissues, and inclusive of 2049 issued to foreigners, 1829 trade marks and three prints registered, and 46,899 applications filed for patents, trade marks, labels, prints, etc. There were also 12,348 patents which expired and 3428 patents forfeited for non-payment of final fees. The four foreign countries leading in the number of patents issued to their citizens by the Government are: England, 614; Germany, 539; Canada, 302; France, 202. In the United States the States leading in the number of patents issued to their citizens are: New York, 3529; Pennsylvania, 2246; Illinois, 2130; Massachusetts, 1259; Ohio, 1233. During the past twenty-five years twenty-five inventors have been granted more than one hundred patents each, the whole number granted to them within that period being 4894. In these "Wizard" Thomas A. Edison of Orange, N. J., leads with 711, Elihu Thomson, the electrician, coming next. The greatest activity of the year was shown in detail inventions and accessories to bicycles and in machines and processes for making the parts. Pneumatic tires have attracted the inventor because of their almost universal use on sulkies as well as bicycles.

DURING a recent voyage around the world Mr. E. D. Fridlander made observations with a pocket dust counter of the amount of dust in the atmosphere in various places. The dust was found not only in the air of civilized countries, over the water near them, and up to 6000 or 7000 feet in the Alps, but was fairly abundant over the ocean far from land, while it has been proven to exist at a height of more than 13,000 feet.

OBSERVATIONS upon the preservation of timber have shown that the more warm and humid the atmosphere the more rapidly the wood deteriorates; also that timber felled in winter is more durable than that felled in summer, and that timber raised in cold climates is most durable, while the best timber is produced on meager soil. When under water the most lasting woods are oak, alder and pine, the least so being birch, linden and willow. In the air timber is exposed to the ravages of insects, this being the case with sap wood more than the hard wood. Woods rich in resin, like the elm and poplar, are not so much troubled as those like the alder, willow, birch, yoke elm and red beech, which have an abundance of sap, and are rapidly deteriorated. Timber construction which is protected from heat and humidity is only endangered by worms, and, on the contrary, that which is in a damp and badly aired place injures by rotting, which is really the result of microscopic vegetable growths. The primary cause of the decay of wood is the presence of albuminoid substances in the sap and incrusting materials, these naturally affording nourishment to insects and microscopic vegetations and their destructive work.

POTASSIUM PLATINO-CYANIDE is still preferred by Jackson, the English physicist, as the fluorescent substance in experiments with Roentgen rays. He gets twice as much light as from calcium tungstate, and is able, with moderate electric energy, to see distinctly the bones in the thickest part of the body, the jawbones in action, and the outline of the skull. He uses two-thirds of an ounce of the potassium salt in a mucilaginous vehicle over a six-inch disk of black cardboard, and affirms that Edison tried too little. Zickler, a German experimenter, has made radiographs with and without visible fluorescence, and finds the latter results equal or better than the former, with the same exposure, thus demonstrating that the rays have a direct chemical action on the plates.

THE great telescope of the Berlin exhibition, when completed, will have two objectives—one of 43 inches aperture and about 20 feet focus, the other of 28 inches aperture and 68 feet focus—in one mounting. It will have no dome, but will be curiously mounted in an immense cylinder, supported only at the inner end.

# Mechanical Progress.

## Lead Production.

The United States Geological Survey gives the following statistics of the production of lead:

| State or Territory. | 1894. Net tons. | 1895. Net tons. |
|---|---|---|
| Colorado | 50,613 | 46,984 |
| Idaho | 33,308 | 31,638 |
| Utah | 23,190 | 31,305 |
| Montana | 9,637 | 9,802 |
| Nevada | 2,254 | 2,583 |
| New Mexico | 2,973 | 3,040 |
| Arizona | 1,480 | 2,053 |
| California | 478 | 949 |
| Washington, Oregon, Alaska and South Dakota | 150 | 381 |
| Missouri, Kansas & Wisconsin. | 8,614 | 13,706 |
| Total lead contents of ores smelted | 132,697 | 142,441 |
| Contents Mexican and Canadian ores | *21,000 | †21,477 |

*Estimated. †Of which 5040 are Canadian.

Assuming that the waste and loss in smelting amounted to 6 per cent, then there were derived from the ores mined in the United States, worked by smelters and desilverizers, 124,700 net tons in 1894 and 134,900 net tons in 1895. Adding the production of soft lead from Kansas, Missouri and Illinois ores, which was 37,686 net tons in 1894 and 39,890 net tons in 1895, the following amounts are reached as closely representing the product of lead from American mines: 162,386 net tons in 1894 and 174,790 net tons in 1895.

According to direct returns the total production of desilverized lead was 201,992 net tons. Of this a certain quantity was obtained from refining Mexican and Canadian base bullion (returned at 54,696 net tons), and from the lead contents of Mexican and Canadian ores (21,477 net tons as per returns).

Making an allowance for waste of 2 per cent on base bullion and 6 per cent on ores there was, therefore, included in the above 201,992 net tons of soft lead, 73,792 of foreign material, leaving 128,200 net tons of lead from domestic sources. This compares with 134,900 tons found by estimating on the basis of direct returns of the lead contents of ores from the smelters. This apparent discrepancy is probably accounted for by changes in the stocks of base bullion carried by refiners, by changes in the quantity of material in transit from smelters to desilverizers, and by difference between the actual metallurgical loss and that estimated. Under the circumstances it seems justifiable to estimate the lead product of

the United States for 1895 at 161,440 net tons.

### Unusual Fly Wheels.

The great velocity at which fly wheels are driven and the consequent casualties that have become a matter of weekly report are evidence of slow evolution in providing for known wants. The sudden advent of electrical apparatus and its high speeds found people making fly wheels of cast iron, with a narrow factor of safety, or, indeed, no factor of safety at all if we consider the impossibility of detecting inherent strains and imperfections in this material. No one can know the value of material molded into form at a temperature of 2,000 degrees and then cooled down to a fortieth of this temperature, nor can they judge internal structure by surface indications. The fact is that cast iron is not suitable material for fly wheels that are to be driven at high speed, nor is it necessary to make them of this material. There is not even the claim of cheapness in their favor, if the methods of making such wheels of wrought iron and steel were once worked out. Twenty years ago a Scotch firm, who had to make a large fly wheel for a spinning mill, riveted up a box rim, made from rolled plates, and filled it with cemented masonry or "grout," and did a very sensible thing. The strength of rolled sections is tolerably well known, their integrity is beyond doubt or can be so, and all that is wanting is some ingenuity and experiment to substitute this kind of material. One reason for using cast iron for fly wheels is to attain a section and stiffness of the arms that will, in the plane of rotation, resist the inertia and momentum of the rim. The sections of wrought-iron spokes required for radial or centrifugal strain are by far too weak for the driving strains, but this is easily provided for by diagonals as in the case of other iron structures.—Cassier's Magazine for June.

THE Helena, Montana, Water and Electric Power Company incorporated on the 21st inst.; capital stock, $200,000. Incorporators—G. T. Hauser, A. M. Holter, T. A. Maslow, Helena; B. Jewell, O. R. Peck, Chicago; A. G. Hewitt, W. G. Gurnee, New York; object, to build a dam across the Missouri river at Stubbs, Mont., and by the falls generate electric power to be used in Helena and East Helena, fourteen miles away, in the shape of mining, factories and car lines. The company will start out with an 800-horse power plant. The smelting works at East Helena will be run by power generated by this company.

## Practical Information.

### Preserving Small Skins.

As the camping season is at hand, and many of our young men may take to the mountains, prey upon the inhabitants and wish to preserve mementoes of the slaughter, the following directions from the *Country Gentleman* may do to put in their gun-cases:

Clean off all the flesh and fatty matter on the flesh side, after which wash that side with a strong lye made from wood ashes, and follow that washing very soon with one of sperm oil. Rub such parts as are not soft enough until they are, and the work is done. Skins of animals of the squirrel size may be tanned in from five to ten minutes; of the cat and rabbit in ten to fifteen; lambs in fifteen to twenty, and calf skins in thirty minutes. The lye must not be allowed to work too long, or it will consume the fiber, and, eating through the skin, will loosen the hair. The design is to have the lye consume or destroy the gluten only, and to use the oil to preserve the fiber and hair, all of which will be realized if the lye and oil are properly used. Rubbing the hair with dry sawdust will cleanse it and give it a bright, glossy appearance.

Stretch the skin on a piece of thick plank and tack the edges, the flesh side being uppermost. Then scrape off all the flesh, fat, etc., being careful to avoid cutting the skin. Then mix equal parts of salt and alum, finely powdered, with rye flour into a paste sufficient to cover the skin a quarter of an inch thick. If there is only one, it should be doubled and pressed by laying a shingle or piece of board upon it, with a weight upon this. If there are several, they may be laid in pairs, the flesh sides together and then pressed. In this state they are to lie for ten days, when for a thick skin the dressing should be repeated. When the skin is fully "tawed" (not tanned) it is shaken out, and again stretched and rubbed with a piece of chalk, and then with pumice stone until it will take in no more chalk, and is quite dry and nice. It is then well shaken and beaten, and is ready for use. Mole skins dressed in this way make beautiful gloves or trimmings.

First soak the skins in cold water until soft. (If just taken off, they will not need soaking.) Then scrape the flesh and grease off. This can be done over a half-round post. Set one end on the ground and have the other as high as the hips. Place the skin over the post so as to lean against the end of the post, and hold the neck of the skin. In place of a beam-knife, a long carving-knife can be used by winding a cloth on the point, so both ends can be held to scrape the skin with the middle of the knife. Next make a liquor by dissolving one pound of alum and one pound of salt together in two or three gallons of water. Set the liquor to cool and put the skins in. Stir them so that the liquor reaches all parts of the skin, and let them remain in the liquor from six to ten days, or longer, if in no hurry for the skins. Then dry them in a cool place.

Dampen them by hanging up in a cellar over night, and then stretch them out. This can be done over a spade turned handle down. (Or a stretcher can be made by nailing a piece of 1½-inch plank, 2½ feet long by 8 inches wide, in the center of a 2-inch plank, 10 inches wide by 3 feet long, in the form of a T, and sawing a slit in the top of the upright piece and fitting in a piece of iron or an old hoe blade.) To clean the fur, put 6 or 8 inches of hardwood sawdust (the finer the better) into the bottom of a barrel and put the skins in, putting more sawdust among and over them; then stand in the barrel and tread them until the fur is clean. The liquor will keep a long time, and as used can be renewed by adding alum and salt.

Take of saltpeter one part; salt, two parts; alum, two parts; pulverize finely and mix thoroughly. From the skins remove all fleshy parts; if they have been dried, you must soak them in water to soften them. Then give the skins a thin coating of the mixture, turn the sides in, roll them up, and lay aside for a few days. The thicker the skin, the longer they must lie. A squirrel requires about three days and a rabbit skin would require, probably, four or five, and perhaps six days. A little practice will be the best teacher in this. Now take them and rinse thoroughly, removing all the mixture; wring them out well; keep rubbing them between the hands and pulling them in every direction until perfectly dry. By following the above directions you will have skins as soft as velvet.

ELECTRIC light wire men frequently carry a small compass in their pockets and before they touch a wire hold the compass near it. If the needle is not deflected, they know there is no current in it and that it is safe to handle; but if the needle is deflected, they use the utmost caution, lest they receive a severe shock and be perhaps killed.—N. W. Perry.

WHAT is probably the largest vein of coal in the world occurs at the strippings near Shenandoah, Pa. It is 50 feet thick, and so near the surface that it is simply quarried like stone. No fewer than 7,145,000 tons of coal were extracted from it last year by the Philadelphia & Reading Coal and Iron Company.

## CALIFORNIA MINES AND MINERS.*

### Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

#### MARIPOSA COUNTY—Continued.

| NAME OF MINE. | Character of Mine. | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| Princeton | Gold. | | Mariposa Estate | | |
| Quail Mine | " | | 10 m E of Coulterville | — Buschi, Owner | Coulterville |
| Quartz Mountain | " | | 2 m S of Hornitos | M. L. Rodgers, Own | Hornitos |
| Red Cloud | " | | 10 m E of Coulterville | Red Cloud M. Co, Own | Coulterville |
| Red Hill | " | | 6½ m S E of Coulterville | Mrs. G. Cammisiona, Own | Coulterville |
| Regan | " | | 6 m N of Mariposa | H. Austin et al, Own | Fresno |
| Reliance Red'n W'ks | " | 5 | 2 m S of Hornitos | M. H. Harn, Supt | Hornitos |
| Rising Sun | " | | 1 m W of Bear Valley | J. Dalcich et al, Own | Bear Valley |
| River View | " | 2 | 6 m W of Hornitos | H. Nelson et al, Own | Merced Falls |
| Robert Emmet | " | | 5 m S W of Coulterville | R. E. McSherry and McCrellish Est., Own | Coulterville |
| Rollins | " | 4 | 8 m E of Mariposa | Revelle Bros., Own | Jerseydale |
| Rutherford | " | | 25 m E of Mariposa | Capt. A. H. Ward, Own | Alameda |
| Santa Clara | " | 2 | 7 m N E of Mariposa | Steten & Hart, Own | Mariposa |
| Santa Rosa | " | 20 | 7 m N E of Mariposa | Hayward & Lane, Own. W. Garvard, Supt | Mariposa |
| Schroeder | " | | 9 m N E of Mariposa | John Schroeder, Own | Mariposa |
| Sebastopol | " | | 4 m S of Mariposa | — Hart, Own | Mariposa |
| Sheridan | " | | Coulterville | Merced G. M. Co., Own | Boston |
| Sherlock | " | | 5½ m N E of Mariposa | | |
| Spencer | " | | 6½ m N of Mariposa | Capt. A. H. Ward, Own | Alameda |
| Star | " | | 11 m E of Coulterville | C. L. Mast, Supt | Coulterville |
| Stevenson Group | " | 8 | 6 m S of Coulterville | N. Martenweiler, Own | S. F. |
| St. Paul | " | 2 | 3 m S E of Coulterville | Angelo Gabarrino, O'n | Coulterville |
| Teets Mine | " | 2 | 6 m N of Mariposa | Jacob Teets | Mariposa |
| Texas Gulch | " | | See Mariposa Estate | | |
| Teborn | " | | 2 m S of Hornitos | Mrs. Hardwick, Own | Hornitos |
| Triple Alliance | " | 3 | 2½ m N W of Bear Valley | Robt. Hutchinson et al, Own. | Bear Valley |
| Triumph Mine | " | 2 | 6 m N of Mariposa | J. Helm, Own | Mariposa |
| Tyro | " | 30 | 1½ m S W of Coulterville | J. McLaughlin, Supt | Coulterville |
| Vanderbilt Mine | " | 4 | 8 m E of Mariposa | Geo. Bebee, Supt | Darrah P. O. |
| Ventura Mine | " | | 1 m S E of Coulterville | J. R. Gilbert, Supt | Coulterville |
| Virginia Mine | " | | 4 m S E of Coulterville | O'Toole & Arnold, Own | San Diego |
| Washington Mine | " | | 2¾ m N E of Hornitos | M. L. Rogers, Own | Hornitos |
| Westminster Mine | " | | 5 m N W of Hornitos | H. Nelson et al, Own | Merced Falls |
| Whitlock Mine (Alabama) | " | 63 | 6 m N of Mariposa | Sierra Butte G. M Co Own; A. G. Briggs, Sup | Mariposa |
| Wilson | " | | 1 m E of Hornitos | Jos. Wesinger, Supt | Bakersfield |
| Wilson & Pedburg | " | | 8 m E of Coulterville | Wilson & Pedburg, O'n | Coulterville |
| Yellowstone Mine | " | | 1 m W of Bear Valley | C. H. Burt, Supt | Bear Valley |

#### MENDOCINO COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Boy Edgar | Gold. | | 15 m E of Ukiah | C. H. Stout, Owner | Ukiah |
| California | Seltzer Water. | | 12 m from Cloverdale | | |
| Cook's Springs | Water. | | 35 m E of Eureka | F. W. Cook, Own | Iaqua, Hum'dt Co. |
| Duncan's | Miner'l Water. | | 1¼ m S W of Hopland | O. Howell, Own | Hopland |
| Eel River | Coal. | | 4 m N of Eden Valley | H. Bragg, Agt | S. F. |
| Garley | Miner'l Water. | | 1 m N of Ukiah | — Garley, Own | Ukiah |
| Lane's Spring | " | | Redwood Valley | Thos. Lane, Own | Calpella |
| Mountain View Sp'gs | | | 28 m E of Eureka | C. H. Stout, Own | Ukiah |
| Orr's Hot Springs | | | 14 m N W of Ukiah | J. L. Orr, Supt | Orr P. O. |
| Salinas | Copp'r. | | 15 m E of Ukiah | Dr. G. W. Stout, Own | Ukiah |
| Thomas | Coal. | | 2 m W of Eden Valley | W. P. Thomas, Own | Ukiah |
| Thomas | Copp'r. | 3 | 2 m S of Eden Valley | W. P. Thomas, Own | Ukiah |
| Vichy | Water. | | 3 m N E of Ukiah | Wm. Doolan, Own | Ukiah |
| Van Allen | Gold. | 2 | 6 m W of Ukiah | Wm. Van Allen, Own | Ukiah |

#### MONO COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Bodie Tun'l & Bechtel | Gold quartz. | 11 | 2 m N of Bodie | Cain & McGove, Owner | Bodie |
| Blanchard & Davidson | Lime. | 3 | 6 m S E of Bodie | Blanchard & Davidson, Own. | Bodie |
| Bulwer | Gold quartz. | 10 | 1 m N of Bodie | J. Kelly, Supt | Bodie |
| Buckeye Hot Springs | | 1 | 7 m W of Bridgeport | C. E. Heath, Own | Bridgeport |
| Bodie | Gold quartz. | 12 | ½ m E of Bodie | John Kelly, Supt | Bodie |
| Contention | " | 6 | ½ m E of Bodie | John Kelly, Supt | Bodie |
| Cal. Travertine | Marble | 5 | 1 m S E of Bridgeport | Cal. Travertine Co, O'n | Bridgeport |
| Cow Boy | Gold quartz. | 3 | 8 m S E of Bridgeport | R. A. Cameron, Supt. | Bridgeport |
| Defiance | " | 3 | ½ m E of Bodie | J. Kelly, Supt | Bodie |
| Dog Town | Placer. | 8 | 9 m S of Bridgeport | C. Anderson, Own | Bridgeport |
| Fales' Hot Springs | Miner'l Water. | 2 | 14 m W of Bridgeport | A. S. Fales, Own | Bridgeport |
| Noonday & Red Cloud | Gold. | 5 | ½ m S E of Bodie | Cameron, Graham & Co., Own. | Bodie |
| Summit | Gold quartz. | 4 | ½ m E of Bodie | J. Kelly, Supt | Bodie |
| Syndicate | " | 10 | 2 m N of Bodie | Parr & Tigue, Own | Bodie |
| South End Cyanide Plant | | 7 | ½ m S of Bodie | — Recknagel, Supt | Bodie |
| Ward | Gold quartz. | 4 | 12 m S of Bridgeport | J. L. McLeoud, Own. | Bridgeport |

#### MONTEREY COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Camello Coal Mine | Coal. | Idle. | 14 m S of Monterey | A. Bassett | Pacific Grove |
| Cruikshank | Gold. | " | Near Jolon | L. Gibson, Pres't | S. F. |
| Tassajara Hot Sp'gs | | 1 | Monterey County | Henry Arnold | Tassajara Sp'gs |
| Kings, C. H | Water. | | Kings City | C. H King | Kings City |
| Mylar Asphalt Co | Asp'lt. | 3 | 9 m E of Kings City | Isaac Mylar, Pres't. | |
| Paraiso Hot Springs | | | 7 m S W of Soledad | R. Robertson | Paraiso Sp'gs P.O. |
| Ulrey, Mrs (Well) | Water. | | Kings City | Mrs. Ulrey | Kings City |

#### LAKE COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| American | Quicksilver. | | 7 m N of Middletown | Wright Bros., Own | Middletown |
| Abbott | " | 14 | 30 m W of Williams Station. | A. A. Gibson, Supt | Sulphur Creek |
| Bullion | " | 2 | 4 m S W of Middletown | Wm. Parsons, Owner | Middletown |
| Baker | " | | 5 m E of Lower Lake | J. C. Baker, Own | Lower Lake |
| Chicago | " | 2 | 6 m W of Middletown | Munz & Ramsdale, O'n | Middletown |
| Corona | " | 4 | 9 m S of Lower Lake | | |
| Great Western | " | 150 | 4 m S W of Middletown | Andrew Rocca, Supt. (75 Chinese.) | Calistoga |
| Maypole | " | 2 | 7 m W of Middletown | Farmer & Turner, Own | Middletown |
| Mirabel | " | 65 | 4 m S W of Middletown | W. W. Randol, Supt. (8 Chinese.) | 320 Sansome, S. F. |
| Sulphur Banks | " | 25 | 19 m N E of Lower Lake | R. White, Own | Lower Lake |
| Utopia | " | 6 | 8 m E of Lakeport | Thos. Sheridan, Own | Lakeport |
| Uncle Sam | " | | 10 m N E of Lower Lake | A. A. Gibson | Lower Lake |

#### LASSEN COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Blue Bell | Gold. | | 59 m N of Susanville | W. C. Howard & Preston | |
| Brush Hill | " | 8 | 59 m N of Susanville | G. Frank Stone | Hayden Hill |
| Evening Star | " | | 59 m N of Susanville | Schloesser et al, Own | |
| Gopher G. M | " | 3 | Hayden Hill | T. Jones | South Fork, (Modoc Co.) |
| Golden Eagle | " | 29 | 59 m N of Susanville | W. C. Howard | Hayden Hill |
| Hayseed | " | 4 | 59 m N of Susanville | L. Owens | Hayden Hill |
| Hayden Hill Con. Tunnel Co | | | High Hill | J. McCoy | Adin, (Modoc Co.) |
| Juniper | Gold. | 3 | 59 m N of Susanville | J. Cyrus | Hayden Hill |
| North Star | " | 3 | 59 m N of Susanville | N. F. Sumners | |

—* Begun in issue of April 25, '96. (To Be Continued.)

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Oertling's Assay Scale, No. 10, in glass case; powers, 10 grains down to 1-100 grain and riders, with weights; price, $60, offered for $40.
Oertling's Pulp Scale, No. 1, in case; power, 500 grains to 1-50 grain; without weights; price, $40, offered for $30.
German Assay Scale, not in case; steel bearings, 10-inch open beam, index pointing below; mounted so as always to be level; pans suspended by three platinum wires and hook; all packs in drawer 12½x6½x2 inches; without weights; price $35, offered for $25.
German Scale; agate bearings for center knife; all packs in drawer 12½x6½x2½; price $30, offered for $22.
German Chemical Scale, in glass case, with two folding doors in front and one at each end; long open beam with 8-inch radius; center knife rests upon agate; pans suspended by platinum wire chain and jewelled hooks; rider movement; beam graduated into 100 parts. This is a new scale left on sale; price $70, offered for $30.
German Assay balance cat No. 2; solid beam, 8 in. long, index pointing upwards; pans suspended by platinum wires and hooks; in glass case with sliding door; price $40, offered for $30.

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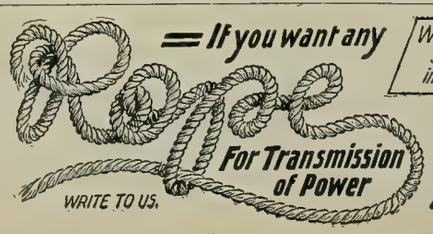
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## Coast Industrial Notes.

—The proposed Mexican exposition has been indefinitely postponed.

—The movement of Florida orange growers to this State still continues in large numbers.

—The Monterey, Mexico, Water Works Co. has been organized at San Antonio, Tex.; capital stock $2,000,000; president, A. French of Pittsburg; chief engineer, S. M. Gray of Providence.

—Butter and eggs were never so low in price in California as since March 1st, and the fact is antagonistic to those who contend that all low prices are due to overproduction by means of machinery.

—The deadlock between Columbia river salmon canners and fishermen continues. On the Washington side, about seventy miles inland, one fisherman has been murdered, the act being disavowed by members of the union, and minor acts of violence have been committed.

—At a meeting last Tuesday of the Manufacturers' and Producers' Association a trade mark was adopted to protect its members against the competition of convict-made goods, and to enable all wishing to patronize home products to readily identify the article of local manufacture.

—At the forty-ninth annual meeting of the Pacific Mail Steamship Co. on the 27th 118,000 shares of stock out of 200,000 shares were represented. The old board of directors was re-elected. The financial report for the year shows: Total receipts, $4,210,036; total expenses, $3,501,655; net earnings, $708,381.

—The San Francisco & San Joaquin Valley Railroad has let a contract to the Pullman Car Co. for six passenger coaches and eight cabooses, to be delivered at Stockton by Sept. 1, '96. Engineer Storey says the track is now laid half way between Merced river and the town of Merced. South of there to the San Joaquin river 200 teams and 400 men are grading.

—Los Angeles oil, which was 35 cents in January, is now over $1. If it goes much higher the action of those forcing it up may retard its general use in a number of instances where its advent was welcomed in competition with higher priced fuel. It is a simple case of supply and demand, and should the price prohibit the consumption it will be another case of "overproduction." Salt water flow is a present source of fear to the oil district.

—Just before the Oregon made her official trial trip Eastern papers published the figures made by the Massachusetts and Indiana, and claimed with some show of justice that those two vessels were at the head of their class of battleships, and that their builders were therefore the foremost shipbuilders in the United States. Now that the Oregon has distanced her sister ships and carries the broom as the boss battleship, the same unerring logic argues that California leads the country in its ability to turn out first class battleships for strength or speed, and that the Union Iron Works has beaten the Cramps, their foremost Eastern competitor.

—G. W. Vaughn, formerly chief engineer Mexican Central, has begun at White Water, N. M., a trip westward to complete preliminary examination of the proposed route for an extension of the Santa Fe Railroad. He has reconnoitered the line from Victor, Cal., east to Ash Fork, Ariz., and will examine the country from White Water to Phœnix, via Solomonville, and Florence, Ariz., with a view to determining the practicability of western connection for the Santa Fe. Mr. Vaughn does not pretend to say what the Santa Fe will do, but as an engineer he thinks it will be obliged to build westward from White Water to Phœnix, and from Ash Fork to the Colorado river, and then, if satisfactory terms cannot be made with the Southern Pacific, from the river to Victor or Barstow.

## Recent California Mining Incorporations.

Gowanus Mining Co., San Francisco; capital stock, $1,000,000, $51,020 subscribed; C. E. Brown, G. A. Crux, W. W. McNair, M. W. Kirwan, B. D. Dean, San Francisco.

Price Mining Company, Stockton; capital stock, $300,000; subscribed, $75,400; C. H. Bulson, J. D. Pelvis, J. C. Castle, C. C. Castle, Stockton; C. Zinch, Plymouth.

Indian Diggins Co-operative Mining Co., Indian Diggins; capital stock, $25,000, $1500 subscribed; J. M. Taylor, D. Shakespear, E. B. Robinson, E. Grautz and C. F. Weed, of San Francisco; J. McComb, Jr., North Temescal.

Knob Hill Gold Mining, Milling and Development Co., Fresno; capital stock, $50,000; subscribed, $30,000; J. H. Hall, W. H. Cavin, Auberry; J. B. Halton, Selma; H. C. B. Gill, J. W. Shanklin, Fresno.

Kings County Oil and Development Co., Grangeville; capital stock, $100,000; all subscribed; E. Mohr, San Francisco; T. L. Hameoh, H. Kirschbraun, J. McKenzie, S. Sampson, Grangeville.

California Sand, Gravel and Supply Co., Los Angeles; capital stock, $20,000; subscribed, $10,000; J. J. Osmer, W. A. Cooper, T. L. Stringham, R. S. Darrach, J. M. Talbert, Los Angeles.

Charity Gold Mining Co., San Francisco; L. L. Alexander, C. N. Fox, G. H. Haines, S. A. and C. L. Kelley; capital stock, $250,000; $1875 subscribed.

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## Personal.

HAMILTON SMITH is at Cripple Creek, Col.

T. L. FORD has returned from Washington, D. C.

J. A. EDMAN is gone back to Meadow Valley, Plumas Co.

THOS. PRICE is visiting the Rawhide mine, Tuolumne Co.

A. J. BOWIE is visiting the North Bloomfield mine, Nevada Co.

PRESIDENT J. H. NEFF has presented a large grey eagle (stuffed) to the Union League Club.

GEO. GRANT of Juneau, Alaska, is here to buy machinery for the electric light company there.

FOREMAN HAMPTON of the Brunswick mine has resigned, and will work at the Fortuna under Capt. Nihell.

E. K. STEVENOT is in El Dorado county to examine and report on some quartz gold mining properties there.

JNO. A. GILL, of Sacramento, has been appointed Pacific Coast Freight Agent for the Vanderbilt railroad system.

GEO. MAHON, recently assayer at the Apollo mine, Unga, Alaska, is here to take a four years' course in the mining department of the University.

CAPT. THOS. MEIN, who has been lucky enough to be liberated from a South African prison, writes that he expects to be in Oakland about July 1st.

WALDEMAR LINDGREN of the United States Geological Survey goes to Idaho next month to investigate the Boise gold belt and the Owyhee mines, thence to Wood river.

J. M. PHILCHER of London is expected in Downieville, Sierra Co., next week to investigate the Big Grizzly mine, which has been bonded by British capitalists for one year.

E. A. ASHCROFT, the inventor of the process for treating sulphide ores, which is to be put into operation by the Sulphide Co. at Newcastle, N. S. W., is superintending the erection of the works there.

GENERAL MANAGER COUCH, of the Merced G. M. Co., is in New York city, on his way for a ninety days' sojourn in Europe. 'Tis stated in Butte that he has resigned the managership of the Merced G. M. Co.

B. E. JANES, one of the students of the mining department of the State University at Berkeley, whose article on the cyanide process at Mercur, Utah, appeared in the issue of the 23d inst., leaves next week for St. Michaels, Alaska, on a year's trip of mining exploration in the upper Yukon country.

A PRIVATE LETTER to a Grass Valley resident from Mrs. Geo. Starr, Johannesburg, S. A., under date of April 12th, says Mr. S. had just received news of the death of Mark M. Elliott of Oakland, Cal., superintendent Salisbury Reef G. M. Co., Mashonaland, S. A. Mr. E. was reported dead some time ago, but incorrectly, and it may be that this is also a mistake.

GARDNER WILLIAMS, manager of the Kimberly, S. A., mine, who was one of the Americans arrested by the Boer Government, has been "released" on payment of $150 "fine." Had there been the slightest probability of ability to prove complicity, the "fine" would have been a thousand times that amount. Here such a "fine" is usually called a "cinch."

IN Virginia, Nev., it is reported that H. M. Yerington will resign the superintendency of the V. & T. road and go to Europe. He will be succeeded by R. J. Laws of the C. & C. G. T. Mills, paymaster of the V. & T., has resigned; his place will be filled by E. Yerington. H. Yerington has also resigned, to take effect June 1st. It is said the Virginia office will close.

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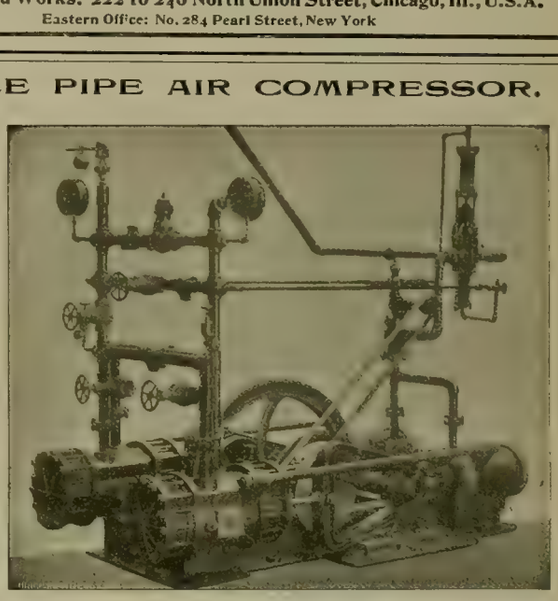
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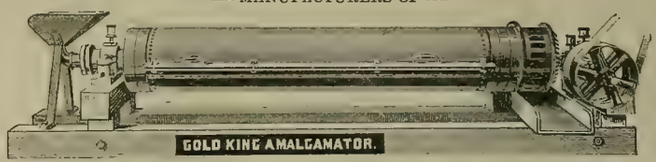


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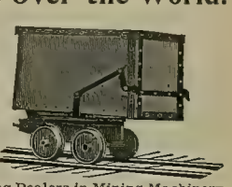


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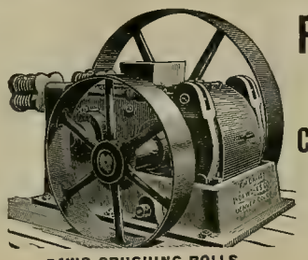
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# Mining Summary.

## CALIFORNIA.

### Amador.

At the Central Eureka, near Sutter Creek, Supt. Thomas expects to start the hoist by June 15th. The speed of the plant is figured to hoist a two-ton load, independent of skip and rope, 2500 feet at the rate of 500 feet per minute. Sinking will be resumed as soon as the plant is ready for operation, and the shaft cleaned out and retimbered to its old depth, 700 feet, where there is a 135-foot drift south in ore.

The Union Consolidated Company, now operating the old Wieland property, has thirty men repairing old machinery and putting in new.

Ransome and Sargent are working the White Swan mine, northeast of the Gwin. A hoist will be erected; a depth of 1000 feet will be reached.

The Newton copper mine came to a standstill last Saturday. All the miners were discharged, about thirty-four in number. The low price of copper is given as the reason for the shut down. The mine, it is claimed, could not be profitably operated at the present price of copper. H. D. Ranlett, the owner, says that the force, which was only employed in development work, was laid off, but the water will be pumped out and the mine kept dry, and that when times improve and the price of copper advances a larger force than ever will be put to work. It is reported that twenty stamps of the New London mill are to be moved to the Gover, which will give that mine a capacity of forty stamps. Reale and Bell, owners of the '49 Flat cement gravel claim at Rancheria, have a two-stamp mill crushing between 20 and 30 tons a day. The Argonaut shaft this week passed the 1300 foot mark. It is still in soft gouge, with no indications of a change in the formation. This soft formation has existed for the past 300 feet; indicating that the pitch of the shaft is the same as the pitch of the vein. If the situation remains unchanged, it may be necessary to change the course of the shaft slightly in order to get out of the soft formation, and get in ground that will admit of drifting.

*Republican:* At Middle Bar Walker & Ransom will work the White Swan mine, below the Gwin. Four men are employed at the Delray mine. They are down 30 feet and have struck the ledge. At the Amador Queen, in Hunt's gulch, they are sinking and crushing the rock taken out of the shaft. At the Doyle mine they have finished the contract in running a crosscut, and the property is at a temporary standstill, pending the letting of another contract. Work at the Butte basin tunnel is being vigorously prosecuted.

### Butte.

*Mercury:* The Cherokee Flat mining suit is ended at last. After being in the courts for over ten years past, during which time the property has been virtually closed down, the end has suddenly come and the mine will soon pass into new hands. The Bank of California and Rideout & Smith, who have been fighting the validity of the mortgage all these years, have just finally concluded to abandon the contest and the big $280,000 foreclosure judgement recently obtained against the mine by the bondholders will be allowed to take its course, unobstructed by any action on the part of the two banks. Their withdrawal ends all delay. The mine will now be duly advertised for sale, by Receiver Whitcomb under the foreclosure order and will in all probability be bid in by the committee representing the bondholders. The bonds are held by various parties. The principal holders in California are: Louis Glass of San Francisco and David Gage of Oakland. Both gentleman were for over twenty years prominently identified with the active operation of the mine and are the only two bondholders familiar with its practical worth and development. The other bondholders are all residents of New York. The suit to foreclose the bonds was filed back in 1888, but the bondholders did not secure judgment until three months ago. At the time of the foreclosure proceedings, the mine was indebted to the Bank of California for some $40,000. That corporation, together with Rideout & Smith, the holder of ten bonds, began a search for technicalities in the issuance of the mortgage, and, thinking they had found one, obtained judgment against the mine for the amount and sold it at sheriff's sale, bidding it in. Since then the mine has been owned by the banks, subject to the lien of the mortgage. The attempt to defeat this mortgage, which has been so stubbornly carried on, has just ended in the banks at last giving up the struggle. The Cherokee mine is one of the largest and richest hydraulic mines in the State, having a record of producing $13,000,000 in gold, with the lead apparently as inexhaustible as ever. The company owns its own system of water supply, which is one of the most extensive in the State. The water is brought over two hundred miles in ditches, pipes and flumes, and controls the largest water shed in this part of the Sierras. The original cost of bringing in the water was $750,000. At the time of closing down the mine employed 250 men. During all these years of litigation Cherokee Flat is generally spoken of as a dead mining camp, but for years 100 men have been mining on a royalty in the blue gravel of the lead that was formerly abandoned by the company as worthless.

### Calaveras.

In the Gwin mine at a depth of 1213 feet a 12-foot ledge of good ore is reported.

*Citizen:* Fine ore has been struck in the Santa Anna mine. The Poorman will probably soon resume. Work has been started at the Jackson mine, near North Branch. Work at the Colliers mine, near Murphys is soon to be started. The machinery for the Tulloch mine was hauled to that property last week. The Jones mine near Angels is being worked. A full force of men is being employed. Work of erecting the machinery on the Hedrick placer mine is going forward. Work of pumping the water out of the Brunner mine near Angels has been completed. Work has been temporarily suspended in the shaft of the Shaw mine, owing to the amount of water. Twenty tons of machinery were hauled to the Woods mine at Robinson's Ferry last week. At the Updergraff mine the tunnel is being rapidly pushed northward in order to tap the old river channel. The Bald Hill mine near Angels has been bonded. A $4000 payment has been made on the property. Work is progressing well at the Thorpe mine. The mill-site is graded and ready for the buildings. J. W. Provard has men at work in the Mester mine. G. W. Telford has bonded 3000x600 feet of a quartz vein running through his ranch in the Jenny Lind district. The Lucky Tom, or Martin placer mine near El Dorado, has been sold. It is stated that the price paid was $2250. The Central Hill gravel mine is making rapid progress. So far over 200 feet of the old river channel has been laid bare. The water is about pumped out of the Ghost mine, near Angels. When the work is completed sinking will commence. A shaft has been sunk on the ranch of G. W. Hayes, near Copperopolis, a depth of 12 feet, and shows a vein of ore six feet wide, which assays $4 in free gold. M. A. Hurley has started work at the Lone Star mine. He will sink a winze 200 feet from the tunnel and then continue it to the surface, making a shaft. E. C. Loftus at the Keystone mine near Railroad Flat has a three-stamp mill running twenty-four hours a day on good ore. W. B. Swank and men are up on Esperanza creek sinking a shaft through the lava cap. Their intention is to sink and tap the old river channel, which runs through that section. The mill at the Hedricks gravel mine will be in working order next week; twenty men will be employed. At the Pine Tree prospect near Copperopolis a shaft has been sunk 40 feet and a level run 50 feet. The vein at the bottom of the shaft is about 14 inches wide and at the end of the drift widens out to three feet. The quartz carries free gold. The five-stamp mill at the Rose Hill mine has started up to crush enough ore to test its value; if the quartz proves to be paying a forty-stamp mill will be erected. The sale of the Specimen is completed, price $2750.

*Prospect:* The shaft at the Gwin mine is now 1215 feet deep. The bottom of the shaft is in quartz of a very promising character. A thickness of 9 feet has been reached by a drill hole, but did not reach to the foot wall. The flow of water from the old works has decreased very much the last week. The hoisting works at the South Paloma is nearing completion. Sinking will be resumed as soon as the machinery is ready.

### El Dorado.

Placerville, May 24th.

(Special Correspondence).—J. Forbes has secured a bond on the Slide Gulch mine near Grizzly Flat twenty miles east of here and is succeeding satisfactorily in his development work. A tunnel on a 4-foot ledge has reached 180 feet.

The Star Light Company has been reorganized and active work on a systematic plan has been started. This property has a good record as a gold producer.

Everson, Chinnick & Stevens are progressing favorably on the old Stockslayer mine, which they bonded from McKinney & Grube. The ore is Roscoelite and has been found in richly paying quantities when worked for hand mortar. The present holders are systematically doing extensive development work. The main tunnel is 476 feet. At a distance of 286 feet from the mouth a shaft runs vertically 80 feet. Engine and hoist are placed at this station in the tunnel. The shaft follows the hanging wall. The property is 9 miles southwest of Placerville, near Lotus.

In the Greenwood district on the Georgetown divide much activity is displayed in development work.

The Eagle King near Grizzly Flat owned by Melton & Wittner opened up a large ledge last week of very good ore. A ten-stamp mill is in continuous operation on this mine.

Development work on the Blue Gouge progresses satisfactorily. At 250 feet in the new tunnel a 3-foot ledge of ore was struck last week that runs from $10 and upwards. Should this discovery lead to a continuous ore body of this quality the Blue Gouge will rival the largest mining camps in existence. It is a mountain of ore that needs but to be quarried. Water and timber are in abundance on the land, of which there is over 300 acres. Col. A. E. Head is at present inspecting the work. He holds the property under a bond.

The five-stamp mill on the Stillwagon mine in the Brownsville district twenty miles east of here was started this week. The ore body at 130-foot depth is small but rich in free gold and sulphurets.

### Kern.

At Havilah, some of the old works at the Warrington are being retimbered. G. Miller is working an antimony deposit. The Amalie mine at Rogers sends encouraging reports. The Carolina shaft is expected to strike the lead at 150 feet.

The *Eyrie* reports that Jones' stamp-mill is at work. The old Gold Hill mine is turning out good ore. In Randsburg the well-boring at the Cow wells is at an end, as they have struck sufficient water to run the eight-stamp mill. Stockton, three miles from Randsburg, expects to put up a ten-stamp mill at once.

Koehn and Stanton will soon have a five-stamp mill in operation at Kane springs.

### Mariposa.

Coulterville, May 26.

(Special Correspondence). — Recent news from Boston in regard to share complications in the Merced G. M. Co.'s affairs have made no change here, work continues as usual. The forty-stamp mill at the Potosi is running night and day. It is working on 100-ton parcels of rock taken from different points in the campany's workings in its various mines, for trial purposes. It is said that there has been some pilfering of specimen rock at the Malvina mine but correct information is hard to get, as the company's officials are very reticent about what goes on.

At Pinon Blanco, Captain A. H. Ward is continuing prospecting work. This mine was the first to be patented on the Pacific Coast under the existing mining laws. Captain Ward has proved the property to his satisfaction on the northeast side of the Pinon Blanco mountain all of which is comprised in his patents, and he is now driving an exploration tunnel from the southwest side. This tunnel is in between 700 and 800 feet.

At the Red Banks eight miles southwest of Coulterville twelve men are employed blocking out ore bodies. Little can be done at Red Banks till the early fall when the snow waters have ceased and it is possible to put a dam in the Merced river. The tunnels of the Red Banks mines come right out on the North Bank of the Merced and the situation for power and milling purposes is excellent.

The Virginia 3½ miles east from Coulterville was bonded recently by Paul Blackmar and Professor Clarence King. The superintendent is J. J. Dolan. Work was begun at the Virginia the first week of this month About twenty-five men are employed. The old shaft and tunnel have been cleaned out and retimbered, and the mine will soon be turning out ore again.

The Tyro mine one mile southeast of Coulterville is running steadily. The ten-stamp mill is working on ore from the 700-foot level. This ore is as good as any yet put through the mill. The Tyro is owned by the San Francisco Gold Mining Company, president J. Buttgenbach, cor. 4th and Bryant St., S. F.

Hite's Cove's mine continues shut down for the present, as are also the Santa Rosa, and Persia mines, each with new ten-stamp batteries on the ground.

John D. Ludwig, the local superintendent of the Mariposa Grant is at Washington urging upon Senator John P. Jones the necessity of immediately erecting a twenty-stamp mill at Mount Ophir. There is now no mill for crushing ore on the grant, the little five-stamp mill having been sold and removed.

There are many more prospectors out all over Mariposa this summer than for a long time past. No remarkably rich finds are reported but a great many claims have been located.

There is rumor of another electrical power distributing concern being started at a point on the Merced river above Benton mills. No details yet to hand.

The following circular has been sent to Merced Gold Mining shareholders: "Mill returns show during the month of April 2303 tons of ore treated, the yield being $8700 gold and 25 tons sulphurets, assay value $75 per ton of 2000 pounds. This shows a yield of $4.59 per ton of rock treated. The first return from the mill was in the month of March, 1285 tons treated, showing gold obtained $1630 and 9 tons sulphurets, averaging $62.43 per ton of 2000 pounds. Judging from the assays of the tailings, and what was probably absorbed by the plates, and other losses necessary in the first operations of the mill, we consider that the first mill-run showed the value of the rock something over $3 per ton."

### Nevada.

The North Banner Tunnel Co., has levied a five cent assessment, payable June 23.

*Union:* The Champion Mining Company has brought suit in the Superior Court of this county against the Providence Gold Mining Company, A. Walrath, R. C. Walrath and John V. Hunter, defendants. This action is brought against the Providence Mining Company and others to recover damages in the sum of $100,000, the value of ore alleged to have been taken out by the Providence company from lands decided by the courts to belong to the Champion Company. It is an outgrowth of the recent litigation between these companies concerning the end line between the two claims, said end line having been established by the courts. The plaintiff sues for the value of all ore that has been extracted north of said end line.

The Lane and Haywards syndicate, after running the Mayflower mine, in this district, for a year, have decided to give it up The property will revert to its original owners on June 5th.

Sacramento parties have made arrangements to work the bed of the South Yuba river from French Corral up the stream for a mile and will also work the old Milton dump.

The *Transcript* says everything continues to look prosperous at the Champion mine and the outlook is better than it ever was. At present there is enough quartz being taken from the mine to keep fifty stamps pounding away steadily night and day. Twenty stamps are running at the new mill and thirty at the old mill. There are employed in the mine and the hoisting works, mill and chlorination works about 140 men.

### Placer.

J. B. Smith of Grass Valley has leased the Foss mine, at Lowell Hill, for a year and will put twenty men at work.

### Plumas.

*Bulletin:* During the last storm 6 feet of snow fell.

E. C. Robinson, owner of the Morning Star, has let a contract to sink the shaft on the Morning Star mine to the 1100-foot level, which is now the water level. This is the pioneer shaft of the Basin. The shaft is already down nearly 60 feet and is showing up in fine order, the ledge widening as depth is gained. Mr. Robinson intends to put his 20-stamp mill in good order, piping the water to the mill from the upper reservoir site, where he expects to put in a dam, and, by means thereof, impound millions of gallons of water. He has already received several bids for the erection of chlorination works.

J. A. Hall has sold a one-sixth interest in the Ella mine. It is expected that Mr. Wagner will start up the Fraser mine next month.

### Riverside.

The Good Hope mine at Perris has resumed. W. J. McIntyre, for H. B. Johnson, the owner, has paid $12,000 in settlements of bills incurred by Receiver Naftzger, and the mine is now run by him. The main shaft will be sunk 400 feet, the levels extended and a reservoir for water made. Then, under the management of Supt. Sigafus, the stamp mill will resume.

### San Diego.

W. H. Storms of the State Mining Bureau has been making an examination of the mines near Mesa Grande. He will examine the Banner, Julian, Rice and Pine Valley districts. He is quoted as saying, after spending a week in the Escondido region: "There may be possibilities for the development of some good mining properties in that section, but in the absence of definite, reliable assays of the ores in the ledges now being opened up, I must decline to express an opinion as to the mining situation there."

### Shasta.

(Special Correspondence).—Mining matters are quiet. A small smelter on Clear Creek, near Igo and Muletown, is in prospect. Some bonding of mines is reported, but very little actual mining is being done. The abundance of water has helped the gravel miners. The prospects are good for quartz mining the balance of the season.

Igo, May 26th.

### Sierra.

*Enterprise:* The stockholders of the Buttes Saddle mine held a meeting last Saturday. Eleven men are working at the Northern Bell mine. Four men are working at the Rising Sun.

*Messenger:* Because of deep snow and stormy weather at St. Louis, the miners are doing but little.

At Cox's Bar drifting is prosecuted with vigor and success.

### Siskiyou.

At Sawyers' Bar the Fort Jones *Reporter* says the owners of the Star of the West will build a ten-stamp mill this summer. Thomas Smith & Co. at the old Casey claim, are cleaning bedrock. S. L. Findley is the manager of the Gold Nugget. Cleaver & Co., at the old Bigelow ledge on White's gulch, are taking out pay rock. The White Swan, on Tanner's peak, is producing $40 ore. Bigelow brothers have commenced in their river claim. The Paymaster is idle at present. The Whistle Bear has resumed.

*Journal:* The cleanup of $3200 by Billups, Humphrey and Quigley, owners of the Barkhouse Creek mines, demonstrates that these mines are the richest quartz ledges yet discovered in that section. The owners will soon commence the erection of a five-stamp mill. The quartz heretofore has been crushed in a twin arrastra at the Commodore mine.

The Distlehorst Dredging Co. are fast getting their machinery in order for working the river with their patent dredger.

The Blue Gravel mine at Greenhorn was shut down a few days ago, and will remain closed until fall, when the owners will begin sinking a new shaft. The old shaft began caving in, and, as the pay was poor, the manager concluded to pull the machinery out and start a new shaft next fall.

*Journal:* Amorel and Dutra, of Hawkinsville, cleaned up $1400 a few days ago from their placer claim. At the Nebraska mine on Cherry creek, a new 5-stamp mill is in course of construction. The hydraulic mines at Oro Fino are running full blast. The river miners on the Klamath are getting along rapidly with the work of opening up their claims, and all will soon be sinking cuts to bedrock, with a number already hoisting pay gravel. The miners at the Espey, Hunter & Co. claim at Hawkinsville are preparing for another cleanup.

### Trinity.

The Altoona Quicksilver Mining Company received six new ore cars last week.

The *Journal* hears that the Armentrout brothers have discoverd a rich gravel mine on Democrat gulch, the bank is from 5 to 8 feet in depth. Some of the dirt has yielded fifty cents to the pan. They have located and had surveyed about eighty acres.

### Tuolumne.

*Independent:* The Crystalline group is mining steadily, shaft sinking and drifting. The Clio mine is reported sold to Boston parties. The Trio mines, Whisky hill, have been sold for $150,000 cash to Boston and English people combined. The Mammoth mine, Jacksonville, is sinking a shaft from low tunnel level, now down 150 feet. The ore improves as sunk on. The Shawmut mine has just completed the erection of their large compressor, which will run eight drills. The Stanley group of mines are at present under negotiation and will very shortly be started up in full blast. There is found on this property a body of low-grade ore from 200 to 300 feet wide, and assays $6—a veritable bonanza. The formation is diorite in a metamorphic condition, intersected and traversed by innumerable quartz veins and oxidized iron stringers, besides, can be obtained from 30 to 300 feet and worked as open quarry.

At the Nourse mine, Jacksonville district, is a low-grade ore body, consisting of diorite and quartz mixed, the quartz being interstratified with the eruptive formation. It is of great extent, probably 100 to 150 feet wide. Surface prospect holes have been sunk all

over the huge croppings. In each instance good prospects are found.

### NEVADA.

ELKO COUNTY.

A mill is to be erected upon the property of the Dexter Mining Company, near Tuscarora. A shipment of ore to Salt Lalt city is reported to have returned $180 per ton in gold. The mine was a gold producer several years ago, but was closed down by litigation. It is said there are 25,000 tons of ore on the dump carrying from $12 to $30 in gold per ton, while the tailings from the old mill are found to contain $22 per ton.

ESMERALDA COUNTY.

At Silver Peak the mill and leaching works are running steadily: gold bullion is being shipped to the mint every month. At Alida valley, Barnes and Keyser have out a shipment of 1000-ounce silver ore. There is a little gold being shipped from Tule canyon; L. Chiatovich has a mill on the way which he will erect on a mine south of old Gold Mountain. Having made a thorough test of the ore, he feels confident of being able to cyanide it to good advantage.

HUMBOLDT COUNTY.

A Kennedy correspondent of the *Silver State* says the electric process is a success.

The New Era Mill and Mining Company has bought from Blossom, Wiggins & Murphy the Kearsarge mine.

The Star Mining Company has bought from King, Duncan & Young the Poorman mine.

LINCOLN COUNTY.

*Tribune*: From a shipment of nineteen tons of gold ore sent in by the April Fool Mining Company of DeLamar, Nev., Wells, Fargo & Co. yesterday placed $8710.77 to the company's credit. From the April Fool proper there were eight and one-half tons of the value of $715 a ton, and from the Swifter ten and one-half tons that yielded $195.50 a ton.

A Carson dispatch says all work in the placer mines in Pine Nut was shut down two months ago, pending a suit brought by a ranch owner to prevent the miners from using the water. The case was decided in favor of the miners, and they will at once resume work.

STOREY COUNTY.

The changes in the management of the Brunswick went into effect on the 25th; preparatory work in the Chollar south drift, where the new find was made, has begun.

Supt. Gorham will have charge of the Chollar-Potosi end of the lode. Supt. Cronan will have charge of the workings in Hale & Norcross ground of the Brunswick lode.

Supt. Gorham says: "The Chollar drift where the new find was recently made will be extended at once. Work will be begun at the face of the drift in the ore and the deposit will be exploited. The preparatory work, however, will require two or three days. Considerable earth has caved from the sides of the drift in the first two or three days and this will have to be taken out. Work was suspended in the drift while the new arrangements for the working of the lode were being effected, but it will now be resumed with vigor."

### OREGON.

Baker City reports that the Bonanza gold quartz mine has been sold for $370,000 to Eastern capitalists; also the Rachel and another gold quartz property in connection, near the Virtue, for $11,000.

### WASHINGTON.

P. Langhammer, Chapaca, Wash., is putting in a sixty-ton mill, hoisting and pumping machinery for the Wyandott M. & M. Co., at the Wyandott mine, on the Similikameen river.

A stock company with a paid-up capital of $75,000 has been organized to tunnel Palmer mountain in the Okanogan country. The tunnel will be over 3000 feet in length and is expected to tap twenty-eight leads.

At Methow, Squaw Creek mining district, Okanogan county, the Friday mine of Durr & Griggs has made a shipment of 403 sacks of high-grade gold sulphides to the Great Falls, Mont., smelter. Twenty-four men are at work.

The Seattle Reduction Company's representatives have located a mill-site at the mouth of Black Canyon creek on the Methow river and propose to put in a plant to treat the ores.

The *Review* reports activity in the Okanogan country. A. C. Coward says the proposition of running a big tunnel into Palmer mountain is assuming a definite shape. The $75,000 required has all been subscribed and $30,000 has been paid in, and the work will commence very shortly. The new 50-ton cyanide plant for the Wyandotte is now on the way in.

The mill at the Triune mine was started up recently and a clean-up of 75 ounces of bullion was made after a run of eight days, and the company have on the ground a large quantity of concentrates running from $100 to $200 per ton. This mine is owned by May of Davenport and Del Hart of Loomiston.

Preparations are being made to start work again on the Ivanhoe, a property from which $10,000 worth of ore has been shipped. The first ore ever shipped from this mine went to Denver and cost the owners $100 a ton freight. Now it can be shipped, freight and treatment charges, from $20 to $30.

### BRITISH COLUMBIA.

Nelson *Tribune:* The force at the Silver King mine is getting out about 125 tons of ore a day. It would be increased were there bunkhouse room. The snow is still deep, there being at least eight feet on the level.

### ALASKA.

*News:* The announcement has appeared that Copper river will be open to prospectors this season and that the Pacific Steam Whaling Company will run a steamer from Nucheck to the mouth of the river, charging a fare of $5. It does not say, however, what a prospector will do on arriving at the mouth of the river, nor how it will be possible for him to ascend the stream to the auriferous regions.

### UTAH.

A deficiency judgment for $54,111.85 has been entered in the Third District Court in favor of the plaintiff in the case of Amos Townsend against the Utah Gem Mining Company.

*Tribune*: With the payment of its dividend in the sum of $15,000 on Wednesday, the Ontario's total dividends will have reached $13,235,000, with $30,250,000 as the total that has been paid by the companies whose dividends are made public.

*Tribune*: Since March 25th the Daly has produced 55,530 ounces of fine silver and the Ontario 75,228 ounces. The last statement submitted by the management of the Daly revealed the fact that there was $330,000 in the treasury and it is very likely that the amount has now reached $400,000. The management of the property has not found it consistent to pay a dividend since May, 1893, at which time the total paid amounted to $2,850,000, and it is not unlikely that dividends will be resumed before many days have passed. The new strike in the property makes it possible for Daly to largely increase its earnings, and it is said of the bonanza that never has Supt. Chambers had it in better condition.

### IDAHO.

At the Hydraulic Placer Company's workings on the John Weiss bar, eight miles below Lewiston, the water is pumped from the river by two large pumps. One is a centrifugal that throws the water through a 15-inch pipe for sluicing. A cylinder force pump forces the water through an 8-inch pipe to the giant, which tears down the bank and forces by hydraulic pressure 1000 yards of sand and gravel into the sluice boxes every twenty-four hours. The main sluice box is 24 inches wide and its bottom is covered with steel plates and steel riffles. From this main sluice box are six under currents which lead off onto six riffle tables; from these the sand passes into smaller boxes over brussels and blankets onto burlap tables, where the slime and black sand are separated from the sand. The tables and smaller sluice boxes are treated four times every twenty-four hours by the blankets, brussels and burlaps being thoroughly washed, and the fine gold, slime and black sands going through a chemical process preparing it for amalgamation. It is then put through an amalgamator and is ready for shipment.

### MONTANA.

Butte *Miner*: Montana mines yielded $47,115,000 worth of minerals last year. The copper production of the State was about sixty-five per cent of the whole output of the United States. The gold product amounted to $4,100,000; silver to 4,500,000 ounces; copper to 212,000 pounds and lead to 24,500,000 pounds. The gold output was 10 per cent greater than in the previous year and 47 per cent greater than in 1893.

Helena *Chronicle* Correspondent: The Poorman mining district which for years past has been practically dead to the world, is opening up again. The largest mine in that district is the old Jay Gould, from which over a million dollars in gold has been taken. When it closed down some years ago, that district was soon lost sight of. Mining experts claim that with a little development work as rich ore as has ever been taken out of it would be uncovered. Men are now at work retimbering the mine and the station on the 300-foot level. As fast as it is retimbered development work is being pushed rapidly. The ore bins at the 10-stamp mill have been filled and the noise of the dropping stamps is soon expected. In that same district are the Hubbard, the Prize and the Poorman mines. Men are at work upon them, and this summer the output of that district will be larger than ever. Superintendent Owen Byrnes of the Prize mines is in the city, awaiting the arrival of new machinery for his mill. At the Poorman mine men are doing development work, and if the work exposes an ore body warranting it, a stamp will be put up on the property this summer.

The Heddleston district, at the headwaters of the main Big Blackfoot, is attracting considerable attention.

The Big Dick is another wet mine in this district. It is owned by Blydenstein & McComb, and was recently bonded to W. Bennett of Helena for $30,000. As soon as it is possible to haul large quantities of ore to the smelters, the force of men will be increased. The first-class ore runs all the way from 500 to 1,800 ounces in silver, 7 per cent copper and 20 per cent lead. The second class runs 129 ounces in silver.

M. D. Pinkston, who purchased the Blizzard mine at Wicks a couple of months ago, has at last succeeded in freeing the mine of water. For six weeks past he has been pumping night and day. Three weeks ago he had the mine half empty, when an interior reservoir broke loose and filled it up in a few hours. This took six weeks of constant pumping, at the rate of 420 gallons per minute, to empty it. But it is empty now and he has commenced shipping ore to the smelter.

This summer will probably see a chlorine mill of about twenty-five stamps erected in Duck creek district. J. H. Casey, one of the big mine holders in that district, says that the coming season will see great changes in that bottom. When the chlorine mill is up and running Mr. Casey alone will give employment to fifty men.

A rich strike comes from the northwestern territory. A party of prospectors have been prospecting on the south fork of the Belly river, a short distance from Chief mountain, within the border of the Montana line. These parties have run against several veins of argentiferous galena ore, which has assayed 50 per cent lead and 80 ounces of silver. On the south side of the Blackfoot reservation a body of sulphurets has been located which runs three ounces of gold to the ton.

In the Nearhart district things look promising. Between the Benton and the Big Seven, forty-eight men are employed and that force will be increased soon. The latter mine is shipping more ore than was ever expected of it.

### WYOMING.

Laramie reports that assays made on the copper ore discovered on the Big Laramie gave 32% per cent copper and $2.40 gold per ton near the surface.

The new town of Morgandale, in the Copper Hill district, is filling up.

The Saratoga *Lure* says Chicago capital is working the Cummins City mines. This was at one time the richest mining proposition in the State, but, like many others, was the victim of mismanagement and ignorance of the men in charge of the works.

### SOUTH DAKOTA.

Deadwood *Times*: Few realize the quantity of siliceous ore that is brought down from the various sections of the siliceous district daily, for treatment at the plants in this city. The Burlington Company delivers about 100 tons at the plants in the First ward, and from 110 to 125 tons to the Pluma mill every day. The Elkhorn train Thursday had 260 tons and the traffic will average 225 tons a day. These shipments are frequently exceeded, and this ore is all treated by the home mills. The product of the siliceous district, including the concentrates from the Homestake treated at the D. & D. smelter, will aggregate 550 tons daily, at $20 a ton. The daily output is $11,000, or $330,000 a month, close to $4,000,000 a year.

### COLORADO.

DENVER MINT GOLD RECEIPTS.—*Republican:* May 14—El Paso county, 25.04 ounces; Gilpin county, 30.25 ounces; Boulder county, 8.78 ounces; San Miguel county, 23.32 ounces; Denver assay offices, 370.91 ounces; South Dakota, 5 90 ounces; Arizona, 34 16 ounces; total, 806.41 ounces; value, $12,000. May 15—El Paso county, 216.04 ounces; San Miguel county, 20.12 ounces; Colorado (unknown), 2,530.65 ounces; Wyoming, 4.62 ounces; jewelry, 12.87 ounces; total, 2,784.62 ounces; value, $55,000. May 16—El Paso county, 145.03 ounces; San Miguel county, 292.32 ounces; New Mexico, 12.13 ounces; Idaho, 5.23 ounces; total, 455.01 ounces; value, $7,000. May 18—El Paso county, 101.62 ounces; Chaffee county, 9.27 ounces; San Miguel county, 27.85 ounces; Clear Creek county, 14.93 ounces; Arizona, 9.31 ounces; Denver assay offices, 311.16 ounces; total, 474.14 ounces; value, $7,500.

E. R. Holden of Denver is reported to have secured 20 acres near the Florence reduction works for a chlorination plant.

The Boulder county mine, Ward, reports a discovery of an 18-inch ledge of black oxide of copper.

The stamp mill at Spencer, which has been shut down since New Years, is now in charge of W. H. Gowdy, who is putting in an electric process.

Work has about ceased in the lower workings of the Argentum-Juniata mine, at Aspen, on account of water.

### NEW MEXICO.

On the 18th, Bell & Stevens, of Pinos Altos, brought to Silver City eight gold bricks, weighing 109½ pounds troy, 1314 ounces, worth $15.50 per ounce, at total value of $23,367—the result of a forty-six full double-shift run of a 10-stamp mill on ore from the Pacific and Ohio mines. The mill was run 23 full day and night shifts in February, 21 day shifts in March and 21 day shifts in April. The dry weather caused a shortage of water so that the mill could not be run on full time. The mines have an abundance of ore.

### ARIZONA.

The Pearce mine, near Wilcox, which was recently sold in this city for $275,000 cash, will pass into the possession of an English syndicate. A stock company has already been formed with a capital stock of $2,000,000, papers for which have been filed at Tombstone. Work has been commenced by the new owners, and ore is being shipped to Wilcox. A 100-stamp mill is to be erected. The previous owners of the mine were Mr. and Mrs. Pearce, their two sons and sons-in-law. Mr. and Mrs. Pearce receive one-fifth and the others one-fifth each—$55,000.

The Planet-Saturn Company at Fool's Gulch has made a strike in the main shaft of its Planet mine, at the 300-foot level—a body of sulphurets which appear to be rich in value. While no assays have been made, it is claimed that the ore will go $200 per ton.

The La Fortuna gold mine is fourteen miles from Blaisdell station, twenty-seven from Yuma, and in Arizona. The work on the La Fortuna consists of three levels. The first is down 65 feet, showing 14 feet of ore. A drift has been run last on this ore body 120 feet. On the second level, at a depth of 130 feet, the ore body is larger and shows 18 feet. One hundred feet of drifting has been done on this level. The third level is at a depth of 215 feet, with a crosscut showing ore body to be about 30 feet. The quartz is equally divided between white and pink; the pink quartz seems to be the most valuable. The estimated value of the ore is $40 per ton. The mill consists of twenty stamps, erected on the mine. The working shaft is on an incline of 60°. The steam hoist operates a grizzly directly to the rock broken and then by gravitation to the stamps. The stamps weigh 1350 pounds each. The framework is the heaviest in the Territory. The runs are each 25 feet long and of heavy plates. There is a drop after the first run, making 50 feet of plates to be run over. The water reaches the mine from the Gila river through a four-inch pipe twelve miles long, at an elevation of 650 feet. There are sixteen men employed in the mine. R. M. Straus is superintendent; J. Golden foreman.

At Bisbee the Copper Queen Company is making improvements and additions to its works. At the Holbrook mine new ore bins of 600 tons capacity are being constructed. At the smelter two new boilers have been added to the power plant, making eight in all. The roasting capacity is to be trebled by the addition of two 25-ton rotary roasters to the one now in use, and provision made for discharging the sulphur fumes outside the town limits.

At Ainsworth the Skyline mine will probably close down until the roads are in a condition to make shipments possible. About $60,000 worth of ore has been shipped from the mine by the present owner. No arrangements have been made looking toward the putting in of a 20-stamp mill, nor has anything definite been done in regard to a stamp mill at all, nor will there be for the present.

### MEXICO.

*Oasis*: A new mining camp is springing up at Santa Barbara, about sixty miles east of Minas Prietas, Sonora. There have been discovered a number of large ledges of auriferous rock which gives large returns. Recently no less than 147 denouncements of mines have been made there.

A Nogales report says at Minas Prietas, Sonora, representatives of the Rothschilds are examining the mines of the Colorado Creston Co., with a view to their purchase. A six months' option has been given and the price is stated to be £2,000,000. The mines are La Colorado, Las Amarillas, Las Minas Prietas, the Grand Central and some outlying claims. In 1895 they produced $3,000,000.

### SOUTH AFRICA.

Johannesburg *Mining Journal*, April 18: The monthly output of the Chamber of Mines for March is greatly curtailed by the secession of certain companes from the Chamber, and the list embraces only thirty-four companies, as compared with forty-three in February. It is sincerely to be hoped that such an occurrence is but temporary, and that the relatively small band of malcontents will once again, in the interest of the whole industry, join with the majority. For the present, however, the number of companies sending returns to the Chamber has, as already stated, fallen from forty-three to thirty-four. The missing companies are the George Goch, Lancaster, Langlaagte Estate, Block B, Meyer & Charlton, *Minerva*, *Orion*, *New Kleinfontein*, Princess Estate, United Main Reef and Van Ryn; the companies italicised, however, not seceding, but having their operations suspended owing to want of water or of native labor.

On the other hand, there are two additions to the list, the Roodepoort Deep Level and Porges Randfontein—the latter reappearing after a short interval, while the former, the second deep level to join the list of producing companies, makes its bow for the first time. And it may be noted that the yield of this company on the plates has been 6.94 dwts. per ton, while the tailings yielded 1.51 dwts., giving a total of about 8¼ dwts. per ton. This, after due allowance made for absorption in the mill and on the zinc or in the solutions, should mean a considerably higher yield for the future. The number of stamps in this list of the Chamber is 2055, as opposed to 2675 for February; the duty per stamp has risen from 4.18 tons per diem to 4.34 tons, while the grade of the ore milled is unchanged, as regards the yield on the plates, standing at 8.01 dwts.: the return in the cyanide has, however, fallen from 5 dwts. to 4.83 dwts.

While the decrease in the number of companies sending returns is about 21 per cent of the former number, the fall in the number of ounces is from 167,018 to 147,015 ounces, being a fall of 12 per cent. It is, therefore, immediately apparent that the seceding companies cannot claim to represent the wealthier and more important contributors to the output, and that they are, with the exception of the Langlaagte Estate and the United Main Reef, of second and third-class proportions. No details have been received from the new association regarding its companies, and a full analysis cannot accordingly be made; but if possible, the usual monthly supplement issued by us will contain details of both output statements.

### AUSTRALIA.

*Standard*: The Madame Berry and the Berry Consols, two adjoining mines near Creswick, (Vic.), are the greatest alluvial mines known in Australia since the early fifties. The former has just ceased work after fifteen years of prosperity. They have already distributed £848,700 in dividends, and the assets of the company are set down at over £6000, or equal to over 6s 6d per share. If the amount paid in royalty, £128,342, and other items not actual working expenditure, are added to the foregoing, it will be found the profits on the workings of this mine amount to nearly £1,000,000.

In the old days of mining in Victoria—or for the matter of that, Australia—the miners, from the managers down, laid down certain theoretical rules upon which they worked for the discovery of gold. For instance, in Victoria a reef running east and west, according to local theories, did not carry gold, or if it did it would soon cut out. Again, if a lode did not exist between two well defined "walls," generally slate on one side and sandstone on the other, that reef could not "live." But the experience of other countries has dispelled these pet fads. To go further afield, the auriferous formation of Johannesburg is unlike anything yet met with in Australia. The ore deposits are neither veins nor irregular masses, but huge beds of conglomerate, which can be followed with the regularity of ordinary stratified rocks. This conglomerate, probably the shore deposit of an

ancient sea, consists of pebbles of quartz, much crushed, embedded in a silicious matrix, which is now a hard quartzite, but may have been originally a loose sand. From the resemblance of the quartz pebbles to almonds in a certain sweetmeat, the Boers have called the conglomerate "banket"—a name which has now firmly rooted itself in mining phraseology. It is in the matrix and not in the pebbles that the gold normally occurs, the metal being sparsely distributed in a very fine state of mechanical division through the iron pyrites, which is present in the banket, whilst near the outcrop of the rock, where the pyrites have been decomposed by meteoric action, the disseminated gold has been set free in a visible form.

WEST AUSTRALIA.

Mention was made in last week's issue of W. H. Hyatt's new "oil process," by which he claims that the water difficulty in gold extraction from the fields of Western Australia, the Transvaal and other auriferous countries has been solved. He describes it as follows: "A coil of iron tubing with detachable lower bends is fixed on a light barrow for easy transit. This coil is fitted with a fitting-hopper, placed immediately above the entrance for a blast of air. A second light barrow carries a suitable blower. In operation, the blower is instantly attached to the amalgamating coil, the lower bends of which are partially filled with mercury. As the crushed ore passes through the feeding-hopper, it is caught up by the blast and driven into the mercury, the mercury being sprayed and violently agitated by the force of the blast; so much so, that every particle of the gold-bearing material is washed and re-washed by the mercury itself, the effect being that the mercury rapidly amalgamates with the gold and leaves the tailings, after the gold is fully extracted from the ore, to be blown out by means of and with the same blast. The loss of mercury in the operation is positively fractional. To remove the gold the bends are detached, and the mercury passed through wash-leather, the amalgam remaining in the leather. The amalgam is retorted, the mercury recovered, and pure gold in a metallic state is obtained, the whole of this operation occupying but a few minutes, independent of water except for drinking purposes."

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING MAY 19, 1896.

560,184—SEPARATOR—F. J. Barnard, Seattle, Wash.
560,252—ROTARY ENGINE—E. O. Bennett, Haywards, Cal.
560,339—WRENCH. Bourn & Hale, Gualala, Cal.
560,467—ENGINE VALVE—S. F. Brousseau, S. F.
560,394—HYDRAULIC ENGINE—A. J. Collar, Yreka, Cal.
560,611—PEN EXTRACTER—A. A. Dayton, S. F.
560,261—FILTER—E. J. Durant, Pasadena, Cal.
560,399—WELL CASING—G. W. Durbrow, Salton, Cal.
560,402—EGG CUTTER—H. B. Everest, Riverside, Cal.
560,358—ANNUNCIATOR—G. Y. King, Oakland, Cal.
560,589—WATER MOTOR—A. R. Lewis, Shelton, Wash.
560,593—SWIMMING DEVICE—W. Luce, Nehalem, Or.
560,273—LEMON SQUEEZER—H. Malinow, Los Angeles, Cal.
560,516—REFRIGERATOR—H. & R. R. Maxwell, Fresno, Cal.
560,398—FILTER—W. L. Murphy, S. F.
560,325—CAR COUPLING—V. Pfaff, S. F.
560,328—CAR COUPLING—V. Pfaff, S. F.
560,436—DRAW BAR—J. Shaw, Woodburn, Or.
560,237—SCISSORS—J. F. Shultz, San Jacinto, Cal.
560,457—HAND TRUCK—York & Slaughter, Colton, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

HYDRAULIC ENGINE.—A. J. Collar, Yreka, Cal. No. 560,394. Dated May 10, 1896. This invention relates to an engine which is adapted to be actuated by liquid under pressure. The object of this invention is to provide an apparatus in which a liquid under pressure is admitted successively to connected cylinders, and a mechanism whereby the pressure of the liquid acts at the proper time upon pistons reciprocating within cylinders, the piston rods being connected with cranks upon the shaft so as to convert the alternate reciprocating motions of the pistons into a continuous rotary motion of the crank shaft. It consists of cylinders arranged in pairs, one of each pair receiving water under pressure at one end and delivering it into its mate at the opposite end; a diagonal pipe by which water is delivered from the second cylinder of the first pair to the first cylinder of the second pair; a connection between the opposite ends of the second pair; open pistons reciprocating within the cylinders connecting with cranks upon a common crank shaft, and valves closing the pistons so that the pressure of the water is alternately applied to the various pistons.


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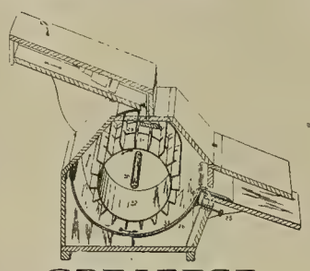
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During the run, in all the panning (of over one hundred) I never missed finding gold before passing through the machine, and after passing the machine I found only two colors in panning after going through; in other words, only two colors were found in the tailings after panning over 120 pans.

Of the many methods that have been tried for saving the gold from the sea sands on this coast for the last twenty-five years, none have given as satisfactory results as the Victor.

I have no hesitation in saying that the machine, properly handled, will save a larger percentage of gold contained in the sea sands than any other process in my experience of over thirty years.

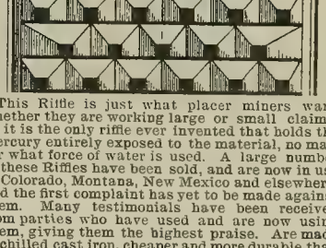
The machine is equally well adapted to saving the free gold from mill tailings, when it is too fine to amalgamate on ordinary plates. In milling talcy ores, I know of no other process so well adapted to saving gold as the Victor Amalgamator.

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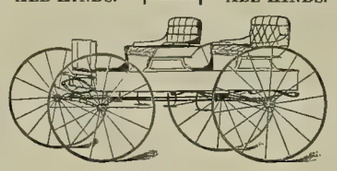
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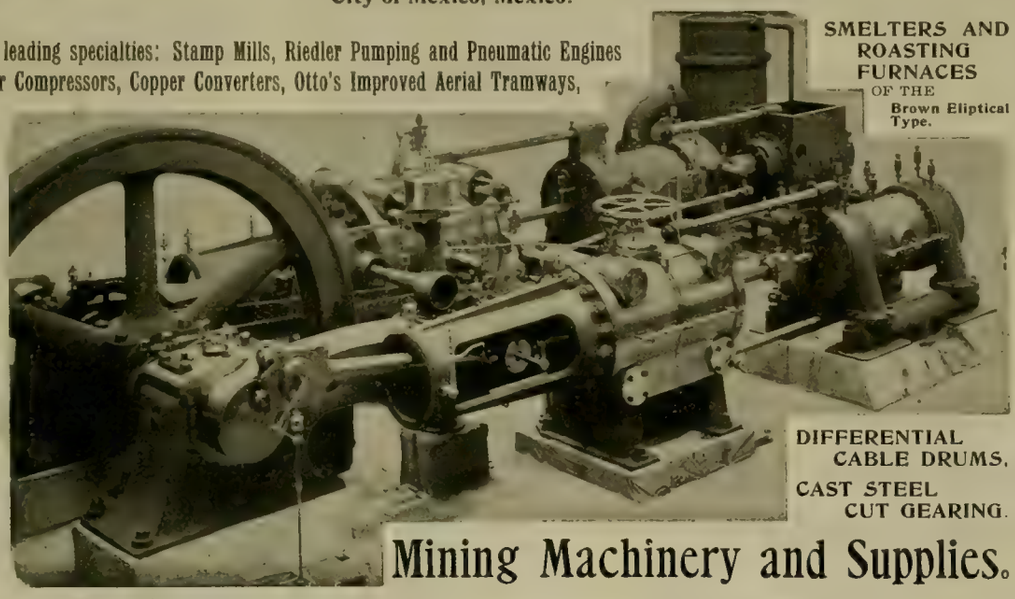
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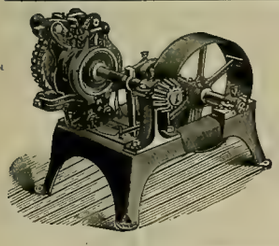
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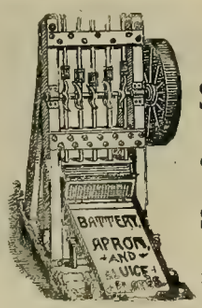
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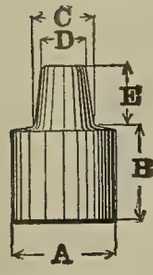
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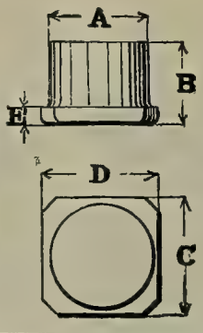

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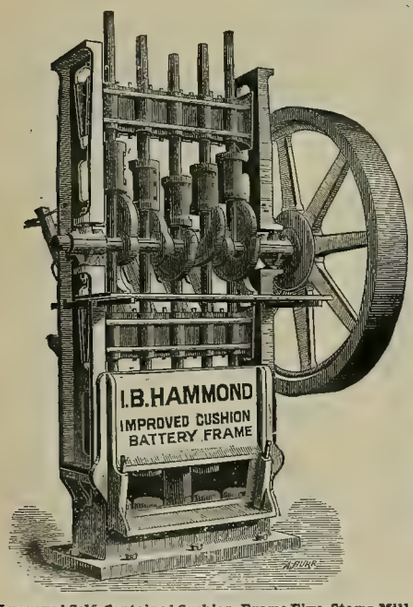
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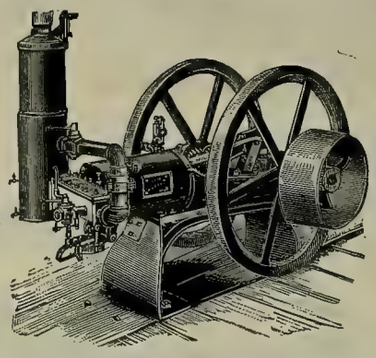
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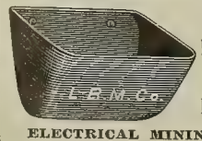
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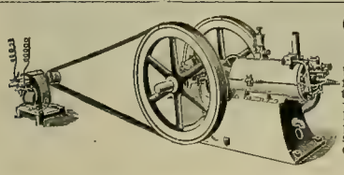
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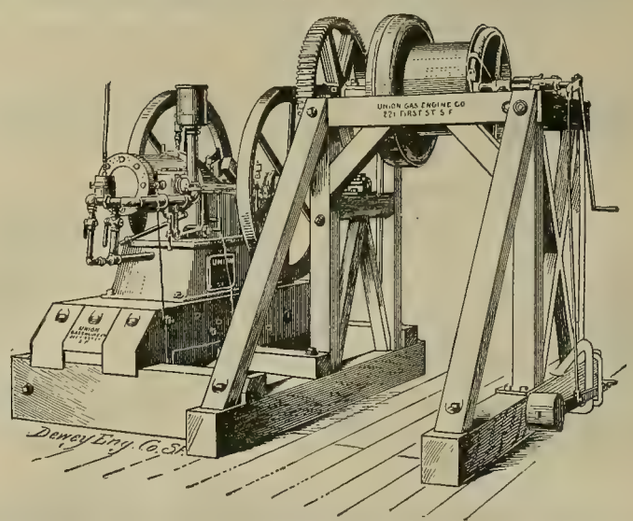
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Represents the highest development yet attained in water wheel practice and affords the most simple, efficient and economical means of utilizing water for power purposes.

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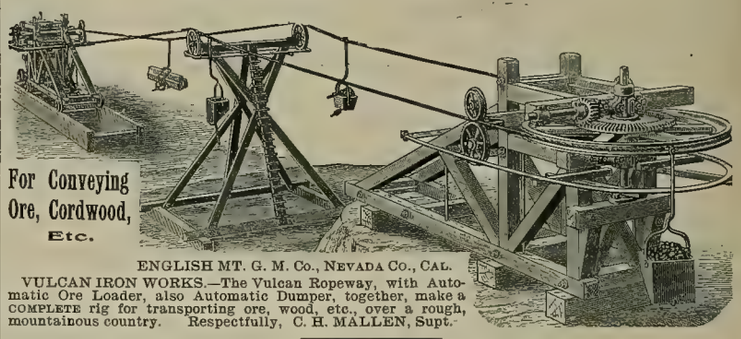
**THE PELTON WATER WHEEL CO.,**

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# Vulcan Wire Ropeway

—WITH—

AUTOMATIC ORE LOADER AND AUTOMATIC DUMPING DEVICE.



For Conveying Ore, Cordwood, Etc.

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VULCAN IRON WORKS.—The Vulcan Ropeway, with Automatic Ore Loader, also Automatic Dumper, together, make a COMPLETE rig for transporting ore, wood, etc., over a rough, mountainous country. Respectfully, C. H. MALLEN, Supt.

**VULCAN IRON WORKS,**

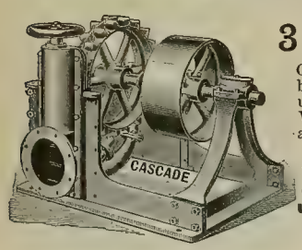
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*Adapted to all Heads from*

**3 Feet to 2000 Feet.**







Our experience of 33 YEARS building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

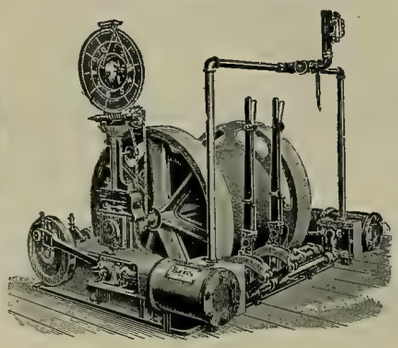
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# ADAMANTINE SHOES AND DIES

—AND—

CHROME CAST STEEL

**Cams, Tappets, Bosses, Roll Shells and Crusher Plates.**







These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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Special attention given to the purchase of Mine and Mill Supplies.



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# Rand Drill Co.



**Rock Drilling, Air Compressing, Mining and Quarrying Machinery.**

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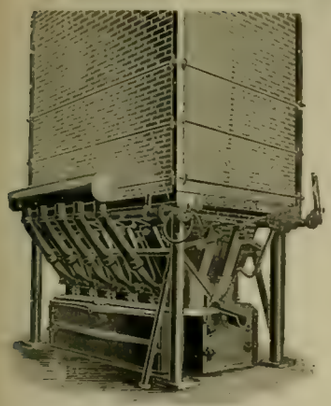
H. D. MORRIS & CO., Agents, 141 First St., San Francisco, Cal.

# H. D. MORRIS & CO.,

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SANDERSON DRILL STEEL,
MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL.



Standard Silver-Lead Water Jacket Smelting Furnace.

Equipped with Arch-Bar System of Mantles, insuring rigid and strong walls. No cracks.

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Established 1860.
1876—Incorporated—1896.

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MANUFACTURERS OF AND CONTRACTING ENGINEERS FOR

## Gold and Silver Mills & Smelting Plants

FOR THE REDUCTION OF GOLD, SILVER, LEAD AND COPPER ORES.

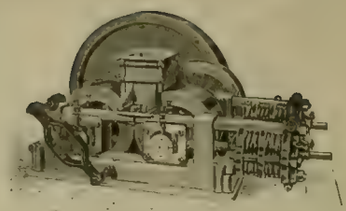
We can furnish on Short Notice MACHINERY and GENERAL EQUIPMENTS for

**Cyanide, Chlorination, Bromine, Concentration and Amalgamation Plants,**

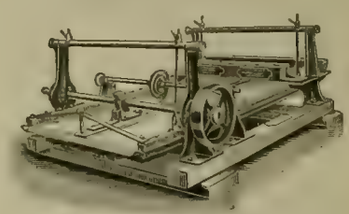
COMPLETE, OR IN PART.

*Catalogues on application.....*

NOTE.—We have a Testing Plant (Mill) on our premises and test ore by Concentration and Amalgamation in ten-ton lots or more, to arrive at best possible method to save values, machinery to be selected accordingly.



CAZIN'S IMPROVED CRUSHING ROLLS.
"Superior to all others."
LARGE CAPACITY. FINE CRUSHING.



PERFECTION CONCENTRATOR.
Capacity 5 to 15 tons in 24 hours. A machine that will do the work.

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Established 1860.

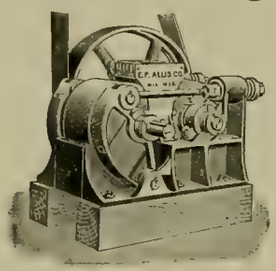
The Reliance Crushing Rolls.

RELIANCE WORKS.

## Mining, Milling and Smelting MACHINERY.

Crushers, Rolls, Jigs, Concentrators, Screens, Stamps, Pumps, Compressors, Hoists, Boilers, Etc., Etc.

REYNOLDS CORLISS ENGINES.



BRANCH OFFICES:

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| Chicago, Ill. | 509 Home Ins. Building. |
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## ENGINES AND BOILERS

## PARKE & LACY COMPANY

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## SILVER-PLATED AMALGAMATED PLATES

For Saving Gold

IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates replated, bought, or gold separated. THOUSANDS OF ORDERS FILLED.

## San Francisco Novelty and Plating Works

Incorporated.

SEND FOR CIRCULARS. 68, 70 and 72 First Street, San Francisco, Cal.

## Justinian Caire, Agent

521 and 523 Market Street, San Francisco,

—DEALER IN—

**Assayers' and Mining Material.**

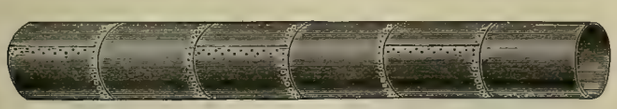
—MANUFACTURER OF—

BATTERY SCREENS AND WIRE CLOTH.

—AGENT FOR—

Hoskins' Hydro-Carbon Assay Furnaces.

# Mining Pipe!

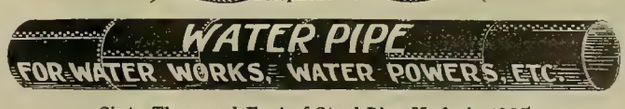


STEEL OR IRON.—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.
COATING.—We use great care in COATING our pipe with a HOT solution of Double Refined Asphaltum and Maltha.
COMPETITORS.—Our competitors say we have the best appointed Pipe Shop on the Coast.

SCHAW, INGRAM, BATCHER & CO., Hardware Merchants,
SACRAMENTO, CAL.

# W. A. WEIGELE PIPE WORKS.

Telephone 1312




Sixty Thousand Feet of Steel Pipe Made in 1895.

SHEET STEEL WORK of all kinds.

2949 and 2951 Laramie Street,

DENVER,.....COLORADO.

# Market Reports.

## The Markets.

SAN FRANCISCO, May 28, 1896.

General trade was fairly active the past week. In several branches jobbers report an increased volume of goods going out on orders. In comparison with the corrresponding time last year it is larger in every line. This, no doubt, is due to the lateness of the season preventing stocking up to any extent. With the warmer and clear weather dealers in the agricultural and mining districts have bought more freely. Crop advices continue favorable for both fruit and grain. The decline in the market value of the latter has somewhat of an unfavorable influence, but even at present quotations for spot and future delivery the market is higher than at the like date in 1895, while the outturn to the acre promises to be fully up to last year's. Iron workers report a continued business with several running full handed and on full time.

The local money market is practically unchanged. The demand is light while the available supply is large. It is expected there will be an improved demand when the crops begin to move, but it must not be forgotten that interior banks are in a fairly independent position and can put out large sums of money before requiring assistance from San Francisco. Merchants report collections fair to good for the season of the year. New York mail advices are to the effect that there is a plethora of funds with next to money changing hands owing, it is said, to borrowers having supplied their wants. European advices state that money is in good supply and that gilt edge security secures a low range of interest. All kinds of gilt edge bonds are readily placed at higher figures than has ruled for several years. European banks of issue report the quantity of gold and silver on hand as follows: May 7, 1896, gold $1,602,200,000; May 9, 1895, $1,436,200,000. The silver held was May 7, 1896, $511,200,000; May 9, 1895, $537,200,000. The above comparison shows a gain of $165,900,000 in gold and a decrease of $26,000,000 in silver.

**New York Silver Prices.**

NEW YORK, May 28.—Following are the closing prices for the week:

| | —Silver in— | |
|---|---|---|
| | London. | N. Y. |
| Friday | 31 1–16 | 67⅞ |
| Saturday | 31 1–16 | 68 |
| Monday | 31½ | 68⅛ |
| Tuesday | 31 3–16 | 68¼ |
| Wednesday | 31¼ | 68⅜ |
| Thursday | 31¼ | 68⅜ |

| | Copper. | Lead. | Iron. | Tin. |
|---|---|---|---|---|
| Friday | 11 25 | 3 02½ | 10 75@13 50 | 13 50 |
| Saturday | 11 25 | 3 02½ | 10 75@13 50 | 13 50 |
| Monday | 11 50 | 3 02½ | 10 75@13 50 | 13 50 |
| Tuesday | 11 50 | 3 02½ | 10 75@13 50 | 13 55 |
| Wednesday | 11 50 | 3 02½ | 10 75@13 50 | 13 50 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 6@7 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | 12½ |
| New York Telegraphic Transfer | 15 |
| London Bankers' 60 days | $4.88¼ |
| London Merchants | $4.86¼ |
| London Sight Bankers | $4.90 |
| Refined Silver, per oz., 1000 fine | 62⅜ |
| Mexican Dollars | 53½@54½c |

SILVER.—The market has advanced ¼c an ounce the past week, closing fairly steady. The improvement is due to France and Russia buying, but as their wants will probably cover several months it is not at all likely they will force prices up against themselves, but buy as required. The demand from India and China is light—almost nothing—which has disappointed dealers.

MEXICAN DOLLARS.—The market is stronger, in sympathy with silver, but the demand is light. Our advices from the East are to the effect that fair shipments are going out at from 53½ to 54 cents.

COPPER.—Our market is very strong for ingot and manufactured in sympathy with European and Eastern markets. New York mail advices are as follows: "The market for all varieties of the metal is very firm. The undertone is strengthened more or less by the semi-monthly European statistics, showing that in the face of enormous exports from this side of the Atlantic, the foreign visible supply decreased 1600 tons during the first half of May. This assurance of enormous consumption in Europe has, in fact, dispelled the suspicion that was more or less generally entertained a short time ago that copper has been 'hidden' by foreign operators for speculative purposes. The extent to which home consumers have placed orders recently would indicate that the outlook in this country is not dark, although manufactured goods may not be selling in wholly satisfactory manner at the present time. Lake Superior ingot appears to be more difficult to secure for any delivery during the next three months."

The exports from this country for the first four months of the calendar year aggregated 38,148 tons, against 19,431 tons during the corresponding time last year.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

QUICKSILVER.—There is a continued good export movement.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| Distant points up north | 38 00 |
| West coast of Mexico, for export | 34 00 |

ANTIMONY.—The market is quiet but steady at 8@9c cents in a jobbing way. New York mail advices quote 7½@7¾c for Cookson's, 6¾@6¾c for Hallett's and 6½@6⅝c for Japanese, from store.

TIN—The market is fairly firm for the pig and plate. The east reports a firmer market. An advance in silver has improved the price of pig tin.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

POWDER.—There is a continued good demand. The market is strong at unchanged quotations.

BORAX.—The market is quoted as follows

| | |
|---|---|
| Refined, in car lots | 6⅛ |
| Refined, in sacks | 5⅞ |
| Powdered, in car lots | 6⅛ |
| Concentrated, " | 5⅝ |

LEAD.—The market is steady. At the East an improved demand is reported, but free supplies are against sellers.

The market is quoted as follows:

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

POWDER.—The market is reported very strong at full figures, with a continued good demand for mining purposes.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " " | 8½c |

IRON.—The local market is practically unchanged. There is a continued larger consumption of pig. The Philadelphia *Press* reports that market as follows: In the iron trade, another uneventful week has passed, and there are no present indications of any material change. A quiet, steady business is doing, and a slight improvement in the demand for manufactured material is noticeable. Contrary to expectation the May statement showed no falling off in the output of pig iron, but from information now at hand a number of furnaces are known to be blowing out, as will appear in the next monthly statement. Western market reports all show a continued quiet state of trade, but makers are still looking for a revival in the demand and prices are held with considerable steadiness. There has been a pressure to secure some rebate on coke, but there is no announcement of any change either in fuel or ores.

Our market is quoted as follows:

AMERICAN.

| | To Arrive. | Spot. |
|---|---|---|
| Sloso | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |

ENGLISH.

| | | |
|---|---|---|
| Barrow | $21 00 | $23 50 |
| Gartsherrie | 21 50 | 23 50 |

COAL.—There is very little Australian on the way, while the labor strike at the collieries is against vessels loading. This shortage will be met by coast collieries, which will prevent much of an advance in prices. The consumption of steam will increase steadily from now on.

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 10 00 |
| " in sacks | — — | @ | 10 50 |
| Cumberland | — — | @ | — — |

NAILS.—Jobbers report a good demand at quotations.

The market is quoted as follows:

| | |
|---|---|
| Wire, carloads, basis per keg | $3 22½ |
| " jobbing, " " | 3 35 |
| Cut, carloads, " " | 2 97½ |
| " jobbing, " " | 3 10 |

LUMBER.—There is a continued good home and export demand.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 14 00 | @ | 19 00 |
| Spruce | 26 00 | @ | 31 00 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, May 28, 1896

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 150 Alpha | 27 | 100 Gould & Curry | 1 55 |
| 100 | 26 | 700 | 1 50 |
| 100 | 25 | 100 Kentuck | 07 |
| 300 Andes | 29 | 350 Mexican | 1 00 |
| 400 Belcher | 79 | 100 Occidental | 1 60 |
| 400 Best & Belcher | 1 35 | 50 Ophir | 1 75 |
| 50 | 1 30 | 300 Overman | 15 |
| 100 Bodie | 68 | 300 Potosi | 1 45 |
| 500 Bullion | 28 | 750 Savage | 1 45 |
| 500 Chollar | 2 80 | 50 S Belcher | 16 |
| 100 Con Cal & Va | 2 85 | 300 Sierra Nevada | 1 00 |
| 50 | 2 80 | 100 Union Con | 90 |
| 200 Crown Point | 69 | 100 | 89 |
| 200 Exchequer | 08 | 500 Utah | 18 |
| 700 H. & N | 3 10 | | |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 400 Ophir | 1 75 | 500 Exchequer | 08 |
| 100 Gould & Curry | 1 45 | 100 Overman | 15 |
| 100 Best & Belcher | 1 35 | 200 Justice | 10 |
| 200 C. C. & Va | 2 80 | 400 Union | 86 |
| 200 Savage | 1 45 | 200 Caledonia | 11 |
| 850 Chollar | 2 70 | 700 S Hill | 07 |
| 100 Potosi | 1 45 | 50 Occidental | 1 50 |
| 200 | 1 40 | 50 | 1 55 |
| 800 H. & N | 3 00 | 100 Andes | 38 |
| 250 Crown Point | 67 | 100 | 37 |
| 300 | 66 | 300 Bodie | 65 |
| 100 Yellow Jacket | 56 | 100 | 64 |
| 200 Belcher | 76 | 100 Bulwer | 37 |
| 100 Confidence | 1 40 | 200 Mono | 05 |
| 200 Sierra Nevada | 98 | 500 Syndicate | 03 |
| 100 | 97 | 100 Mexican | 1 00 |

## Mining Share Market.

SAN FRANCISCO, May 28, 1896.

The depression reported last week culminated with Friday. After the regular Call on that day a raid was made on Chollar, sending the price, within a few minutes, down to $1.55; but in less than three minutes the price jumped back to $2.10, closing the day's transactions at $2 bid. Every share on the list, except Hale & Norcross, sold some lower and then closed slightly better. Hale & Norcross did not go off much. At the decline and recovery there were heavy transactions. The break came unexpectedly and caused a more or less demoralized feeling. Saturday's closing was firm at a slight advance, with Hale & Norcross the leader. On Monday the market opened strong, active and higher under a good demand for shares in the above mine. At the advance many outside holders are said to have sold, fearing that the market would sell down; but up to this writing it has not, although trading has been more quiet with no great strength in any of the shares except those of Hale & Norcross. Taking the list as a whole, and there is no denying there is a good undertone, at each shading there is a quick recovery. Many of the traders deal for cash, not caring to take chances on margin buying. Owing to the rapidity, an account can be uncovered when not protected by a 75 per cent margin. Commission brokers report very small holdings by outside dealers; the majority seem to have taken their profit and are waiting for lower prices to buy back. The movements of the market, combined with the work in the different groups of mines, particularly those having grounds on the Brunswick lode, warrant the assertion that there will be good fluctuations in prices which ought to make it attractive to professional traders—those at hand to take advantage of the turns at a moment's notice. At this writing it looks as if the general market will fluctuate to higher prices. Yet dealers should be prepared for the worst, which may come any day. At this writing the most attractive shares are of the mines having ground on the Brunswick lode. This, no doubt, is largely due to their having two chances of making a development—one on that lode and the other on the Comstock. Besides this, a new field of operation is at all times attractive when backed by sharp manipulation.

In the Gold Hill shares trading has been more active in Yellow Jacket, Belcher and Crown Point, but prices did not show more than a 10 per cent fluctuation. It looks as if some strong party is opposing an upmove in them, and the work that is being done in the mines is carried on in such a way as not to encourage buying by outsiders. No assessment was levied the past week, but some are expected to be levied the coming month.

The news from the Comstock mines is practically unchanged since our last week's issue. While there is more or less work reported in every mine, except a limited few, yet official letters do not contain much of an encouraging character to shareholders who have visions of big bonanzas near at hand. The work in several of the mines is in the direction to strike ore, but how much is an unsolved problem which time alone can solve. It is the uncertainty of mining that makes the gamble, but it is the certainty that destroys it. From the Alta group work is only reported in Alta. It is on the same levels as heretofore made public, with no change in the material encountered. From the Gold Hill group the news is about as heretofore reported. The official letters are as void of encouragement as a bitter almond is of a pleasant taste. In Overman work will be resumed next week. Both Seg Belcher and Belcher report more ore raised, with the assays higher. In Crown Point the ore on one of the levels assays from $5 to $7 a ton, but on the other levels only porphyry is reported. No work is reported in either Kentuck or Yellow Jacket. In Confidence they are still prospecting from the raise above the 200-foot level. This is the level where rich ore was found, but which, it is said, was lost in the shuffle for lower prices for shares. The joint west crossdrift being run by Confidence, Challenge and Con. Imperial is in more favorable material. It is out over 500 feet. In Alpha the usual work is reported on the 500-foot level. Work on the long west crossdrift in Bullion is continued. The work in Potosi is on two levels, as it is in Chollar. The official letter from Hale & Norcross is quite important, so far as the direction of the work is concerned. In Savage the improvement reported last week on the 850-foot level is continued. The company raised nearly 100 tons of ore, which assayed over $61 to the ton. They are having 225 tons milled. If the ore is worked as close as was that of Hale & Norcross, shareholders will not have cause for complaint. In Gould & Curry and Best & Belcher the work is the same as heretofore given out. The work in Con. Virginia is on several levels, with miners watching that on the 1000-foot level. In Ophir, Mexican, Union and Sierra Nevada the work is on the same levels as heretofore reported. There are those who look for an improvement soon.

The Brunswick lode continues to attract attention. The work in Occidental is said to be quite important, but there are those who have very little faith in their finding enough ore of a free milling character to warrant any undue excitement. Meetings have been held and combinations formed for the purpose of working to better advantage the ground owned by Potosi, Chollar, Hale & Norcross, Savage, Gould & Curry, Best & Belcher and Con. Virginia. It has been decided that the particular work in each of the above companies' ground shall be prosecuted under direction of the superintendent of each mine. This will call for a larger expenditure of money—but what do shareholders care for this, so long as the market is active and there are opportunities of making a big find of ore. There is enough work outlined to take several months to carry out. While this work is being done the shares of the mines will be a gamble and ought to have lively fluctuations as it is pushed forward.

From the Bodie mines the news is about the same as has been given out the past few weeks.

The market opened this morning barely steady and only fairly active. After regular call prices shaded off about 5 per cent, but closed at noon at call prices. At the 2:30 P. M. session Ophir sold slightly higher and Chollar a shade lower; the rest of the list was unchanged. Trading was light. It is stated that outsiders sold to-day more than they bought, and as the shares have drifted into strong hands it is not at all unreasonable to affirm that we can look for better prices soon. Advices from the Comstock state that when some necessary work is done in Crown Point active exploiting will be begun in quite interesting ground on three different levels.

The following illustrates the changes of the week:

| Mines. | May 21. | May 28. |
|---|---|---|
| Alpha | $ 28 | $ 27 |
| Alta Consolidated | 11 | ..... |
| Andes | 43 | 38 |
| Belcher | 75 | 79 |
| Best & Belcher | 1 70 | 1 35 |
| Bodie | 77 | 68 |
| Bullion | 32 | 28 |
| Challenge | 50 | ..... |
| Chollar | 2 65 | 2 80 |
| Confidence | 1 45 | 1 40 |
| Consolidated California and Virginia | 3 10 | 2 85 |
| Consolidated New York | ..... | ..... |
| Crown Point | 70 | 69 |
| Exchequer | 10 | 8 |
| Gould & Curry | 1 85 | 1 55 |
| Hale & Norcross | 2 50 | 3 10 |
| Justice | ..... | 10 |
| Mexican | 94 | 1 00 |
| Ophir | 2 05 | 1 75 |
| Overman | 18 | 15 |
| Potosi | 1 30 | 1 45 |
| Savage | 1 55 | 1 45 |
| Sierra Nevada | 1 15 | 1 00 |
| Union | 1 10 | 90 |
| Utah | ..... | 18 |
| Yellow Jacket | 73 | 56 |

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alaska-Willoughby G M Co, Alaska | 1 | 20c | Apr 6 | May 25..June 29 | T Pollard, 22 California |
| Alpha Con M & M Co, Nev | 16 | 5c | Apr 7 | May 12..June 2 | C E Elliot, 309 Montgomery |
| Alta S M Co, Nev | 52 | 10c | May 4 | June 9..June 30 | J E Jacobus, 309 Montgomery |
| Burlington G M Co, Cal | 2 | 3c | Apr 23 | May 27..June 17 | W C Ralston, 331 Pine |
| Central Eureka M Co, Cal | 1 | 3c | May 16 | June 22..July 18 | W Van Bokkelen, 320 Sansome |
| Inyo Marble Co, Cal | 28 | 10c | Mar 30 | May 4..June 4 | M A Cahn, Phelan Bldg |
| Mexican G & S M Co, Nev | 54 | 20c | Apr 23 | May 28..June 18 | C E Elliot, 309 Montgomery |
| Mt Diablo M & M Co, Nev | 4 | 5c | May 21 | July 2..July 23 | R W Heath, 318 Pine |
| Old Flag M Co, Cal | 3 | 2c | May 11 | June 18..July 6 | F L Olmsted, 315 Montgomery |
| Overman S M Co, Nev | 75 | 10c | May 2 | June 5..June 25 | G D Edwards, 414 California |
| Peabody G M Co, Cal | 6 | 10c | Apr 28 | June 3..June 24 | B Naterp, 124 Sansome |
| Potosi M Co, Nev | 45 | 20c | Apr 9 | May 14..June 4 | C E Elliot, 309 Montgomery |
| Savage M Co, Nev | 89 | 20c | May 1 | June 3..June 23 | E B Holmes, 309 Montgomery |
| Silver King M Co, Arizona | 14 | 25c | May 7 | June 16..July 14 | J W Pew, 310 Pine |
| Siskiyou Con Q M Co | 11 | 1c | May 5 | June 8..June 29 | E F Stone, 306 Pine |
| Ybarra G M Co, Mexico | 4 | 15c | May 21 | June 21..July 9 | Jas Coffin, 132 Market |


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## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 3) levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| Chas. A. Moore | 102 | 7,222 | 361 10 |
| Chas. A. Moore, Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6,000 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore, Trustee | 130 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 160 | 6,667 | 333 35 |
| N. L. Bell, Trustee | 128 | 250 | 12 50 |
| A. U. Rugg | 16 | 1,000 | 50 00 |
| A. U. Rugg | 67 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 155 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg, Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg, Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 109 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 141 | 1,667 | 83 35 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 133 | 3,195 | 159 75 |
| E. C. Godfrey | 134 | 4,000 | 200 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Room 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

### POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until SATURDAY, May 9, 1896, at the hour of 2 P. M., at the office of the Company, Room 38 Crocker Building, San Francisco, Cal.

E. C. GODFREY, Secretary.

### POSTPONEMENT NOTICE.

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until MONDAY, June 8, 1896, at the same hour and place. E. C. GODFREY, Secretary.

Office, No. 38 Crocker Building, San Francisco.

## DELINQUENT SALE NOTICE.

INYO MARBLE COMPANY OF CALIFORNIA.—Location of principal place of business, San Francisco, California. Location of works, Marmol, Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 28) levied on the Thirtieth (30th) day of March, 1896, the several amounts set opposite the names of the respective shareholders, as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| W. W. Sargaent, Trustee | 482 | 1,250 | 125 00 |
| W. W. Sargaent, Trustee | 485 | 1,000 | 100 00 |
| W. W. Sargaent, Trustee | 488 | 745 | 74 50 |
| W. W. Sargaent, Trustee | 505 | 1,000 | 100 00 |
| W. W. Sargaent, Trustee | 514 | 500 | 50 00 |
| W. W. Sargaent, Trustee | 516 | 600 | 60 00 |
| W. W. Sargaent, Trustee | 518 | 1,000 | 100 00 |
| G. W. Luce | 310 | 5 | 50 |
| G. W. Luce, Trustee | 369 | 9 | 90 |
| Geo. Dillman | 530 | 980 | 98 00 |
| Israel Luce, Trustee | 397 | 1,000 | 100 00 |
| A. F. Thane, Trustee | 447 | 500 | 50 00 |
| Percy Beamish, Trustee | 494 | 500 | 50 00 |
| Percy Beamish, Trustee | 495 | 225 | 22 50 |
| A. J. Hughes | 522 | 429 | 42 90 |
| H. E. Noble | 524 | 100 | 10 00 |
| F. H. Hilbert | 533 | 100 | 10 00 |
| F. H. Hilbert | 534 | 100 | 10 00 |
| F. H. Hilbert | 535 | 100 | 10 00 |
| F. H. Hilbert | 536 | 100 | 10 00 |
| F. H. Hilbert | 537 | 100 | 10 00 |
| F. H. Hilbert | 538 | 500 | 50 00 |
| F. H. Hilbert | 539 | 500 | 50 00 |
| Voss Conrad & Co | 541 | 301 | 30 10 |

And in accordance with law, and an order from the Board of Directors, made on the 30th day of March, 1896, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at their office, Room 323 Phelan Building, San Francisco, California, on THURSDAY, the 4th day of June, 1896, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale. M. A. CAHN, Secretary.

Office, Room 323, Phelan Building, San Francisco, California.

TO THE STOCKHOLDERS OF THE SOUTH PALOMA GOLD MINING COMPANY, LIMITED:

Notice is hereby given that by resolution of the Board of Directors of the corporation, adopted on the 21st day of March, 1896, a meeting of the stockholders of the corporation was called for the purpose of increasing the capital stock to the amount of two hundred thousand dollars, to be divided into one hundred thousand shares of the par value of two dollars per share, and of determining the disposition to be made of the increased capital stock; and it was resolved that such meeting shall take place at the principal place of business of the corporation, being the same building where the Board of Directors usually meet, to wit: No. 212 Sansome street, room 17, in the City and County of San Francisco, on WEDNESDAY, the 10th day of June, A. D., 1896, at 11 o'clock in the forenoon of that day.

Dated San Francisco, 2nd of April, 1896.

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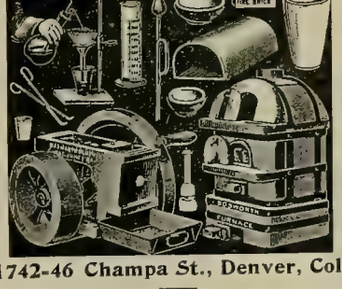
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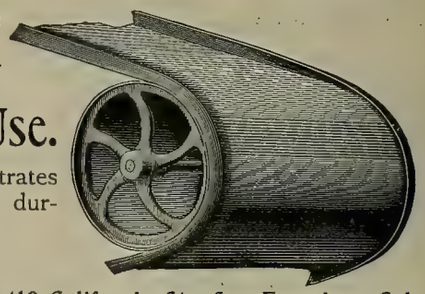
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MINING AND SCIENTIFIC PRESS.

AND PACIFIC ELECTRICAL REVIEW.

No. 1874.—VOLUME LXXII. Number 23. SAN FRANCISCO, SATURDAY, JUNE 6, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

## Wanted—A Secretary of Mines.

A Shasta county correspondent takes issue with us as to the need of a Cabinet Secretary, who would have Government charge of the mining industries of the country, and says that we as a people have too many departments and secretaries now, that we are ceasing to be a democratic republic or a republican democracy, and are fast becoming ruled by bureaucrats and commissioners and heads of departments; that to-day the will of the people is overruled and overridden by Washington satraps.

It does look a little that way, but we do not despair of the republic. The hard deal that the miners are now getting at the hands of arrogant and ignorant department heads is, however, the best argument we know of for the establishment of a bureau of mines, the creation of a Cabinet officer, whose sole business it shall be to attend to the great mining industries of the country. As things are, it is necessarily a part of governmental functions that the affairs of the country shall be administered by a presidential Cabinet, and it is better for the miners of California and of this coast to recognize this fact and unite in a demand for just recognition than to content themselves with decrying existing systems. Whether good or bad, it is the way things are done, and the way they will be done, and the creation of a Secretary of Mines is in direct line with the policy and outgrowth that has made the Cabinet. At first the Cabinet of the President of the United States was composed only of a Secretary of State, a Secretary of War and a Secretary of the Navy. In the century of our existence there have been added successively a Secretary of the Interior, an Attorney-General, a Postmaster-General and a Secretary of Agriculture. In the order of evolution or development, the time has arrived for a Secretary of Mines. The MINING AND SCIENTIFIC PRESS said this ten years ago; it has continued to press the subject; it has probably made itself a little tiresome by repetition; but all great results are gained only by continuity of effort. Any intelligent man who will note the trend of affairs as regards the mining industry in the past decade will be likely to give affirmative echo to the statement that the creation of a Cabinet officer to have charge of the country's mining industries is not only of immediate necessity to the miner, but of pressing importance to the interests of the nation in its entirety. Without more than passing reference to the dignity of the mining profession, or to the fact that upon the prosperity of its mineral industry primarily rests the prosperity of any country, it is but necessary to cite the present value and extent of the mineral industries of this nation and the evident increase. An industry that represents an annual output with a value of more than six hundred million dollars, and an investment of nearly four times that amount, can justly demand the recognition asked. In this State and elsewhere the ignorance displayed by the Interior Department is lamentable. With no disposition to find fault or blame; fully cognizant of the fact that these officials are overworked, and that they can not be expected to know anything about those matters, yet the fact remains that the great mining industry is, in their Government charge, a little dump heap in a corner of a big office, and that constant injury to the mining public is the result. Take, for instance, a common experience. Every day a point comes up involving interpretation of that maze of modern mystery, the mining laws of the United States. A letter to the Secretary of the Interior will bring a construction or ruling on a disputed point, and a letter to the Commissioner of the General Land Office will bring a construction or understanding on the same point exactly opposite to that of his superior.

These men know nothing about mining. This is not their fault, but it is our misfortune.

We need a new department of the Federal Government—the Department of Mining—with a competent mining man in charge, possessed of equal standing with other Cabinet officers. There are a great many things in the mining world that need straightening out, and they will never receive the attention their importance justifies till there is a Cabinet officer of mines. At present the mining interests of this country, and of this west half of the nation in particular, are harassed and held back at the mercy of a few petty officials, who don't know a shaft from a shift, who never saw the inside or outside of a mine, and who, largely left to their own devices, become imbued with the idea that the miner is a sort of a nuisance. It is hard enough at best for the miners of this country, without having things made harder still. Between the grab of the corporation and the merciless ignorance of those in power, matters are made harder still. Things are getting no better very fast, and the creation of a department of mines, in charge of a Cabinet officer, will alone bring permanent or satisfactory solution of this important question. If the miners of the country (and that term is meant to include everyone directly connected with the mining industry) will work together in a united demand for such recognition, it will be forthcoming.



GREENSTONE OUTCROP ON THE MOTHER LODE.

## Greenstone Outcrop.

Contrary to the generally accepted theory that development of greenstone veins on the Mother Lode does not pay, experiments and developments at the Mayflower and elsewhere lend practical interest to the idea entertained by some that a greenstone vein may be found of sufficient value to at least thoroughly prospect. Herewith is an illustration of a greenstone outcrop at Rancheria Creek, Amador county.

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AFTER considerable delay the diplomas and medals awarded by the World's International Columbian Exposition in Chicago in 1893 are being at last sent to the successful competitors. Whatever of advertising value they possessed has been largely lost by lapse of time, and they are now chiefly of interest as historical mementoes of a great event. The MINING AND SCIENTIFIC PRESS last Monday received the bronze medal and diploma awarded to it by unanimous vote of the commissioners. The medal is a massive one, appropriately inscribed; the diploma is handsomely executed. The award was for the high character of this paper, its accuracy and reliability, and is valued as a fine tribute from competent critics So far as known it is the only journal thus honored, and the distinction is appreciated. The medal will be placed in the archives of this office and the diploma handsomely framed will grace our walls.

# MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

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J. F. HALLORAN.....General Manager

San Francisco, June 6, 1896.


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## The $250,000 Appropriation.

The President of the United States is not so powerful in influencing National legislation as the Speaker of the House of Representatives. The latter can absolutely block legislation: the former can only delay it. On the 29th ult. the President vetoed the River and Harbor bill, which contained the $250,000 hydraulic appropriation asked for by miners and valley residents for restraining barriers in California rivers. On the 2nd inst. the House passed the bill over the head of the Chief Executive by a vote of 220 to 60. On the 3rd the Senate followed suit by a vote of 56 to 5. So that part of the legislation desired by the miners of California is secured.

The full text of that portion of the bill making the appropriation is as follows:

For the construction of restraining barriers for the protection of the Sacramento and Feather rivers in California, two hundred and fifty thousand dollars; such restraining barriers to be constructed under the direction of the Secretary of War in accordance with the recommendations of the California Debris Commission, pursuant to the provisions of, and for the purposes set forth in, section 25 of the act of the Congress of the United States entitled "An act to create the California Debris Commission and regulate hydraulic mining in the State of California," approved March 1, 1893.

*Provided*, that the Treasurer of the United States be, and he is hereby, authorized to receive from the State of California, through the Debris Commissioner of said State, or other officer thereunto duly authorized, any and all sums of money which have been, or which may hereafter be, appropriated by said State for the purposes herein set forth. And said sums, when so received, are hereby appropriated for the purposes above named, to be expended in the manner above provided.

It will be noticed that no mention is made of De Guerre Point, or any other specific location; it will also be noticed that there is no reference to hydraulic mining *per se*. The difference is accentuated by comparison of the above (which is incorporated in the general River and Harbor bill) with the following:

A BILL TO APPROPRIATE MONEY FOR THE CONSTRUCTION OF WORKS TO IMPOUND MINING DEBRIS, AND THEREBY TO PROTECT THE NAVIGABLE STREAMS OF CALIFORNIA.

*Be it enacted by the Senate and House of Representatives of the United States of America, in Congress Assembled.*

SECTION 1. That there is hereby appropriated out of any money in the treasury not otherwise appropriated the sum of one million and thirty thousand dollars, which sum shall be immediately available and shall be expended under the direction of the Secretary of War, in accordance with the plans, specifications and recommendations of the California Debris Commission, appointed under the Act of Congress entitled, "An Act to create the California Debris Commission and regulate hydraulic mining in the State of California," approved March 1, 1893, for the purpose of constructing works for the restraining and impounding of mining debris upon the tributaries of the Sacramento and San Joaquin rivers in California and the branches of such tributaries.

SEC. 2. Whenever any such works for the restraining and impounding of mining debris shall have been constructed out of such appropriation, or shall have reached such a stage as, in the opinion of such commission, it shall be safe to use the same, it shall be lawful for such commission to make the order provided for in section 13 of said act, upon proceedings being first had and taken in accordance with the provisions of section 9, 11 and 12 of said act, but in such cases the owners of the mines affected by said orders shall not be bound by the proviso to said section 13 of said act nor by the provisions contained in section 16 thereof.

SEC. 3. The said commission shall also have the power to make the order provided for in section 13 of said act as to any mine or mines whenever it shall appear to the satisfaction of said commission that no impounding works are necessary other than the means already provided by nature to protect from material injury the navigable streams mentioned in said act and the land adjacent thereto, upon proceedings had in accordance with sections 9, 10 and 12 of said act.

The above is the original bill drafted by the Legislative Committee of the California Miners' Association and presented last January in the Senate by Senator Perkins and in the House by Representative Johnson. It was found that, as an independent measure, it could not pass, and, after considerable modification, a $250,000 appropriation, as stated, got through.

This appropriation is doubly valuable, as it unlocks the appropriation of an equal amount for the same purpose made by the State in '93, contingent upon such congressional action as has now been taken. The appropriation will be available on the first of next month, and as preliminary surveys have already been made, and the location of the dams practically decided upon by the present U. S. Debris Commission, who will have entire charge, the work can begin early in the last half of this calendar year. It is to be borne in mind that this work is largely experimental and that in no way is there any change in the present legal requirements regarding hydraulic mining. The efforts of the miners secured the appropriation, and its benefits will be more largely shared by valley residents.

The appropriation is made under the provisions of section 25 of the Caminetti act—just as the California Miners' Association has always asked it. Under section 25 of the Caminetti act, the reports of Col. Mendell and the Biggs' Commission are made the basis of operations. These reports recommend various places in the foothills and canyons along the tributaries of the Sacramento and Feather rivers, including the branches of the Bear, Yuba and American, for dam sites. The California Debris Commission is left free to select the site, or sites, for the construction of the restraining barriers provided for.

The appropriation is unconditional and is in no wise dependent upon the California appropriation. California, however, in order to keep faith with the General Government, must see to it that the contingent $250,000 appropriated three years ago is added to the Federal appropriation.

But two points now remain to be overcome: First, to demonstrate the efficiency of restraining works; second, to secure such amendment to the Caminetti act as will enable the miners to use the Government works, as originally contemplated. Section 16 of the Caminetti act and the proviso to section 13 preclude any power of the miner to use any works other than those constructed by himself.

The wording of the appropriation is deserving of particular attention. It is to be noted that the appropriation is made under the provisions of Section 25 of the Caminetti act. That section is appended.

SECTION 25. That said commission, in order that such material as is now or may hereafter be lodged in the tributaries of the Sacramento and San Joaquin river systems resulting from mining operations, natural erosions, or other causes, shall be prevented from injuring the said navigable rivers or such of the tributaries of either as may be navigable and the land adjacent thereto, is hereby directed and empowered, when appropriations are made therefor by law, or sufficient money is deposited for that purpose in said debris fund, to build at such points above the head of navigation in said rivers and on the main tributaries thereof, or branches of such tributaries, or at any place adjacent to the same, which in the judgment of said commission will effect said object (the same to be of such materials as will insure safety and permanency), such restraining or impounding dams and settling reservoirs, with such canals, locks, or other works adapted and required to complete same. The recommendations contained in executive document numbered two hundred and sixty-seven, Fifty-first Congress, second session, and executive document numbered ninety-eight, Forty-seventh Congress, first session, as far as they refer to impounding dams, or other restraining works, are hereby adopted, and the same are directed to be made the basis of operations.

The appropriation is to be used in compliance with the provisions of the above section, and is solely for the purpose of constructing restraining barriers against what has been or may become in need of such restraint. As regards location, it needs only to be said that several years ago the U. S. Debris Commission made two reports recommending the building of a restraining dam or barrier at De Guerre point. Since that time the entire personnel of the commission has changed, and the views held by the commission as formerly constituted are considerably modified. Since then, also, the channel of the river has changed, and those now in charge are convinced that it would be unwise to build any restraining barrier at that point. It is believed that the preliminary work under the provisions of the appropriation when available, in about three weeks time, will be on the Yuba river, between the city of Marysville and the foothills.

## Cost of Classification of Mineral Lands.

Speaker Reed, as a part of his reason for his refusal to permit the Mineral Lands Classification bill to become a law, stated that the cost of the classification would be a million dollars. The statement is not true nor even approximately true. It certainly is not believed by the railroad or Mr. Mills would not have made the proposition to the Miners' Association to make the classification at the joint expense of the railroad and the association. As a fact the amount is a most unreasonable estimate. Under the terms of the bill practically all of the indisputably agricultural land would be so classified without any field inspection, and at little or no cost. In Butte, Yuba, Sierra, Nevada, Placer and El Dorado counties the areas of unpatented lands that would require examination and classification by sections are not near as large as generally believed. The information available for determining their character, which would undoubtedly be used to direct the field examination is extensive and reliable. The United States Geological Survey has been made over the entire region and the maps published. Though these maps do not show the township and section lines, they are topographically so accurate that these lines can be platted onto the maps. The State Mining Bureau has published maps of portions of Placer and Nevada counties that are also utilizable. The California Miners' Association, at an expense of nearly $1,200, has also secured accurate maps of almost all the region in dispute. The location of the mineral belts has become well known, and the evidences of their existence and possibilities of value are comprehensible on a rapid examination with the aid of the data noted. It is safe to say that the entire cost of the classification of the unpatented lands in these counties would not exceed $20,000. In Siskiyou, Trinity and Shasta counties the areas requiring classification cover much more territory than in the six counties already referred to; but a much larger proportion of that area is indisputably non-mineral in character and can be classified without field examination. The cost of the entire classification in this section is safely estimated as being within $20,000. Estimating for the southern group of counties—Kern, Los Angeles, San Bernardino, Riverside and San Diego—as much as for the other two groups combined, $40,000, the total cost of the classification would not be more than $80,000, and there are many reasons for believing that the cost would be very much less. This sum would be but a fraction of what would come into the national treasury from the sale of these lands as mineral patents are obtained for them. The Government receives $2.50 an acre for placer lands and $5 an acre for quartz.

This paper never has any desire to hold post mortems. The Mineral Land bill was cleverly smothered, and those who did it doubtless got or expect their reward; but it is in order to note that Speaker Reed's plea of cost was as fallacious as his still more specious statement that he believed it was a "railroad measure" and therefore opposed it. That is so manifestly absurd as to need no reply. Meanwhile, by the time this article gets to the bulk of its readers Congress will have adjourned, and nothing can be done this session. At the second session of the 54th Congress it may be possible to get the bill through. The thanks of the miners of California are due to the men who tried to secure a measure of justice at the hands of Congress.

It might be worth while this summer to dig a little into the patents that are issued already to the railroad company, the more so as the company seems to have made a practice of holding back some of its patents from record with the county recorders. An action has just been commenced in Placer county by the Central Pacific itself to quiet title to section 21 of T 15 N, R 12 E, against a miner who claims a quartz ledge on it. This section was patented to the Central Pacific some ten years since, but the patent is not on record there. The section is said to be well known valuable mineral land. How much similar land the same patents may take no one knows there. An examination of the recorded patents shows that thousands of acres of mineral land are patented to the railroad in that county.

## Concentrates.

THE Pueblo, Col., Mining Exchange has resumed calls.

THERE are 2,600 men on the payrolls at Anaconda, Montana.

WORK is resumed at the North American mine, Gibsonville.

SEVERAL California mining men are returning from South Africa.

THE Los Angeles Mining and Stock Exchange opened for business May 26th.

THE monthly profits of the Utica mine, Calaveras Co., are stated to be $150,000.

AT the Plumas Eureka, Johnsville, twenty stamps are dropping. Sixty men are now employed.

IT is estimated that there are now 18,000 miners at work in this State—an increase of 4,000 over '94.

THE value of the output for the Kootenai country for 1896 is estimated at from $5,000,000 to $10,000,000.

A RUSSIAN COMPANY has obtained a Government grant to work for gold in Corea for twenty-five years.

A CLOUDBURST at Empire, Nevada, last week, carried away about 1000 tons of tailings from below the Morgan mill.

W. H. MARTIN now has charge of the Mayflower mine, Nevada Co., which has reverted to its original owners.

TWO MEN from the War Eagle won the drilling contest at Rossland, B. C., last week—31¼ inches in fifteen minutes.

THE San Francisco Mint will be closed on both crude and refined gold from June 13th to July 6th for the annual cleanup.

FEELING the need of a vacation, the editor of the Bellevue, Idaho, *Herald* has suspended publication for two months to go fishing.

IN May the coinage at the U. S. Mint in this city aggregated $2,266,990; for the first five months of this year it aggregated $9,102,490.

THE Anaconda Company is now producing almost as much copper as the whole State of Michigan, more than Spain and more than Chile.

THE State Mining Bureau has received a bronze medal and award for its handsome exhibit at the World's Columbian Exposition at Chicago in '93.

THE miners of Belt, Montana, propose to raise $5,000 to send orators East to educate the people and give a current presentation of the silver cause.

POSTMASTER ROSE of Cripple Creek, Col., recently grew tired of seeing mail matter accumulate, and accordingly burned four wagonloads of it.

IN London it is thought that a solution of the labor problem in the South African gold mines can be found in the importation of 10,000 Chinese to the Rand.

TWO NUGGETS are on exhibition in Globe, Ariz., weighing six and one-fourth pounds, and said to be almost pure silver. They were found in Richmond Basin.

ABOUT 1200 miners are at Cook's Inlet, Alaska, waiting for the breaking up of the ice. So far the restaurants and saloon men are the only ones who have a paying claim.

SUPT. ADAMS of the Carson, Nev., Mint has received instructions from Washington to reopen the Mint to receive bullion and to resume operations in the refinery.

THE DeLamar, Idaho, Mining Company, limited, in its report for April, shows the total value of the product to have been $62,730, and the profit for the month $25,275.

AN international exhibition of machinery, mining appliances and metallurgical processes will be held at Brisbane, Queensland, Australia, during June, July and August, 1897.

A NEW YORK financial journal puffs a mining company reorganized in Sierra County which "owns three full claims of 3000 feet by 600 feet each," with "veins rich in value."

A SECOND EDITION of two valuable treatises, "Mine Timbering," by W. H. Storms, and "The Cyanide Process," by A. Schiedel, has been issued by the State Mining Bureau.

THE renewed interest in the mining industry is a Godsend to many a California rancher, who finds his best cash market among the miners, and who shares directly in the benefit.

THE sales on regular call at the San Francisco Stock Exchange last month were 818,610 shares; in May, '95, 274,030 shares. The sales in May, '96, were the largest for many years.

IT is understood in Salt Lake, Utah, that the Centennial-Eureka sale is "a go," and that this week the whole property will be turned over to its English purchasers on a $3,000,000 basis.

The *Searchlight* reports that the Dyson Consolidated Mining Company, owners of the "white or unknown metal" claims in Modoc county, have bonded them to W. W. Robinson of Redding, for $21,000.

AT Pike City, Sierra Co., the Alaska mine is to be reopened and worked on a larger scale. R. A. Paine will have charge. The stamp mill which recently burned down will be replaced by a new and larger one.

IN the General Deficiency Appropriation bill, which passed Congress this week, was an item of $45,000 for the construction of sampling works for assaying imported silver-lead ores at the points previously reported.

THE scheme to run a tunnel through the Rocky mountains forty-eight miles from Colorado City to Cripple Creek is again revived, which would seem to indicate that Brick Pomeroy, who passed away last week, died too soon.

A CLOUD burst over the Red Boy mining camp at Baker City, Or., on the 2nd, wrecking the miners' boarding-house. The office building and mine headquarters were moved from their foundations. The mill and mine were not within range of the flood.

A HELENA, Montana, smelting company essayed to restrain a placer miner from working above them, claiming that he muddied the water so that they could not use it. The case was decided against them, and the miner then agreed to impound his tailings.

THE President vetoed the River and Harbor bill on May 29th. On the 2nd inst. the House passed the bill over his head by a vote of 220 to 60. On the 3rd the Senate did likewise by a vote of 56 to 5. This insures the $250,000 appropriation asked for by the miners of California.

AT Union Square Hall in this city last Wednesday evening Prof. Harold Fairbanks of the University of California, for many years connected with the State Mining Bureau, delivered an interesting and instructive lecture on "The Mother Lode" before an audience that filled the hall.

THE Plumas *Independent* says Thompson, Hosselkus and Hardgrave have received from Mrs. L. Wegener payment for the Lucky S. mine. This property has been under lease to Mrs. Wegener with the privilege of buying for more than a year, and the lady has spent over $30,000 in development and other work. The sum paid is stated to have been $9000. The new owner will, it is understood, proceed to increase the milling facilities and push ahead the tunnel.

SILVER REEF, UTAH, which came into prominence twenty years ago as the first place in the world where silver was found in sand, and where petrified wood assayed way up in the hundreds, shows signs of new life, and the old dumps are expected to turn out considerable gold values by the cyanide process.

THE local paper of Tallapoosa, Ga., has the following advertisement: "A few good men can secure steady employment at the Royal mines. Wages from 80 cents to $1.25 per day. Apply at mines. A. C. Theis, Supt.," and devotes an editorial thereon to the great "boom" in gold mining in that section.

BUTTE, MONTANA, advices are to the effect that the Rothschilds have finally acquired a controlling interest in the Anaconda Co. The syndicate they represent recently secured a quarter interest in the property on a basis of $30,000,000, but the present purchase is on a basis of $45,000,000 for the whole property.

THE Cleveland G. & S. M. Co. started up their mill last week. This company owns a number of claims about forty miles south of Austin, Nev. So far the ore averages $15 gold and $9 silver per ton. The mill consists of a crusher and a 6-foot vanner. The mill was built by O. H. Packer, the superintendent.

AN Ottawa, Ontario, dispatch of the 4th says: "The mining properties in the Kootenay district, British Columbia, known as Le Roi, War Eagle and Iron Mask mines, have been sold to capitalists in London, England. The Le Roi mine brought $5,000,000, the War Eagle $2,000,000 and the Iron Mask $1,000,000."

UTAH furnishes an example of how modern methods make profitable the working of lean ore in the case of the Geyser Company, Camp Floyd district, where the average value of the ore milled during the month of April was but $3.92 per ton. The entire cost of mining and milling was $1.97 per ton, leaving a profit of $1.95 per ton.

THE Court of Appeals of Colorado holds that, where one to whom an interest in the lease of a mine is assigned agrees to pay all costs and assessments on his own interest and that of his assignor, he is not liable for a deficiency of receipts for a certain month and incurs no liability if, during the whole period of the lease, there are funds available for expenses. Shaw v. Horner, 42 Pacific Reporter, 689.

W. E. VAN SLYKE, A. S. Omer, M. E. Miller, F. Shaffer and W. W. McCoy have executed a deed to a group of mines in the Ibex mining district in San Bernardino county, the consideration being $225,000. The deed runs to Eugene Harbeck, "but," says a southern California paper, "the real party in interest is the Lord Mayor of London." He is probably acting for the Prince of Wales or Chauncey Depew.

WHETHER from a desire to play with his captives, a wish to impress them with his power, or an honest effort at clemency, President Kruger of the South African Republic has acted very singularly with the political prisoners. News now comes that John Hays Hammond and his fellow-sufferers, who were first condemned to death, subsequently commuted to fifteen years' imprisonment, then fine, are to be released from custody.

AT Frisco, Utah, the Horn Silver mine and mill closed down on the 1st, owing to a contemplated reduction of 25 cents per shift in miners' wages. Miners who had been receiving $2.75 for ten hours' work were notified that the pay in future would be $2.50 for eight hours. Laborers' wages remain $2.25, the same as formerly for ten hours. The men operating the drills were to receive the same for eight hours as they formerly did for ten hours—$2.75.

DUST from dry tailings annoy residents adjacent to the Johannesburg, South Africa, mines. Some two or three from the South African capital can organize an anti-debris association there and make a good thing of it in the way of a profitable job. Now that some of the Sacramento valley agitators are denied further support by the county boards of supervisors, they could probably find profit and notoriety in kicking up a row among the Boers.

THE South African *Mining Journal* of May 2 says that on the Robinson Deep the two shafts are now nearly 1600 feet deep—several hundred feet deeper than any others on the Rand—and progress continues to be made. Difficulty has been encountered owing to the scarcity of skilled native miners, for the whole of the sinking has been done by hand drilling. An average of 65 feet a month in each shaft has been maintained during the two years the work has been in progress.

THE Merced Gold Mining Company at Coulterville, Mariposa Co., has been accused of being un-American and employing only Cornishmen. The superintendent has prepared a list, showing that about three-fifths of the company's employes are native-born Americans. In the Transvaal the native-born population complain that the English companies will give them no work, and now a disgusted English miner writes to a London paper that the same concerns which are spending English money will not employ English miners on account of the "Yankee bosses" who favor their own countrymen.

SAYS the Stockton *Independent*: This is a truth that cannot be too often repeated to impress on Californians, that it is idle to seek wealth in distant or foreign regions when there is such a vast amount of undeveloped wealth in this State. All that is required to develop it is knowledge of mining and energy and persistency in seeking it. When a good deposit is discovered there is no lack of capital for development, and many hundreds of millions will continue to reward those who have the intelligence to seek and the perseverance to continue the search in the gold-laden Sierra, not a tithe of the wealth of which is yet known.

GEO. TURNER, manager of the Le Roi mine, Trail Creek, B. C., says he is preparing to add a forty-drill compressor and a 250 H. P. hoist to the machinery of the mine, and will then be able to take out about 500 tons of ore a day. The new engines will be in position by November 1st. "Heretofore we have been working with a ten-drill compressor and a 50 H. P. hoist, getting out about 100 tons a day. I recently took an average on all the ore shipped by the mine so far, and it came to $36.77 per ton, not including 3 ounces of silver and 3 per cent copper. The cost of hauling to the smelter amounts to $2 per ton, and it costs $9 to have it smelted. For some months past the monthly payment of dividends has alternated between 5 and 10 cents a share. In round figures the dividends have been $500,000 for the past year."

REGARDING the Butte Co. properties of the English syndicate the London *Mining Journal* of May 23rd reports: "An extraordinary general meeting of the shareholders in the Golden Gate of California (Limited) was held on Wednesday at Winchester House, E. C., Mr. W. Ashton-Ellis presiding, for the purpose of considering resolutions for the reconstruction of the company. The chairman, in moving the resolutions, stated that it was very encouraging to the directors, after having experienced such troublous times, to find that they had a very rich property in the Rock river mines, for which they required additional capital to complete the purchase. On Monday they received the following cable from their consulting engineer (Mr. J. B. Low) and the general manager (Mr. G. H. Evans): 'The character of the ore we expect to strike will be so remarkably rich that it will be most advantageous for shipment. Mill will not be required. Ore will be carefully assorted by hand when prepared for shipment to San Francisco. In our present position it will be best to be all ready to complete the purchase July 1st. In the meantime you must push on developments.' The capital of the new company would be £80,000 in 80,000 £1 shares credited with 17s paid up; 1s would be paid on application and 6d on allotment, and the balance as and when required. However, it was not anticipated that the balance would be wanted. Mr. Pechey seconded the resolutions, and they were carried unanimously. A vote of thanks to the chairman and directors concluded the meeting."

WORK is resumed on the Muscovite Mica Mining Company's mine, fifteen miles from Vollner, Idaho, after a suspension of several years following upon an abortive sale of the property to London capitalists, and production will now be pushed from the greatest mica mine west of North Carolina. The mica occurs in blocks of various sizes, enclosed in a 10-foot ledge of feldspar, their weight being from five to 500 pounds each. About 3,000 feet of development work has been done, consisting of a shaft 160 feet deep and four tunnels, of which the three upper ones average 800 feet in length and the lowest, forty feet below the bottom of the shaft, is in 200 feet and will now be driven farther. The mica is split and cut into marketable sizes and shapes at the mine. The smallest sheets, cut in merchantable sizes, sell for 30 cents a pound, the largest from $20 to $30, and the average about $10.

CONSIDERABLE inquiry is received regarding the Rigaud gold process, recently noticed in these columns. The *Credit National* of Paris has issued a special illustrated number treating of the new process, which contains little more than that previously reported herein, except sundry extravagant statements which will hardly be accepted by California miners. Among other things it is declared that the tailings dumps of the world contain gold worth $5,400,000,000, and that the Total Gold Extraction Company can take out all this gold in all these dumps at a profit of one-half the amount. It is also claimed that at the works at Tancarville, France, the company can "fairly count in its first year upon an income of $8,000,000." The whole thing looks like a big scheme to sell stock, but the author of the statement should have had a little more knowledge of metallurgy and of existing facts before preparing the cleverly worded prospectus.

DISCUSSING Siskiyou Co. mines the Yreka *Journal* reports that the French Creek mine, near Etna has closed down. The Espey-Hunter mine at Hawkinsville, will be opened up this week. Hobart & Co., Hull Gulch, Scott Valley, had occasion to move the first twenty boxes of their sluice way lately to work in another place, that cleaned up about $6,000, with 300 boxes not touched, seventy of which show amalgam floated down, with the balance no doubt containing fine gold carried off by the water. The hydraulic miners at Oro Fino expect to be able to keep their giants at work until after the 4th of July this year. The warm weather of the past few days is melting snow rapidly. Two of the Distlehorst dredgers are now in the Klamath river, and the third will be launched in a few days, to begin the work of mining in the river bed by dredging, above Oak Bar. At the Columbia quartz mine, between Oak Bar and Scott Bar, forty men are employed.

THE eight-hour Utah mining law went into effect in that State yesterday. It makes it a misdemeanor for a mine owner or smelter to permit any employe to work longer than eight hours a day. The practical workings of the new statute is of interest to the miners there. Manager O. B. Hardy of the Bingham Copper Company says: "There are miners whom I know who can do as much work in eight hours as in ten, and there are hands who could not do the work of a miner's day if you allowed them twelve hours. The way I feel about it is that, if a miner can do his work in eight hours, let him do it. If, on the other hand, a man cannot do it in that time, let the foreman fire him and employ one who can." A Salt Lake attorney says that there is nothing in the law to prevent a miner dictating his own hours and working as many in excess of the statutory provision as he liked. This may enable the miner and mine owner to arrive at harmonious conclusions.

THE Simmer & Jack, South Africa, directors send the following summary of operations for March: Quartz milled (100 heads), 13,145 tons of 2000 lbs., yielding 5,491.97 ozs. smelted gold, taken at 72s per oz.—£19,771 1s 10d; chlorination, 652.05 ozs. from concentrates—£2608 4s; tailings treated, 8215 tons, and 81 tons concentrates, yielding 2492.64 ozs. smelted gold—£7477 18s 5d; total value, £29,857 4s 3d. Cost, £12,373 5s 2d: Mining and hauling, 12s 4.01d per ton; transport, 6.16d; milling, 4s 4.32d—17s 2.49d per ton; general charges, 1s 7.42d—18s 9.91d; expended on mine development, 4s 8.79d per ton—£3110 10s 9d; total per ton, 23s 6.70d; cost of treating concentrates, £495 10s 9d; cost of producing concentrates, £375 3s 11d; cost of treating tailings, £2036 11s 8d—£6017 17s 1d; total cost, £18,391 2s 3d. Profit for month, £11,466 2s. Capital Account: Expended on plant and buildings, new shafts, etc., £45,853 18s 6d. Mine Development: 1945½ feet sunk and driven, developing approximately 38,910 tons of ore.

TWO STRONG APPEALS were made to Speaker Reed this week in favor of the Mineral Land bill. The first reads as follows: San Francisco, June 2, 1896.—Thomas B. Reed, Speaker House of Representatives, Washington, D. C.: The miners of California appeal to you to afford a California Congressman recognition on the Mineral Lands bill. The measure is just and will afford relief to thousands of California's citizens. Well knowing your thorough knowledge of parliamentary law, we firmly believe you will find a way to give to California the long-sought-for benefit. The people of this State are unanimously in favor of the bill; and if you desire, we can get all of the largest and most influential commercial and financial organizations of California to join in the appeal to allow this bill to pass. It was signed by Pres't Neff and Sec'y Sonntag of the California Miners' Association. On the 3rd a second telegram was sent as follows: San Francisco, June 3, 1896.—Thomas B. Reed, House of Representatives, Washington, D. C.: California is deeply and vitally interested in House bill 5819, for examination and classification of certain lands in California and Oregon. The bill affects California and Oregon only. It is now pending in the House for concurrence in Senate amendments. California would be grateful for any assistance you might render. The failure of the measure to pass at the present session would be a bitter disappointment to California, while the passage of the same would be hailed with joy throughout the State. This was signed by Attorney-General Fitzgerald, Secretary of State Brown, Controller Colgan, Hugh Craig, president of the Chamber of Commerce, A. A. Watkins, president of the San Francisco Board of Trade, and George Stone, president of the Union League. "We have done all in our power, Senator Ford and I," said Secretary Sonntag to a reporter, "to get the Mineral Lands bill off of the calendar. Our reason for getting the signatures of the State officers was to show Speaker Reed how general is the feeling of the people of California in favor of the passage of the measure. We would have liked to have had the signature of the Governor, but he is in the Yosemite and could not be reached. The only answer we want from Mr. Reed is for him to say to some member of the California delegation, 'I'll recognize you to-morrow.' We only ask these few words. If the bill should not pass at this session we will make a great effort to have it become a law at the next meeting of Congress; but, meanwhile, thousands of acres of mineral lands may be gobbled up."

## The Assay by Prospectors of Auriferous Ores and Gravels by Means of Amalgamation and the Blowpipe.*

BY WM. H MERRITT.

At the Pittsburg meeting last February Mr. Merritt of Toronto, Canada, discussing the subject named in the caption of this article, said, regarding the fired testing of gold ores, that, after sampling the ore, he treats two pounds. the one-thousandth part of a ton being a convenient quantity to operate upon, passing ore through a forty or sixty-mesh seive, generally the latter; but if it be known that the ore is to be treated in a mill using a screen with the former mesh, then the use of that size will give a fairer test.

We use an ounce of mercury, and I find (as stated by Louis) that the results are better when sodium amalgam is used, as the mercury does not flour so much, and also that a little sodium helps immensely to gather the very fine globules of quicksilver toward the end of the panning. After panning, the mercury is weighed to see if it all has been recovered. If there is a loss, the pulp is repanned, or a pro-rata loss of gold is allowed for. Instead of grinding the pulp after the mercury has been mixed with it, I use a pestle made of soft wood, for I consider that thorough mixing (say for an hour) will give as intimate a contact as is obtained in the stamp mill, and that (as the test is really to determine what we may expect from the mill) this result is no more than we wish for. Fine grinding with the mercury would probably give a higher result. This it may be desired to ascertain by subsequent investigation, but in the first instance we seek the result we may expect from the stamp mill. After panning and getting first the mercury and afterwards the concentrates, and estimating the percentage of concentrates in the ton of ore, we follow a rude method, which is practically useful. In operating upon 2 pounds of pulp, every grain of gold or bullion obtained will represent approximately 2 ounces to the ton of ore (more precisely, 2.08 ounces Troy of gold or bullion in 2000 pounds avoirdupois of ore). An excellent little balance with sliding weight, capable of weighing from 0.1 up to 5 grains, can be bought for $3. As every grain of gold obtained represents practically 2 ounces per ton, it will be seen that a gold ore can be determined running as low in free gold as $3.60 per ton (the bullion being estimated at $18 an ounce) by means of this $3 balance. Indeed, it is quite possible to adjust the weight half-way between two divisions and get a result below $2, as we have done in our testing. Again, in the matter of a retort for retorting the small quantity of mercury, we find that a small sheet of Russia iron can be worked by a tinsmith, for a few cents, into a deep cup-shaped retort, with a smooth rounded bottom and corrugated sides. If necessary, this can be unbent and flattened, should any difficulty be found in getting out the gold, which seldom occurs.

To avoid the fumes, or to save the mercury, a hollowed-out potato answers the purpose of a cover and condenser. The sponge of bullion is preferably taken out of the retort, mixed with lead and fused by blowpipe on charcoal or in a capsule, flux being added for refining after the first fusion. Cupellation is done in a clay pipe. A good idea of the bullion will be obtained by the color of the button, but to be exact it can be parted in the usual manner and both gold and silver estimated. The amalgamation can be done in a miner's pan (kept for that purpose); therefore the whole outfit, balance included, only costs a few dollars, and is within the limit of financial possibility of all prospectors. The cheapness and portability of the outfit is also not objectionable to the mining engineer in the field. We generally content ourselves with testing the concentrates for gold and silver by the blowpipe, I may say, qualitatively, without measuring the bead, going on the principle that any gold bead which is visible to the naked eye, or a fair-sized silver bead, are evidences that the concentrates are worth a more careful assay. Gold ores which we have tested in our prospectors' classes have yielded results from $115 free gold per ton, with $689 concentrates (or $8 in concentrates per ton of ore), down to $3 free gold per ton and nothing in concentrates. One ore was determined down to $1.50 per ton, free gold. Some samples have proved to contain nothing, but we naturally avoid using them for class instruction. A sample of alluvial sand from this province, treated in the manner above described, was proved to carry $2 per ton in free gold. As might be expected, its concentrates carried nothing.

*Cost of Apparatus.*—The *panning* outfit catalogued below, including sufficient supplies of reagents, etc., for any ordinary prospecting trip, will cost about $7.50: Glass-stoppered bottle, containing strong nitric acid. (This can be carried in a "patent lightest-weight liquid-mailing case.") Two gold-pans; one to be used for mercury only. Mercury, about 1 pound. "Travellers' letter and parcel-balance" hand-scale, weighing 0.25 to 12 ounces, for weighing mercury and pulp; cost, 30 cents. Balance, hand-scale with sliding weight, very sensitive, from 0.1 to 5 grains; cost, $3. Small Russia sheet-iron retort, and sheet of Russia iron 1 foot square, (with hole for retort in the center), for supporting the retort. Small porcelain dish or thimble. Iron mortar and pestle; cost, 90 cents. Brass wire 60-mesh sieve; cost, 50 cents. A little sodium carried in naptha, in a wide-mouthed bottle, in a "patent lightest weight liquid-mailing case." Wooden pestle. Sheet or shot-lead (pure, if possible). Borax. Soda. Blowpipe; cost, 25 cents. Bone-ash. Clay pipe for cupelling. Charcoal. Candles.

For *quantitative* determination of value of concentrates by measurement, a sufficient outfit, including the scale, can be obtained for $5, if the prospector makes his own little anvil, pestle and guard and pincers, and gets a small cheap hammer. He will need in addition (included in the $5) only a blowpipe furnace, clay crucibles and capsules, a spirit lamp and some litharge.

For *qualitative* work, a prospector's simple blowpipe outfit might comprise: Knife; magnifying-glass; blowpipe; charcoal; candle; old scissors; pincers; steel anvil, ½ by 1½ by 2 inches; pestle and guard; small hammer; magnet; borax; soda; litharge; bone-ash; clay pipe for cupel; round-headed bolt for making cupels. To which may be added platinum wire, spirit lamp, microcosmic salt, cobalt nitrate, three-cornered file and glass tubing. The total cost need not greatly exceed $1.

Therefore for the entire panning, qualitative and quantitative field outfit for purposes above indicated, the cost need not exceed $14, and with it the prospector, or indeed the mining engineer, can with practice obtain in most cases valuable information in the field concerning the ores of the precious metals.

*Weight of Apparatus.*—The weight of complete outfit, including the panning, qualitative and quantitative outfits (avoiding duplications in above lists) may be about:

| | Pounds. | Ounces. |
|---|---|---|
| Two pans | 3 | 12 |
| Mortar and pestle | 11 | |
| Remaining articles, including mercury and other ingredients | 5 | 4 |
| Total weight | 20 pounds. | |

*Condensed from the report in the transactions of the Institute of American Mining Engineers.

## Manufacture, Use and Abuse of Dynamite.

H. A. Lee, Commissioner of Mines of the State of Colorado, has the following to say on the above subject:

*The Dangers of Dynamite Manufacture.*—Under the most favorable conditions the manufacture of dynamite is a hazardous business, safety being entirely dependent upon the purity of materials used and the skill and care of the workmen employed. In the manufacture of explosives, as in all lines backed by American ideas and energy, the American product stands pre-eminent. Although the first plant was established in this country only a little over twenty years ago, the art has to-day reached that point of perfection, brought feats of engineering within the range of possibility and exerted an influence upon modern civilization, which entitles it to take rank with the application of steam power.

The aim of the various powder companies is to supply a product which can be transported and handled with safety, which will give uniform results in blasting, keep in good condition when properly stored, and, as far as possible, neutralize all poisonous fumes when exploded. The explosives used almost universally throughout Colorado are compounds having nitro-glycerine for a base, commonly called by the miner "30 per cent powder" or "60 per cent powder," according to percentage of nitro-glycerine in the mixture.

The strength of the American nitro powder is not, as is generally supposed, wholly dependent for force upon the amount of nitro-glycerine present in the mixture. The compound is composed of various elements which in manufacture not only absorb the desired amount of nitro-glycerine, but are in themselves an explosive. In blasting, the exploder or cap, which is charged with fulminate of mercury, explodes the nitro-glycerine and the nitro-glycerine, in turn, the remainder of the mixture. A line of experiments, conducted by experts, shows that the force exerted by this combination exceeds that of the sum of the three exploded separately.

The American dynamite of to-day is not an accident, but is the result of a long line of careful experiments, conducted by eminent chemists, and demonstrated by practical tests. These tests, aided by great advances in the art of manufacturing, have demonstrated that the products can be handled with greater impunity than many other things common to transportation by common carriers. They have also demonstrated that the safety of the compound is dependent upon purity of materials used and care in mixing. During the past few years competition among various powder companies has been so keen and bitter that gradually but steadily the cost of dynamite to the consumer has been reduced. It is a dangerous contest and a rivalry in which, sooner or later, if continued, safety will be sacrificed. To be more explicit upon this point—skilled labor commands a certain price, likewise chemically pure nitro-glycerine, the two being the most expensive parts in the compound of dynamite; combined, the product is a safe mixture. Unskilled labor and impure nitro-glycerine can be had for less money, but the product of this combination is a mixture subject to decomposition. Decomposition in such a compound is practically explosion. Decomposition may not set in for some time, and the great danger of the competition, in the manufacture and sale of dynamite, is that of forcing some of the competitors to use impure or cheaper materials and labor, in order to meet a lower price, and take chances upon decomposition not commencing before the stock thus manufactured is disposed of. This danger point may not as yet have been reached. The older powder companies have much invested and a reputation to maintain; the newer companies have much invested and a reputation to make. From the standpoint of safety, however, the bottom price is very little below the market price of to-day.

*The Storage and Age of Powder.*—Powder should be stored in a dry, cool and well-ventilated magazine built for that purpose. A brick or stone magazine is preferable to a frame, both on account of being affected less by sudden changes in temperature and freed from any danger of bullets from careless marksmen. When built of wood the frame, or studding, should be covered inside and out with boards and so set that the air can circulate all around, and the inner boards be but little affected by the heat of the hot sun.

Caps should not be stored with powder.

Regarding the age of powder—when powder has had proper care in manufacture and storage, decomposition will not set in. If there is no decomposition there is no chemical change, and under these circumstances powder ten years old or older is just as good and safe to handle as powder ten days old.

One of the main sources of accident is from thawing powder, and the only safe plan is the use of heat from hot water. The powder should not be dipped in the water, but placed in a water-tight vessel and the vessel set in hot water, or a regular powder warmer should be made. These vessels can be obtained from any of the mechanical firms or from the powder companies, at nominal cost. Do not place powder under or on a stove, or in the oven. Do not lay on boiler wall or on back plate of a boiler. Do not heat around a blacksmith forge, or over a burning candle. Do not lay on hot sand, or, in short, do not thaw powder with dry heat. Do not consider these precautions unnecessary, or reason that because you have done so many times there is no danger. An explosion is usually fatal, and numberless escapes in no manner reduce the explosive force.

*Freezing Temperatures.*—Powder freezes at from 40° to 44° F., explodes when confined, at from 320° to to 360° F. From a quick application of dry heat, powder is liable to explode at 120° F. A stick of powder heated to 120° F. can be held in the hand with little inconvenience, and this degree of heat is soon reached when placed under or about a stove.

That frozen dynamite is liable to explode from heat quickly applied has been demonstrated many times, and to ignorance, non-appreciation or carelessness of this fact, most accidents are due. If you have heated powder above a stove for years without harm, consider yourself fortunate and stop it. If the warning of those who make the powder has no effect, let the accidents constantly occurring from this cause convince you. If you cannot procure a powder-warmer, take a five-pound lard bucket, fill it with powder, and set in warm water. If you have no warm water, put some sharp rocks in the bottom of a larger vessel to keep smaller vessel off the bottom, surround the inner vessel with water and set two lighted "snuffs" about an inch long under the big can, throw an ore sack over the whole, and in a short time the powder is in good condition for use and no risk has been incurred. With slow heat thus applied, dynamite may be heated to temperature of boiling water with safety. Do not use frozen powder to load a hole. It is unfit for use. If it explodes at all it will do poor work. If it does not seemingly burn or explode, it may be smouldering or decomposing, and the dropping in of a spoon, a drill or the stroke of a pick or hammer may be sufficient to explode what is left.

*Do Not Hurry Back to a Shot.*—Constant care in preparing charge and loading will avoid "missed holes. Next to warming powder with quick, dry heat, "picking out a shot" is the cause of the most fatal accidents. If a hole "misses," do not be in a hurry to return, and especially if the hole was tamped close. More accidents are caused from supposed missed holes than from actual. A small, sharp rock may be tamped into a piece of fuse so that the fire will not pass that point for hours; this is often mistaken for a "missed hole." The hole is picked out, this particular rock removed and an explosion follows. To fully demonstrate this, put some V-shaped clamps on a piece of fuse and see how long it will take to burn by certain points. Long after the fuse is supposed to be out, loosen the clamps and see how quickly it will "spit" at the other end. Some holes do miss fire and have to be picked out. In these great care should be exercised to clean down not nearer than 5 inches from cap, then reload with another charge, and, instead of using a small piece of powder, use plenty. A heavy charge on top may

destroy the effectiveness of the lower charge, but it will explode and get rid of a bad job. If the "collar" of the hole is simply blown off and the lower charge has not broken to bottom of hole, do not drop in a drill or spoon to see "how much hole is left"; leave it alone as long as possible. The lower powder may have frozen and all may not have been consumed.

Caps are charged with fulminate of mercury—one of the most violent explosives and one of the most unstable, chemically—and may explode from the slightest jar or least amount of friction. The caps at all times should be stored well away from the powder and at no time in or round a miner's pocket.

Powder should under no circumstances be stored underground. Poor ventilation with damp air will produce decomposition, and decomposition explosion. There is practically no danger in transporting powder in cases, and especially when frozen. Even well-thawed powder will not explode from any of the jars occasioned by a wagon haul or pack train. A case dropped several hundred feet upon a rock might explode, but separate sticks would simply break out of the wrapper and no explosion follow.

Powder will burn in the open air and not explode, providing the gases generated in the adjoining powder from the heat of combustion have room to escape. For example, place two boxes of powder side by side, open one and ignite, and leave the other box closed. The burning box will not explode, but the heat will explode the closed box.

# Scientific Progress.

IF a couple of hundred coins are placed upon a tray and tossed on the table repeatedly, it is plain that any number of heads from none to 200 may turn up after each throw. If there were no trick in the business, none and 200 would very rarely appear. Most frequently the difference between heads and tails would be more or less even. Now, supposing we were to take a piece of paper ruled into 200 vertical columns, and to write the numbers from nothing to 200 in order along the foot of the columns. Then suppose we sat down and tossed the tray of 200 coins a few thousand times, at each toss counting the number of heads and placing a black mark in the proper column, we should find that the middle columns would soon increase in height, while the lateral columns would increase much more slowly. After a sufficient number of experiments, providing that the tossing was fair, the top of the columns would form a curve, rising regularly from the nothing to the hundred column, and filling regularly up to the two hundred. Such a curve would be nearly what a mathematician like Prof. Pearson would call the normal curve of frequency. Supposing, however, that when the operator was not looking, after each throw some one were to turn around half a dozen or so of the tails to heads, it will readily be understood that the resulting curve would not be symmetrical, but would bulge out on one side of the middle line. A large number of other disturbing causes would alter the curve in a definite fashion.

THE following from the current issue of *Machinery*, will doubtless elicit discussion and dissent: "Mining engineers, although fewer than formerly, have a strong impression, and in some cases a belief, that iron and steel crystallize under vibration. That nothing of the kind does occur is, of course, known to metallurgists, physicists, and those members of the engineering profession who have been favored with opportunities for investigating the causes of failure of material which has been subjected to stresses alternating from tension to compression, or of either kind frequently repeated. Ore stamp stems, piston rods, rock drills, channelling machines, and drop hammers, cam shafts for bolt headers, ore and rock crushers, all break after being in service a short time, their length of life depending on the amount of work they are called upon to perform. The repeated alternation of stress and release seems to exhaust their life at their weakest point, and they break off suddenly with a coarse granular fracture, the appearance of which has given rise to the belief that crystallization has taken place. There is no reason why crystallization should occur, and it is not known that the cause of failure is that the elastic limit of the metal has been repeatedly exceeded in the strain of the metal."

THE new chemistry of high temperatures is likened by Prof. Dewar to the solvent power of water. In its solid state this has little potency as a solvent; in its liquid form it has greater powers of solution than any other liquid, and its solvency is increased by heat. So with minerals and metals. As a solid a metal is relatively inert, but under the enormous heat of the electric furnace, metals heretofore unmanageable combine with minerals or chemical elements forming compounds which heretofore have been mainly hypothetical.

THE Roentgen rays of sunlight should be sought, Prof. Lodge recommends, from the tops of high mountains, because the atmosphere is equivalent to two feet of mercury, and must entirely screen these rays from lower levels. Alpine tourists have often reported an unaccountable fogging of plates. A medical paper reports action of the X-rays on the skin, long experimenting producing an effect resembling sunburn.

THE constituents of helium are being sought by Prof. Ramsey, evidence that it is a mixture being quite strong. The density of the gas from cleveite is 2.2, from samarskite 2.12, from broggerite 2.18, and from fergusonite 2.14; while considerable spectroscopic differences have been observed, and a difference in color is perceptile to the unaided eye.

A NON-POISONOUS MATCH has been devised by a French chemist, potassium, permanganate and amyl acetate being among the inoffensive ingredients. The matches are made easily and without danger, ignite readily, are not liable to explosion when stored in quantity and have an ordor said to be positively agreeable.

# Mechanical Progress.

### Depth of Lake Superior Mines and Mining Costs.

John Birkinbine says:

As illustrating the depths reached by some of the mining operations of Lake Superior, and the relations which the mouth and bottom of various shafts bear to the level of the ocean and that of Lake Superior, it may be stated that in the copper region the work has been carried to a depth of nearly one mile from the surface, and those interested in these exploitations anticipate no unsurmountable difficulties in reaching depths of 10,000 feet. The surface at these mines approximates 650 feet above Lake Superior, or 1250 feet above sea level, but the vertical shafts of the Tamarack, Calumet and Hecla, the slopes of the Quincy and other mines extend far below the water level of Lake Superior and of the ocean, and the Silver Islet workings were carried from a few feet above the lake level to below ocean level.

The iron mines are located from 550 to 1200 feet above lake level; and, although a number have been exploited to or below lake level, but a few have been carried to depths below ocean level. The high temperatures experienced in the Comstock lode and other deep workings in the Western States is not apparent in the Lake Superior mines, which have penetrated the earth for great distances. The increase in temperature is not great, and at 1500 feet the mine water becomes saline, but as greater depths are reached more objectionable characteristics are noticed, the water becoming so acrid as to destroy books and clothing and affect the skin.

In some of the iron ore mines ore is dug from 500 to 700 feet below the surface and delivered on cars for shipment for less than 70 cents per ton. This includes wages of miners, cost of light, explosives, timbering, etc., surface and machinery attendance, repairs and all charges except royalty, general administration and interest on investment. During the business depression which has characterized the past two years, millions of tons of iron ore have been mined in the Lake Superior region, shipped by railroad from fifteen to ninety miles to ore docks, transferred to vessels, and carried from 600 to 1000 miles unloaded and delivered on cars at lower lake ports from $2 to $3 per ton. Although little if any profit (after paying royalties or interest) resulted from these low prices, the possibility of accomplishing the above result is a tribute to the skill in mining, transporting and handling large quantities of ore.

### The Best Ore Mining Record.

The marvelous record made by General Manager Florada at the Lone Jack mine last season, when he stripped and opened this mine and shipped therefrom 400,000 tons of good merchantable ore inside of a space of six months, is without parallel in the annals of iron mining, and probably never will be equalled, and affords an instance of the ease and celerity with which the Mesabi ores can be handled in the early stages of the development of the open pit mine. At the Chandler mine, the finest underground mine in Minnesota, before a like amount was hoisted to the surface, patient and scientific mining work had to be undertaken which extended over a period of nearly eighteen months, aided by costly pumping and hoisting machinery. At the Lone Jack the entire work was performed by three steam shovels and a little powder. However, it is only a question of time when the present steam-shovel mines will all be worked on the underground plan, and at increased cost.—American Manufacturer.

AN important improvement is expected to follow the introduction of 400-foot ore carriers on the great lakes. The immense open holds of these big vessels offer special opportunities for the development of a machine for trimming the ore after it is dumped into the vessel from above-pockets in shipping docks at the upper lake ports. The labor cost of about 3 cents a ton which is paid for trimming is an important item, and then, too, there has been more or less trouble of late with this kind of labor. At least two of the shipbuilding companies are trying to work out the details of a machine for trimming ore, to be located permanently in the vessel's hold, and it is quite probable that such a machine will be ready for use before the coming season is at an end.—Marine Review.

A NEW cage for incline shafts is in successful operation at the Original mine and is attracting considerable attention among those interested in mining machinery. The cage is protected on three sides by steel plates so that there is absolutely no danger of the men on it being jammed against the wall plates. It is considered a great improvement over the skip, much safer, has more carrying capacity, is lighter and it is claimed can be constructed and operated at less expense than the skip.—Butte Miner.

THE report of the Chicago City Railway Co. (see *Street Railway Review*, Feb. 15, '96, p. 807) shows cost of operating per car mile as follows:

| | 1894. | 1895. |
|---|---|---|
| Cable lines | $0 09972 | $0 10240 |
| Electric lines | 0 16904 | 0 14776 |

Report of North Chicago Street Railway Co. for 1895 (see same):

| | Earnings. | Expense. | Expense to Earnings. |
|---|---|---|---|
| Cable lines | $1,632,797 | $651,942 | 40 per cent |
| Electric lines | 670,284 | 303,136 | 45 per cent |

# Electrical Progress.

### An Electric Mine Plant at Silverton, Colorado.

A few months ago in these columns was described the power-transmission plant installed at the Silver Lake mines of E. G. Stoiber at Silverton, Colo., which has resulted in economy so noticeable that an increase in the plant is now being made, to provide for an extension of the system in the mines and to reinforce the water power, which is not sufficient to furnish all the power required throughout the year. Two cross-compound Corliss engines, with cylinders 24x46x48 inches, each engine of 850 I. H. P., are now being set up, together with water-tube boilers, mechanical stokers, coal and ash conveyors, feed-water heaters, separators, water meter, coal weighers—the whole making what will be the most thoroughly modern steam plant in the State. The difference between the cost of coal at the power house and its cost at the mine, which is at greater elevation by some 2500 feet, is such that the saving effected, even when steam power is used for generating purposes, will insure an ample return on the investment, while the economy induced by the use of the water power is considerably greater. Mr. Stoiber, therefore, feels that in adopting electricity for the operation of his mines he has more than considerably diminished the cost of working them. The additional plant will consist of two 150 K. W. general electric generators, one 100 H. P. motor for the mill, one 15 H. P. motor to drive a pump and two 10 H. P. for blowers, forges and miscellaneous machinery, and to eventually utilize to the full the capacity of the steam and water power plants additional and larger generators will be set up. Although the entire output of electrical energy is to be used in the operation of a single mining property, it will be when completed the largest electric power plant in the State of Colorado.

THE '96 model alternating current fan motor of the General Electric Company, herewith illustrated, is a new device embodying many improvements dictated by careful observation of the performances of the fan motors of previous years. Of these improvements, perhaps, the most important is the universality of direction which can be given to the draft caused by the revolving blades, the motor field frame being provided with trunnions resting on a yoke, the current of air may be directed at almost any angle in a vertical plane. While the yoke is so set in the base that the motor may be moved through a complete circle horizontally and the current be directed toward any point as desired, the yoke may also be removed from the base and inserted in a wall bracket. The design of the motor is both simple and ingenious. The field is a ring built up of thin iron punchings, with inwardly projecting teeth carrying the field wiring. The armature is a cylinder of iron laminations, with small bare copper rods running through the



iron and terminating in copper discs fastened at the end of the core. There are neither brushes nor commutators, and this small fan motor embodies principles similar to those involved in the large General Electric induction motors. To reduce the friction of the starting and running current, the fan is provided with smooth-running bearings, with hardened steel cones and balls. The complete device is artistic in design and handsomely finished. The diameter of the fan is twelve inches and the speed 1800 revolutions per minute.

# Practical Information.

### Mining Case Decided.

Eicke et al., plaintiffs, vs. Reed et al., defendants.

This action is brought by the plaintiffs under the mistaken belief that a laborer is entitled to a lien upon a mining claim for labor performed therein at the instance of a lessee after the owner of the mine has posted in a conspicuous place thereon a notice that he will not be responsible for such labor.

The attorney for plaintiff admits that such a notice is operative as to all new employments entered into after the notice was posted but insists that it does not apply in a case where the labor was commenced, say a month before the notice was posted.

But it was held in the case of Calenberg vs. Hamilton on the authority of a decision by Chief Justice Beatty that an employment from month to month as long as mutually agreeable is in effect a new employment for each separate month and that the conditions at the beginning of any new month are to operate as to the rights of the parties for that month. It follows that the lien is not operative after the end of the month within which it is posted and that the court has no authority to allow a lien for a longer period.

I find by inquiry that this is the rule followed in the neighboring mining counties of Amador, El Dorado, Nevada, Sierra and others and is undoubtedly correct.

The end and aim of the law should be in all cases, actual and abstract, justice, and this is usually obtained by the construction above suggested. It is perhaps true that sometimes it works a hardship on one side or the other; but this is an infirmity growing out of the weakness of human statutes.

The fairest course is the best in this as in all other relations in life, and this course is best attained by rigidly holding the mine for the debts created against it, unless the mine owner by public notice gives warning that the mine is not liable.

But whether it is the best course or not, it is clearly the law and the court has no choice but to follow it.

Let findings be prepared awarding the plaintiff Eicke a lien in accordance with the views above expressed and awarding to the other plaintiffs money judgments for their claims.

J. E. PREWETT, Judge.

—Placer Herald.

A TREE is a composite being, a kind of community by itself. The leaves and limbs are all the time striving with each other to see which shall have the most room and the most sunshine. Each strives for all he can get. While some perish in the attempt, or meet with only very indifferent success, the strongest of the strongest buds survive. Each leaf helps to sustain the limb which carries it, and each limb furnishes some nourishment to the common trunk for the common welfare. The tax is always adjusted according to the ability of each to contribute. As the limbs of a tree are constantly striving for the mastery, so each bush and tree in grove or forest is striving with others for the mastery. The weakest succumb to the strongest; some perish early, some lead a feeble existence for many years, while even the strongest are more or less injured. With plenty of room the trunk will be short, the branches many and widespread; where crowded, the lower limbs perish for want of light. Dead limbs fall to the ground to protect and enrich it for nourishing the surviving limbs and trunk. The scars heal over, more limbs perish as new ones creep upward, and thus we find tall, clean trunks in a dense forest.

MR. MINER wants to know how the contents of logs are computed according to Doyle's rule. Here it is: From the diameter in inches subtract four. Square one-fourth of the remainder and multiply the product by the length in feet. Thus: take a log 24 inches diameter, 12 feet long; 24—4=20; ¼ of 20=5; 5×5=25, which, multiplied by 12 (the length in feet), equals 300 feet. Another way to obtain the same results, and by some considered a much simpler method, is as follows: From the diameter in inches deduct four. Square the remainder. This gives the contents of a 12-foot log. Then increase or diminish in proportion for other lengths. Thus, for 18 feet add one-eighth; for 20 feet add one-fourth of itself. For a 14-foot log subtract one-eighth; for 12-foot one-fourth of itself. For example, take a log 24 inches in diameter, 12 feet long, as in the foregoing illustration; 24—4=20, and 20×20=400; one-fourth of 400=100, and 400—100=300—the same result as the other. The first method is Doyle's rule, but both will work the same as to results. — Corwin in the Wood Worker.

MICROSCOPIC investigation has proved that the pores of wood invite the passage of moisture in the direction of the timber's growth, but repel it in the opposite direction. This accounts for the phenomenon which has so often been noticed, and which puzzles a great many people, namely, why two pieces of timber sawn from the same section of a tree sometimes appear to possess very variable degrees of durability. If the wood, say of a gate post is placed right end up the moisture in the soil will affect it, but the rain falling on the top will do little harm; if, on the other hand, the butt end of a tree is put uppermost, the top of the post will decay, because the moisture of the atmosphere will penetrate the pores of the wood more rapidly in this position. Many people have noticed that the staves in a wooden tub appear to absorb moisture irregularly, some getting quite sodden while others are comparatively dry and almost impervious to moisture. In this case the dry staves are in the position in which the tree grew, while the saturated ones are reversed.

THE largest blast ever made on the Marquette, Mich., iron range was fired recently in the Winthrop open pit. The amount of ore brought down from the east side of the pit is estimated at from 10,000 to 13,000 tons. Previous to the blast proper 300 pounds of giant powder were exploded to loosen the ground. This did its work splendidly. Some of the cracks in the ore were two inches in width, while there were many smaller ones. Immediately back of the larger crack, about 40 feet from the end of the hanging, a large hole, 35 feet in depth, had been drilled. Over half a ton of black powder was put into this hole. When the blast went off the ore ahead and 40 feet on either side the hole tumbled over into the huge pit. The Winthrop open pit is a mammoth affair. It is about 150 feet in depth and is over 500 feet long by 400 feet wide. The entire east side is in solid ore, as is also a portion of the south side. The bottom is also in ore, and the deposit can only be conjectured.

THE authorities in Colorado have been examining the forest regions of the State to determine to what extent they hold back the snow from melting in the spring. It is found that the forests retard the melting of the snows, and so cause the waters to flow down gradually over a much longer period of time than is the case where the trees are cut away. They thus have a tendency to prevent floods in the spring and droughts in the summer. Some time we of California will awake to a realization of the fact.

## Notes of Travel.

NUMBER I.

By Our Traveling Correspondent.

Ione, Amador county, was the first place of importance reached in the mining districts after leaving Stockton. It has 900 inhabitants. It is not a mining town, although some fine prospects exist near by. The coal and iron mine, known as "No. 3," is three miles northwest. The Preston School of Industry, one mile from Ione, on the Plymouth road, is superintended by E. C. Bank, and has the most efficient corps of officers, teachers and servants I ever met in any similar institution. Over 200 (supposed) criminal youths are (I won't say confined) retained here, without a weapon, whip, or even a strong lock, by a staff of about thirty-four teachers and servants.

Drytown has increased but slightly since the census year. The interest, however, in prospective mining has increased perceptibly. The Phœnix Reduction Works of Barney & Voorheis, located at this place, are running to their full capacity. The La Jolla gold quartz mine, within the limits of Drytown, is owned and superintended by John M. Wilson, who will soon be working a full force. The Loyal Lead mine, quoted as being located near Plymouth, is one mile east of Drytown. The Pocahontas mine is about three-quarters of a mile east of Drytown, on the mother lode, and shows considerable promise. It is owned by A. McWayne et al. The character of this location is gold bearing quartz and sulphurets. Sufficient prospecting has been done upon this mine to warrant an outlay for deeper development. It is patented. All of the working mines in and around Amador City and Sutter Creek, including the mills and chlorination works, are running full forces of men. The Keystone at Amador City has 110 men on the payroll. John R. Tregloan, superintendent of several mines at this place, has introduced a complete telephone service throughout one of the mines under his management, so that from his office or residence he can communicate with every level in his mine, and any portion of his mill or works—the first of record, so far as I know, of a telephone service underground throughout a mine.

Jackson, the county seat of Amador county, shows improvement in many ways since my last visit. The larger corporations, such as the Kennedy Mill & Mining Co. and the Zeile Mining Co., are running full forces of men; but anything like detailed information from these companies is out of the question. It is self-evident, however, that the output of ore both in quantity and quality from these mines is satisfying their managers.

Union Consolidated Gold Mining Company, originally called the Clinton Consolidated, is seven miles from Jackson in the direction of Volcano. Benjamin Bibo is the resident superintendent. Their improvements consist of extensive hoisting works, run by both steam and water power; a head of 280 feet for their water power gives them ample force for their hoisting works over their principal shaft, down 330 feet. They are working thirty-five men; expect to have sixty men at work by July 1st, when their new thirty-stamp mill will be in operation. The property of this corporation consists of 800 acres, covered by U. S. patent. They have good machinery for operating their mine, which from all appearances will prove a paying property. Besides the main shaft they are running a tunnel, which will be, when completed, 1500 feet in length; now within 100 feet of the shaft. This tunnel taps the mine at the 200-foot level; another tunnel has been started to reach still lower levels. I am informed by the superintendent that the rock thus far extracted prospects from $13 to $53 per ton.

West Point, Calaveras county, has more apparent activity in a mining way at the present writing than any village of 800 inhabitants in the State. A telephone and telegraph company has just been organized, to be in operation within sixty days. Some of the working mines are: The Machu Gold Mine & Mining Company of Denver, Col., located adjoining the town of West Point; A. B. Twombly of New York is president; H. Collbran, president of the Midland Railroad, is vice-president; L. R. Ford of Denver, Col., is secretary; John T. Grayson, Stanford, Conn., and A. T. Rowe of Denver constitute the directors, J. M. Martin of Salt Lake City is the general manager and S. T. Godbe mining engineer. The capital stock of this corporation is $1,000,000. This property consists of 180 acres of mining ground covered by U. S. patent. In addition, they have lately acquired by purchase of what is known as the Smith property adjoining, for which they paid $13,000; this will give the company about 4500 feet on the lode. The trend or dip of the ore chutes are to the southwest; general strike of the fissure north and south, in a granite formation, varying from 50 to 100 feet wide; the ore chutes occurring at intervals of from 100 to 200 feet apart. Through a shaft down 160 feet on the lead they have developed an ore body that averages 20 feet in thickness, as far as penetrated, that will mill some $5 per ton. The superintendent informs me that the whole formation for 100 feet wide has been so completely impregnated with the gold solution that at least $4 per ton can be extracted from the whole mass. Working thirty men; extracting about ten tons of ore per day, simply developing work coming out of their shaft. The improvements consist of 60 feet of shaft on the lead; double cylinder hoist, 60-horse steam power. A gallows spring 65 feet high has been erected in anticipation of putting up a rock-breaker. A 20-stamp mill is to be erected on this plant within sixty days. The rock, I am informed, averages $15 per ton; sulphurets run up to $260 per ton.

The Blazing Star mine is located 1½ miles southeast of West Point. It is owned and managed by W. E. Foster. The owner has applied for a U. S. patent for an area of 600 feet by 1200 feet; he has also obtained by purchase parts of two other claims adjoining. The ore body of the mine runs north and south and pitches west; granite is the formation; the ore body averages 4 feet wide; it is of a rebellious character; the ore is assorted and the refractory part sent to Selby & Co. at Vallejo Junction for treatment. Of the free milling ore that they assort, Mr. Foster informs me, will pay from $20 to $40 per ton, and is crushed by a 5-stamp mill on the plant. The portion sent to Selby & Co. pays from $100 to $350 per ton.

The Soap Root mine, located one mile east of West Point, is owned by parties residing in San Francisco; Captain J. W. Summerville is superintendent. At present twenty men are employed. This mine has a steam hoist; shaft down one hundred feet. They have a ledge of blue granite formation, about four feet wide. It runs north and south, pitches west, but now nearly vertical. The ore of this mine is of a rebellious character, which they have reduced at the Scorpion Chlorination Works adjoining their mine. The Scorpion mine was idle when I visited it, but it will be started up early in June. The Soap Root only recently started up; they have about twenty tons of ore on the dump, said to assay $250 per ton. Rumor has it that this will prove to be a good paying property. Other mines working a few men each are:

Hurley gold mine employing twelve men.

St. Louis mine, working three men; they have developed a ledge four feet thick that prospects from $5 to $10 per ton.

Lone Star gold mine, character gold quartz, is located two and one-half miles northwest of West Point; owned by the Hurley Mining Co., M. Hurley, president and superintendent; residence Palace Hotel, San Francisco; have four men at work.

Lockwood Gold Mining Co., located near West Point, have two men at work. They will soon start up with a full force under the supervision of an English syndicate; said to be a good property. There are at least a dozen other prospective mines in this district that I did not visit.

The North Star mine, located in Happy Valley, one mile east of Mokelumne Hill, on West Point road, is a curio, both in character and the method of working it. It is a cement gravel mine. It has been worked in various ways in the past, by hydraulic, sluice, rocker and by slacking in the sun and then washing. But all this has changed. Now it has a 10-stamp mill to crush the cement gravel formation. This property was formerly operated by the Crescent Mill and Mining Company, H. B. Harvey president, and for some eight months development work only was performed under the superintendency of W. W. Cook. This mine with all its equipments was recently purchased by Mr. P. L. Shuman, of Chicago, who is at present managing its affairs. This property consists of 110 acres of mining ground, covered by a U. S. patent. The mine has connected with it 3,500 feet of bed-rock flume, six air shafts from 61 to 235 feet deep; also, two tunnels, one in 620 feet, the other 530 feet, opening up two channels, one 61 feet above the other and all in gold-bearing gravel. Water is taken from the Mokelumne ditch with a fall of 210 feet. Fully 30 inches of water is obtainable here the year round. This force of water runs the mill of 10 stamps, the hoist and air compressor, and gives them free water for the mill and power for draining the mine. The drainage is accomplished by a siphon-shaped pipe, so placed that after descending to a sump in the lowest part of the mine it is turned upward and lifts all the seepage some 12 feet and passes it out into the flume in the tunnel without apparent cost or trouble. There are 15 men employed at this writing, but this force will be increased to 30 men, when Mr. Shuman said he will be able to dispose of about 100 tons of gravel daily. The gravel averages about $4 per cubic yard, of 3,000 pounds. His mill has been overhauled and rebuilt, a new ore bin of 100 tons capacity has been placed in position, hoist and elevator for cars, where the gravel is dumped on the grizzly. Hendy ore feeders and silver plates have been added. A new blacksmith shop is in course of construction, also an air compressor and power drills are to be placed in position within 30 days. Altogether this will be, when completed, the best equipped gravel mine in this (Calaveras) county. The cost of extracting and reducing the material is reduced to the lowest possible figure. Mr. Shuman is in charge personally, and W. W. Cook is acting in the capacity of superintendent. This mine is not for sale; the foregoing points are given publicity to answer the inquries of Mr. Shuman's friends.

More next week from Mokelumne Hill, San Andreas and Angels. L. P. Mc.

## Recent California Mining Incorporations.

Woodsides' Con. G. M. Co.; capital stock, $400,000; $204,000 subscribed. S. J. Bakke, Belfast, Ireland; J. C. Jens, T. Frouch, A. Woodside, G. Gall, W. J. Woodside, J. M. Porter, H. E. Zimmerman, O. Seipert.

Bankers' Group Gold Mines; capital stock, $1,000,000; $2500 subscribed. W. McCracken, J. M. Logan, H. Z. Burkhart, B. R. Keith, P. T. M. Wate.

Florence G. M. Co., Amador; capital stock, $200,000; subscribed $100.000. C. H. Morey, J. W. Freidman, J. O. Yardley, C. E. Williams, Stockton, and J. Isaacs, San Francisco.

Colorado Development Company, San Francisco; capital stock, $100,000; subscribed, $90,000. G. Stone, P. Tautphaus, A. Gerberding, S. K. Thornton, T. J. Parsons, C. Stepp, F. Boeckmann.

Saulsby Con. G. M. Co., San Francisco; capital stock $875,000; subscribed $250. E. W. Hebbard, C. Hebbard, A. Lundberg, M. C. Hebbard.

California Bar M. Co., Oakland; capital stock $50,000; subscribed $50. E. Price, W. P. Prindle, G. P. and W. R. Berry, Oakland, G. E. Price, San Francisco.

## Coast Industrial Notes.

—Coalinga, Fresno county, has begun shipping oil.

—The State's rock-crushing plant at Folsom will be formally opened to-day.

—Electric power brought thirty miles from the San Joaquin river prints the Fresno *Republican*.

—F. Weitman of this city has a contract to cover the roof of the Guatamalan capital with aluminum.

—Mendocino county tan bark has fallen in price from $15.50 to $14 per cord, delivered at San Francisco.

—Rapid progress is making in the construction of the railroad from Corral Hollow, Alameda county, to Stockton.

—San Francisco merchants propose to sell Japan some goods and will establish an agent in Yokohama for that purpose.

—An electric road to cost $175,000 is projected from Redlands to the top of San Bernardino range north of that town.

—The Travertine Company, Bridgeport, Mono Co., has shipped machinery for the quarry. The company has on hand several large orders.

—Shipments of lumber from Coos bay, Or., during 1895 footed up 29,853,983 feet of lumber and 3,162,900 lath, against 22,535,694 feet of lumber and 3,028,700 lath during 1894.

—Telephone lines are reaching out from the bay to every part of the State. Amador and Calaveras are now covered with several lines, and as far north as Trinity the long distance service is available.

—The Japanese Steamship Company, with a line of steamers from Yokohama to Honolulu, have chosen Portland, Or., as their American port. They will there connect with the coast steamship lines for this city.

—The United States Minister to Corea reports that a concession to build, operate and maintain a railroad between Seoul, the capital, and Chemulpo, its seaport, has been granted to an American syndicate.

—The United States Consul in Honduras reports that the Congress of Honduras has passed an act granting to New York capitalists a concession for building an interoceanic railroad from Puerto Cortes to Amapala.

—Ladue & Harper of Sixty-Mile, Alaska, will put in a sawmill at Circle City, also an electric light plant. Lumber at Circle City, which is within the Arctic Circle, is worth $100 for rough and $130 per 1000 feet for dressed.

—The Senate committee on the Nicaragua canal last Wednesday authorized the chairman, Senator Morgan, to report favorably a bill similar to that which has been reported in the House for the construction of the Nicaragua canal.

—Youngren & Walker have located a water right on the Tuolumne river near Sonora, and are credited with intention to build a canal and generate electricity for light and power for the Blue Gulch, Mammoth, Eagle and other mines in that vicinity.

—W. A. Nygh, agent for London capitalists, has bought the property of the Spilman Suburban Water Works at Los Angeles for $225,000. To complete the project will take nearly $2,000,000 more, and includes an 1100-foot tunnel below the bed of the Los Angeles river.

—Los Angeles reports an advance in the price of oil from $1.15 to $1.25 f. o. b. a barrel. There has been an increased consumption since January. The Southern California Railroad and other large consumers are using more than formerly. Twenty new wells are being bored.

—The flax crop at Hollister, San Benito Co., is valued at $30,000—the product of 1400 acres. Oakland men want a grant of five acres upon which to erect buildings and prepare the flax for market. The company will contract for the cutting and cleaning of each man's crop and give $2.50 a ton for the straw.

—There will be a decrease in the production of hops in Washington and Oregon this year. Over-production has brought the price down to an unprofitable figure, and in the last year insect pests have caused great loss to the growers. A great many hop fields in various parts of the two States have been plowed up.

—The House Committee on Commerce has reported favorably on a bill looking to the construction of a cable from San Francisco to Japan via Honolulu. The estimated cost is $7,500,000, a subsidy of $100,000 for eighty years to be paid by the government. The Pacific Cable Company, capital stock $10,000,000, is behind the enterprise.

—The Utah & California road attracts renewed attention, the idea being to push on from Milford, Utah, through Lincoln county, Nev., close to Las Vegas, cross the Atlantic & Pacific near Ludlow, cross the Southern Pacific at Banning, go through the San Bernardino range via the Morongo pass and thence to Los Angeles.

—Lieut. Miley has mounted a fifty-ton rifle at Fort Winfield Scott in this harbor, the second modern rifle to be added to the heavy artillery on this coast. The gun has a bore of twelve inches, shoots a projectile weighing 1000 pounds and requires a charge of 450 pounds of powder at each shot. The estimated "life" of the gun is one hundred shots.

—The Skamokawa, Wash., mill is turning out the largest timber ever cut at any mill on the Columbia river, cargo of the schooner Louis, consigned to parties in Shanghai, China. The list includes one stick 111 feet long, 24x24 inches, and there are eight 100-foot timbers that square from 24x24 to 18x18 inches. There are also a number of heavy timbers running from 70 to 90 feet in length. She also carries four spars 100 feet long, 24 inches through the center. The bark Big Bonanza, also loading for Shanghai, will take about the same number of heavy timbers as the Louis.

—H. R. Robertson, whose timber raft was illustrated and described in this paper last August, is building another cigar-shaped lumber raft at Stella, Wash., on the lower Columbia, which will contain 300 M feet, exclusive of 300 ships' spars 100 feet long and from 18 to 32 inches in diameter. He expects to have his raft ready for towing to this city on the 15th prox.

—The California State Pharmaceutical Society has decided to establish a laboratory in San Francisco for the manufacture of many medicines that they now purchase in the East. Large Eastern firms sell to California druggists prepared articles, such as liniments, cough mixtures, etc., to the value of several hundreds of thousands of dollars annually. It is stated that the formula of the different patented medicines are well known to all druggists, and can be as easily and as perfectly made here as elsewhere and at one-half the cost.

## Personal.

CAPT. A. H. WARD, of Pinon Blanco, Mariposa Co., is at Alameda.

I. T. PETERSON has been appointed State mine inspector of Idaho.

COL. GRAYSON, of New York, is in Calaveras Co., with a view to mining investments.

J. H. TIBBITTS is reported to be on his way back from Matabeleland, South Africa.

E. B. HENDRIE, pres't Hendrie & Bolthoff Mfg. Co. of Denver, Col., is visiting San Francisco.

CAPT. THOS. COUCH, who is now in Europe, expects to return to Mariposa county about September 15th.

ALEX. HILL, general manager Mountain Mines Co., Ltd., Keswick, Shasta Co., has returned from Butte, Montana.

PRINCE CHILKOVE, Russian Minister of Ways and Communications, will visit San Francisco next August.

A CABLEGRAM from Pretoria says the leaders of the Johannesburg Reform Committee, including John Hays Hammond, "will be released in a few days."

MRS. JOHN HAYS HAMMOND is very ill and her attending physicians have abandoned all hope of her recovery. Her condition is due almost entirely to anxiety and suspense incident to her husband's imprisonment.

A LETTER received at Prescott, Arizona, from South Africa confirms the telegraphic news of the killing of H. N. Palmer and W. H. Johnson near Buluwayo. They were on the way to the mines thirty miles from Buluwayo, when the party was attacked and massacred. Palmer went to South Africa at Hammond's request to take charge of mines for Cecil Rhodes near Buluwayo.

## Commercial Paragraphs.

A ROPP straight-line furnace is to be erected at the Hanauer, Utah, smelter.

THE Fulton Engineering & Ship Building Works is sending machinery for the new Hawaiian steamer Jas. McGee.

IN addition to a good local and coast business, the Denver Fire Clay Company of Denver, Col., report an increased export trade with British Columbia and Mexico.

KNIGHT & Co., of Sutter Creek, are building a 100-horse water power plant for Indian Diggins. This week they shipped a 50 H. P. wheel for an electric light plant at Fort Jones and a 100 H. P. air compressor for the Shawmut mine, Chinese Camp, Tuolumne county.

THE Colorado Iron Works Company of Denver are making one carload of steel jackets for the new copper furnaces of the Guggenheim Smelting Company at Aguas Calientas, Mexico. They have also recently made and shipped two silver-lead furnaces for the same company.

JOSEPH J. PAYNE, inventor of the Payne gold saving riffle, made a public test of his riffle plates recently at Denver, Col., on Cherry creek at the Broadway bridge. The cleanup showed forty cents per cubic yard and it is stated not a color could be found in the tailings.

MANAGER GRAHAM of the Vulcan Iron Works is fast getting matters in shape for increased activity. Since the recent disastrous fire he has occupied the N. W. corner 1st & Mission as business headquarters. The company has just issued Catalogue "B," a handsomely illustrated description of the Vulcan Ropeway, a detailed account of its operation at Empire, Nevada, recently appearing in this paper. The matter in the catalogue is all new. It will be sent to any address upon request.

THE Pelton Water Wheel Co. has been awarded the contract for the hydraulic work of the new power station of the Central California Electric Co., located near Newcastle, Placer county. The plant consists of two pair of 48-inch Pelton wheels mounted on a cast iron base and direct connected to Westinghouse generators, the wheels having a capacity of 1200 H. P. running under 420 feet head at 400 revolutions. The power thus produced is to be transmitted to Sacramento, a distance of twenty-eight miles, and used for light and general power purposes. This company has large water resources and proposes later on to greatly increase the present plant. It has already a station with which it is supplying Penryn, Rocklin and other surrounding towns with light.

AT the Risdon Iron Works, Howard & Beale streets, this city, T. J. Barbour is superintending the construction of what will be the largest mining hoist of that character in the country. It is understood to be for the Anaconda, Montana, Co.; there are two 30x72 hoisting engines, direct acting Corliss, and will handle a load of twenty tons from a depth of 4,000 feet at an average speed of forty-seven feet per second. The cage is a 4-deck affair. The whole hoist will weigh 275 tons; the shaft is eighteen inches diameter and twenty-seven and a half feet long; seven double cylinder engines will operate the hoist. The whole thing will be ready for shipment about August 1st. The Risdon Iron Works is also building a 20-drill cross-compound Corliss compressor with the new Risdon ring inlet valves for the Boston & Montana Co., who will use it at the Leonard shaft at Butte, Montana. The Risdon Iron Works is also building two new furnaces for the Mountain Mines Co., at Keswick, Shasta Co.

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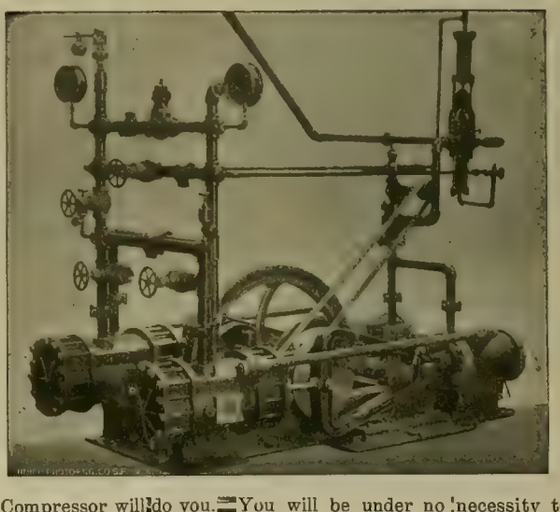
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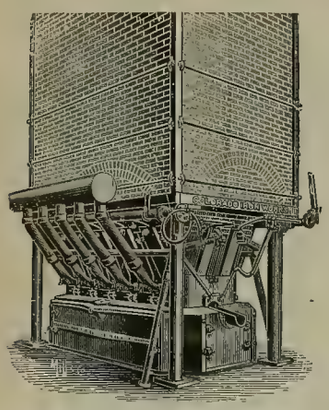
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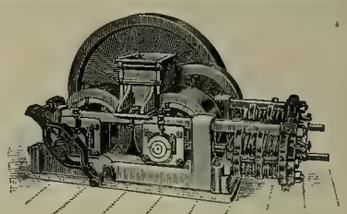
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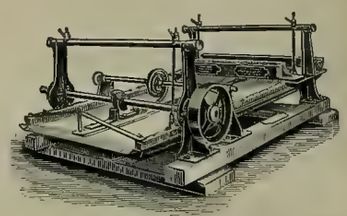
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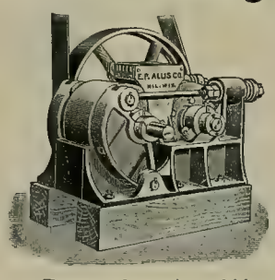
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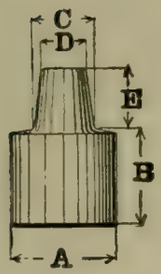
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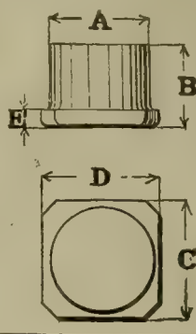

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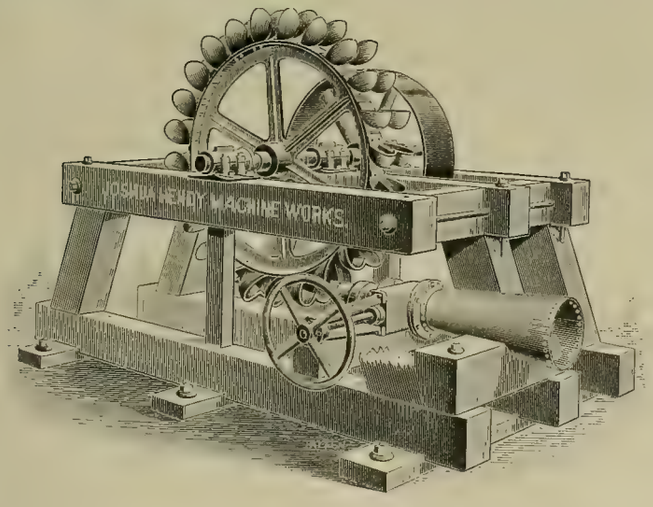
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# Mining Summary.

## CALIFORNIA.

### Amador.

*Record*: The Good Hope mine is operating on a small scale, three or four men being employed, working one shift per day.

*Record*: The Bellwether Gold Mining Company, principal place of business Des Moines, Iowa, capital $1,000,000, in one million shares at $1 each, proposes to operate near Jackson. The limit of indebtedness is placed at $600,000, and the articles provide that the private property of stockholders shall be exempt from liability for corporate debts. The term of existence is 20 years. The amount of capital actually subscribed is not given. It is reported that active operations are to commence next month. George Adams, the superintendent, and Mr. Knapp have arrived to start operations.

The Red Hill Mining and Milling Company has incorporated; principal place of business, Jackson; term, 50 years; amount of capital stock, $500,000; C. B. Zeek, 20,050 shares; E. V. Zumbiel, 1500 shares; M. S. Matson, 10,000 shares; C. E. Brown, 5000 shares; E. Ginnocchio, 50 shares. The intention is to develop the mining claims formerly owned by M. S. Matson and others near Butte basin.

### Butte.

A vertical shaft is being sunk at the old Miocene mine. Work is resumed at the Pershbacker and at the Princess, near Marysville. The Cascade Mining Co. has incorporated at Chico to work a claim on Butte creek, near the Savercool mine.

The Denver mine, near Enterprise, has twenty men at work. Work has been resumed on the Golden Queen mine at Forbestown.

### Calaveras.

At the Gwin mine they have struck the foot of the old drift, and have 300 tons of milling ore on the dump. They are also taking out old iron pipe, old picks and rotten wood. A survey has been made for a 40-stamp mill just below the present shaft. There is considerable free gold to be seen in the quartz. The ledge is thought to be from 15 to 20 feet wide; 12 to 14 feet has been opened up east and west with neither foot nor hanging wall as yet. The president, Mr. Belshaw, and superintendent, F. F. Thomas, are elated over the outlook of the Gwin mine being restored ere long to its bonanza times.

### El Dorado.

Placerville, Cal., June 3, '96.

(Special Correspondence).— The Reservoir Gold Mining Co., are reopening old tunnels and running new drifts two and a half miles northeast of town. A 10-stamp mill is in course of construction. This is a gravel property, worked under bond by J. W. Knowlton of Bridgeport, Conn., and W. C. Root of Idaho.

The Blanchard Mining Co., four miles south of town are placing a 20-horse power engine and a 60-horse power boiler, and preparing to erect a 10-stamp mill.

The Kipp brothers are said to have discovered a good ledge on the extension of the Boulder mine sixteen miles southwest of Placerville.

An option on the Newton Mining and Milling Company's property four miles east of town has been given to D. H. Jackson. This is both a gravel and quartz mine; it has a 10-stamp mill. Drifting and tunnel work is in active operation.

M. Starbuck is operating a gravel plant in Green Valley district twenty miles west of here with good success.

In the new tunnel being run on the Blue Gouge by Mackey, Head and Flood, another good ledge was struck yesterday. The ore assays an average of $8 in free gold. The ledge is not yet cut and it is not known how large it will prove. This is the sixth in the series of ledges cut by the new tunnel.

The International Gold Syndicate, Limited, of London has secured a lease and option of purchase from J. J. Crawford of the Richmond mine fifteen miles south of Placerville on the east vein of the mother lode. It has a 15-stamp mill. A shaft already begun will be carried to a depth of 600 feet; new hoist, rock breaker and concentrators will be added at once. The syndicate will expend $50,000 in prospecting this property.

Work on the copper plant recently bonded by A. E. Head and Jos. Clark, is progressing rapidly. The old 160-foot tunnel has been put in working order and will be crowded forward.

Considerable prospecting and some development work is being done in the Grizzly Flats section. This portion of the county twenty-five miles east is regaining its old time popularity for rich quartz lodes.

About Greenwood and the Taylor mine sections properties are receiving continued attention. These are in the vicinity of Georgetown, sixteen miles north of Placerville and reached by good wagon roads and excellent stage service.

The Grand Victory people six miles south have made new discoveries of ore bodies in their sinking and crosscutting from the 100-foot level.

### Kern.

Miners at Piute Mountain, in the eastern part of the county, report a 34-foot ledge of gold-bearing quartz near the Bright Star mine, which it is said will average $25 per ton. It is twenty-five miles from Caliente.

### Mariposa.

Coulterville, June 3, '96.

(Special Correspondence).—William Johns, the general manager of the Sierra Buttes Company, Limited, has just been visiting the Tendron mine at Whitlocks, six miles from Mariposa. The mine, which is under the superintendency of A. G. Briggs, is worked economically and well. Twenty head of stamps are constantly running, but the expense of steam power is excessive, and, as timber is disappearing, it is on the increase. Steps are likely to be taken for the introduction of electrical power from the Merced river, only a few miles distant. Sinking is going on steadily at the Tendron; but until cheaper power is available, the position of the mine can scarcely be regarded as satisfactory.

Curiosity has been aroused by a paragraph in the MINING AND SCIENTIFIC PRESS stating that Whitelaw Reid, son-in-law of D. O. Mills, and proprietor of the New York *Tribune*, had purchased a controlling interest in a mine three miles from Coulterville. The Virginia mine, now operated by Prof. Clarence King and Paul Blackmar, is just that distance away, but Mr. Blackmar stated a few days ago that he knew nothing of the transaction. Prof. King was instrumental as an expert in introducing Whitelaw Reid to the Washington coal property, in which he is so largely interested, and it is possible that he may have induced Mr. Reid to turn his attention to this section of the mother lode. At any rate, Prof. King is now in New York and Paul Blackmar left Merced to join him in the end of last week.

At the Virginia mine work is going on rapidly and everything on the surface is in ship-shape order. The old shaft and tunnel are being cleaned out and retimbered—a work of great difficulty from the nature of the ground. Until the tunnel and shaft are opened out there will be nothing of interest to report.

Recent discussions of the Merced Gold Mining Company and its affairs, which have been receiving considerable newspaper attention, have not affected the actual work that is going on at the properties themselves. The 40-stamp mill is running night and day. The ore being crushed appears to be mostly samples taken in 100-ton parcels from different levels of the company's various mines.

A. Wartenweiler, the managing owner, is at present visiting his Red Banks property, eight miles distant on the north bank of the Merced river. Mr. Wartenweiler has cut down his working force at the Red Banks to as few men as possible until the snow water runs out of the Merced river. As soon as the river reaches its fall level, a dam will be constructed in the same place where an attempt was made last summer. At that time a very unexpected cloudburst in the Yosemite valley brought down the Merced river and carried away a dam there in course of construction.

The Tyro with its 10-stamp mill is working full time. Jos. Buttgenbach, the president of the San Francisco Gold Mining Company, which owns it, is now visiting the property and expresses himself as well pleased.

Chas. E. Stuart of Piqua, Ohio, has returned to Hornitos and is starting up the Dorse (or Brooks) mine on a considerable scale. Mr. Stuart, who held a bond over it, has had a force of men working with Burleigh drills on this property for some time past. He is apparently satisfied with the prospecting he has done.

Some interest has been shown during the week in a prospecting claim about two miles southwest of Coulterville. It is known as the Alline, and is situated to the south of the Merced Gold Mining Company's Melvina mine. The owners are Sam DeBow, Dave Forbes and Louis James. The claim is on a well-defined quartz vein which crops out on a steep mountain side that forms the north bank of Maxwell's creek. It is apparently a true vein and not a bunch of quartz. It prospects well and the rock shows considerable gold in places. The owners have not the means to work it to any great extent, and there is some talk of making a stock company for prospecting purposes.

It is stated on apparently good authority that a twenty-stamp mill is shortly to be erected at Mount Ophir on the Mariposa grant. At the present time the prospectors on that property have no means of crushing their ore; and as they are for the most part men who cannot afford to lie out of their money, there is considerable complaint.

### Nevada.

The *Union* says the Lone Ridge mine at Blue Tent is to be started up by Superintendent Treadwell.

*Tidings*: The Champion Mining Company are arranging to add ten stamps to the twenty which have recently been erected in their new mill. This will give them a capacity of sixty stamps, and there is room for ten additional stamps, which may be put in later. The new machinery, weighing thirty-five tons, is now at the depot.

### Placer.

The *Sentinel* reports that 1,184,725 pounds of sulphurets have been received at Colfax for shipment since January 1st. During the same period 852 cars of freight have been received and distributed at Colfax.

### Plumas.

The mills of Standart & McGill and of the Hibernia Company, near Greenville, are dropping their stamps on good rock.

*National-Bulletin*: M. H. Day has placed upon record two deeds from L. P. Drexler, conveying the Sunnyside and Day mines to Mr. Loring of Boston. A corporation has been formed to work the mines. J. F. Cummings will superintend the work. The channel of the Sunnyside will be opened by a lower tunnel so that the gravel can be extracted on a large scale. Thus far the bottom of the channel has never been reached, the explorations having been on the rim only. Even here very rich gravel has been taken out, some of the nuggets ranging from $20 to $60.

### San Bernardino.

T. N. Stebbins of Calico filed a petition in insolvency Tuesday, the liabilities embracing debts due for materials, supplies and borrowed money—aggregating $20,442. Assets consist of over one hundred mining claims, most of them being located in Calico district—valued at $35,000. The *Sun* says that the failure resulted from the depression in the price of silver, which not only reduced his income, but almost entirely removed opportunities for the sale of silver mining properties.

### Shasta.

J. W. Parmelee, owner of the Minnesota mine near Copley, will secure control of the mill and machinery of the Parmelee Ore Concentrating Company.

*Democrat*: The Gold Group Mining Company, which is negotiating the purchase of the Shasta County Mining and Developing Co.'s property near Iron Mountain, will no doubt in a few days become in possession of the property and begin development work. The affairs of the Shasta Development Company are being straightened out so that a transfer can be made. The Hopper process for reducing the ores will be put in on the mine.

*Democrat*: Work has commenced in the Iron Mountain Co.'s new ditch. Fifteen miles of flume will also be built. It will take over a year to complete the ditch and flume and get the new works in operation. The smelter is now working smoothly and is a complete success.

The smelter for Clear Creek is a go. We can state on authority that in less than four months time the smelter will be in operation. The new plant has been ordered and will arrive here some time next week. It will be located near the bridge across Clear Creek on the Igo road. This will mean a boom for western Shasta.

The Little Maud mine, near Iron Mountain, owned by D. N. Haskell & Co, is looking up nicely. Last week two splendid bodies of paying ore were opened up on the upper level in the east and west drifts. The company has just contracted with the Review smelter people to work another hundred tons of ore and have begun to ship. The ore averages $20 per ton.

E. A. Zoellen has just completed a survey of a ditch eight miles in length, from Brandy creek to the Dobelin mine, in Muletown district, which has recently been purchased by a Colorado syndicate. The ditch will carry water to work the extensive gravel mine at the Dobelin place. The new company will do extensive development work this summer.

Work on the E. P. Conner mine, on Salt creek, is progressing rapidly. The arrastra is working right along on $10 ore.

### Sierra.

*Messenger*: There are seventy-five men employed at the Thistle shaft. Everything is looking bright.

The Gould & Spencer mine at Hopkins Creek is working ten men, with the expectations of a big cleanup.

The North American and Bunker Hill mines are being sold to a large company of capitalists, of which Major McLaughlin of Oroville is a party. Upon the completion of the sale, development work on a large scale will be commenced and pushed forward vigorously during the summer months.

Squire's mine near Gibsonville will soon be in operation again.

The Schofield boys are hydraulicking at the North American mine, and about six men are employed at present.

Thomas Rugg and others will operate this summer on Cleghorn bar, on a branch of the Feather river. They intend putting in machinery, with a view to sinking upon the bar.

Overstreet and others, owners of the Hawkeye mine, are at present employing twelve men.

At the Claybank mine near La Porte work is being vigorously prosecuted.

*Enterprise*: The Mammoth Springs Q. M. Co., owning the ground beyond the Bald Mountain Extension claim, expect to strike good paying gravel soon. The main tunnel is in near 2,000 feet and in good working order. D. Devers of ForestCity is superintendent.

### Siskiyou.

About 300 acres rich placer ground at Happy Camp has been bought from the Siskiyou Mining Corporation by A. Doolittle. There are several miles of ditches belonging to the property, one being the Lone Pine ditch, taking water from Indian creek, and another the South Fork ditch, which carries water for a distance of eighteen miles. Negotiations in progress for the placer property of Capt. Doolittle, to a New York syndicate if they fall through, will result in work being resumed this season. He purposes to secure water and operate the mine himself if the New York company does not purchase it. The property comprises over 200 acres of gravel. Placer mining at Happy Camp has received a fresh impetus and the renewed activity will increase the gold output of Siskiyou county to an appreciable extent.

### Trinity.

McLain Bros. have the contract to build 9,000 feet of tunnel and eleven miles of flume for the La Grande Mining Company on the grounds near Weaverville. The tunnel will be through almost solid rock. The tunnel and flume are for the purpose of conveying water for power purposes. Work will begin immediately and a large force of men employed. It will take two years to complete the job.

### Tuolumne.

The King Solomon, Coarse Gold and War Eagle mines, in Tuolume county, are reported sold to an English syndicate for $150,000.

*Independent*: The Dead Horse has struck very rich ore in the 1400-foot level.

## NEVADA.

### HUMBOLDT COUNTY.

Derby & Co.'s 5-stamp mill is crushing ore from the Badger mine.

### STOREY COUNTY.

*Appeal*: Peck Bros., who have been running tailings from the Morgan and Mexican mills for some time past, have been making money. The amount of bullion produced has always been a matter of guess work, but these are the figures: Out of 11,569 tons worked in three months from January 1, 1896, $42,238.13 was netted. Of this amount they have paid into the county treasury a bullion tax amounting to $330.40.

## OREGON.

### BAKER COUNTY.

T. W. McCoy has bought from Bradbury Bros., the Perry mine, an extension of the Rachael, for $11,500, of which $1,500 is cash.

In the Bohemia mining district sixty men are building a wagon road to the Annie mine, owned by a Chicago syndicate, under the management of P. J. Jennings. This company, it is said, will erect chlorination works at the mine this season and a 20-stamp mill. The 10-stamp mill at the Champion is running on full time. It is thought that the district will not be free from snow until June 20th. The snow now is about 15 feet deep at the Annie and Music claims.

### DOUGLAS COUNTY.

The Pacific Mining & Smelting Co. of Elk Head has been actively at work for four months, says the *Journal*, developing the old Todd quicksilver mine, about eight miles from Yoncalla, the nearest railroad point. A 250-foot upraise from the end of a 275-foot tunnel has been made, and the tunnel extended 130 feet beyond the upraise, uncovering a 20-foot body of excellent ore.

### LINN COUNTY.

At the Lawler mines on the Santiam river the 20-stamp mill is running. At Quartzville seventy-five men are employed by the company.

## WASHINGTON.

At Marcus the Drummond claim on Sand creek is claimed to be one of the best strikes on the reservation. The surface shows a ledge 20x30 feet of solid iron capping. Rock Cut is twenty miles from Marcus, on the Kettle river.

To illustrate the activity in the State of Washington in the mining incorporation industry, the following list is appended of new mining companies filing articles of incorporation at Olympia, the State capital, for the week ending May 30: Ontario Gold Mining Company, Spokane; capital, $1,000,000; M. T. Hartson, C. W. Ide, Smith Ely. Jo Jo Gold Mining Company, Spokane; capital, $500,000; G. N. Taylor, C. Mills et al. Frisco Mining Company, Spokane; capital, $500,000; J. Currie, L. L. Westfall et al. Novelty Gold Mining Company, Spokane; $1,000,000; P. Larsen, M. R. Galusha. Comet Mining Company, Everett; $500,000; W. Bennison, J. W. Cover. White Bear G. M. Co., Spokane; $500,000; J. Cole, C. P. Oudin, F. J. Kilner. Diamond Dust Con. G. M. Co., Spokane; $1,000,000; H. L. Rodgers, F. P. Smith. Mustaher G. M. Co., Spokane; $600,000; A. G. Ansell, O. O. Peck, A. B. Clark. Interstate Mining Co., Spokane; $750,000; I. Smith, W. H. Marshall. Mabel G. M. Co., Spokane; $1,000,000; F. F. Leland, C. D. Crites. Centennial M. and S. Co., Spokane; $300,000; S. Glasgow, E. J. Cady. Bluebird Mining Co., Spokane; $600,000; E. Vousquet, J. Fountain. United States G. M. Co., Spokane; $600,000; J. D. Hinkle, D. R. Evans. Lilly May G. M. Co., Spokane; $1,000,000; J. Raymond, W. J. Harris, G. Turner. Electric M. and M. Co., Spokane; $600,000; W. D. Nixon, L. B. Stutz. Queen Ann M. and M. Co., Davenport; $700,000; A. L. Tinsley, A. C. Shaw. Wonderful Group M. Co., Spokane; $1,000,000; W. W. D. Turner, G. Turner.

## BRITISH COLUMBIA.

The Skylark and Denver claims at Greenwood city have been bought by the Lexington Co. of Butte, Montana, for $20,000, one half cash.

Ashcroft *Journal*, May 30th: The reports this week from the Horsefly are that the Horsefly Hydraulic Gold Mining Co. has been working for the past several weeks and seems to be doing good work. There is no news as yet when a washup is contemplated. At the Horsefly Gold Mining Co.'s camp it is reported that the mine will be ready to begin piping about July 4th, work so far having gone on satisfactorily. There are many idle men at that point and twenty-five were let out some days ago, as the ditch work is well along.

## IDAHO.

Pierce, Idaho, May 23rd, '96.

(Special Correspondence).—Owing to the late inclement weather, placer mining has been materially retarded and the output will be considerably reduced this season. But recent new discoveries in quartz will more than offset the deficiency. The development on the Idaho still progresses favorably and the mill will start up in a few days. The Bond is also producing some rich ore. The owners are now sinking on the vein. The Caledonia Gold Mining Co., recently organized to operate in Pierce mining district on the Caledonia group, formerly owned by A. Walker and J. B. Williams, will soon commence active work. At present there is a large body of low-grade ore in sight, and if development work shows up as well as it is expected it will a large mill will be built to handle the ore, which is free milling. At present it is practically a prospect, but the amount of ore exposed on the surface justifies and entitles the Caledonia to the name of a mine. Recent discoveries are quite numerous, amongst the most important being the G. A. R., owned by J. Rankins & A. S. Warren; also the Calumet & Hecla claims, owned by Thomas Keily of Kendrick and A. Walker. Some ore is exposed on those claims that runs $200 to the ton, but the vein is small as yet. The Climax group is another important prospect destined to be a producer before the snow flies. This property is situated on a high divide and will be very easily opened by tunnel, and the ore requires no glass to see free gold in it. The Golden Reward is idle at present owing to a slide in the mountain caving in the tunnel. A deal is pending on the Climax and Golden Reward group, and if consummated will fall into the hands of Eastern men. Mr. Sullivan, representing the Anaconda Co., was in here last fall, and was surprised at the good indications for the making of a big mining camp

quartz, and he intends returning here as soon as it is possible to get over the roads, which at present are almost impassable. Men hunting for work would do well to avoid this camp for the present, as the supply of miners is fully equal to the demand, and until later in the season very few additional men will be needed.

The contract for the construction of the Tiger & Poorman concentrator, recently destroyed by fire, has been awarded. The insurance companies have been settled with for $75,000. The two companies have been consolidated and will have one concentrator with a daily capacity of 350 tons. The concentrator will be completed in four months and it is expected that the mines will then clear $25,000 per month.

*Headache*, May 29th: It is understood that the DeLamar Mining Company made the union a proposition last Tuesday to increase the carmen's wages 25 cents per day and to grant all employes the privilege of boarding where they choose. The proposition was rejected by the union, and everything continues quiet.

A dispatch dated Boise, June 3d, says: "The DeLamar miners dropped their demands for a written agreement that none of the strikers be discharged, and work has been resumed."

Wallace reports that the Standard mill is closed down on account of the caving in of the tunnel of the mine at Burke. There has been a number of caves in the tunnel, until it is completely blocked, and will have to be retimbered in part before it is used again. This trouble does not affect work on the new or Campbell tunnel where thirty men are employed.

Operations at the Red Cloud mines were resumed this week.

### UTAH.

*Tribune*, May 28: At the Hanauer smelter yesterday a notice was posted informing the employes that on and after June 1st the eight-hour law would be enforced. At the same time it was decided to make an advance of 10 per cent, which will leave the scale at from 18 cents and a fraction to 25 cents an hour. This, said an officer of the company in discussing it, is virtually a return to the wages that prevailed prior to the slump in the metal market in 1893, and which was followed by a reduction of 10 per cent. According to the new scale, a man working eight hours at 18 cents an hour would receive at the rate of $1.44 a day, and at 25 cents an hour $2 a day. Mr. T. R. Jones of the Germania was visited and said the same scale would be put into effect at that plant on June 1st.

At Tintic the Eureka Hill mill shut down on the first to put in forty additional stamps, which will give the mill 100 stamps. This will occupy about a month.

### MONTANA.

*Miner:* The new camp of Quigley continues to boom. Men are coming in daily and the camp now has a population of over 600. The Golden Scepter Co. is now engaged in an expenditure of nearly $500,000, as follows: A mill of 100 stamps capacity, which is to cost $150,000; an electric railway eight miles in length, to cost $40,000; a flume four miles in length, size 9x6 feet, to cost $30,000; hoisting works and accessories at the mine, to cost $50,000; $30,000 more necessary for the carrying on of detail work, and a late expenditure of $35,000.

The April payroll amounted to $40,000 and it is thought that $60,000 will be expended for labor alone in May. The estimated number of men now at work for the Golden Scepter Co. is 500, divided as follows: Laborers, graders and excavators, 100; rock men, 30; flume men, 50; miners, 55; railroad, 50; masons, carpenters and bricklayers, 50; lumbermen, 50; teamsters, 75; civil engineers, foremen, etc., 25.

The mines in that vicinity are also showing up well. Several prospectors have uncovered good ledges which assay high. When the mill is complete and the mines are working Quigley will be a great camp

A Helena dispatch of May 30 says the hoist house and a portion of one of the shafts of the Poorman mine have been destroyed by fire. Several men were in the mine at the time but made their escape through one of the other shafts. The fire caught from a spark from the furnance. The damage will amount to several thousand dollars. The house will be immediately rebuilt and the shaft repaired.

### SOUTH DAKOTA.

COST OF STAMP-MILLING IN THE BLACK HILLS, SOUTH DAKOTA.

*The Homestake Mill.*

| Year | 1887–1888. | 1888–1889. | 1893–1894. |
|---|---|---|---|
| Number of stamps | 80. | 80. | 80. |
| Tons treated | 96,790 | 105,780 | 104,905 |
| Labor | $0.2561 | $0.2305 | $0.2543 |
| Supplies | 0.0130 | 0.0045 | 0.0105 |
| Water | 0.1720 | 0.1562 | 0.1986 |
| Wood | 0.3766 | 0.2230 | 0.0597 |
| Coal | ..... | ..... | 0.1783 |
| Machinery | 0.0922 | 0.0893 | 0.1097 |
| Oil | 0.0109 | 0.0084 | 0.0034 |
| Candles | 0.0016 | 0.0014 | .. |
| Quicksilver | 0.0103 | 0.0053 | 0.0083 |
| Lumber | 0.0070 | 0.0139 | 0.0167 |
| Timber | ..... | ..... | 0.0155 |
| Total cost per ton of ore | $0.8406 | $0.7415 | $0.8551 |

*The Golden Star Mill.*

| Year | 1887–1888. | 1888–1889. | 1893–1894. |
|---|---|---|---|
| Number of stamps | 120. | 120. | 160. |
| Tons treated | 146,585 | 161,755 | 201,215 |
| Labor | $0.2138 | $0.1755 | $0.1556 |
| Supplies | 0.0079 | 0.0044 | 0.0121 |
| Water | 0.1712 | 0.1622 | 0.2043 |
| Wood | 0.2739 | 0.1959 | 0.0346 |
| Coal | ..... | ..... | 0.1637 |
| Machinery | 0.1220 | 0.1088 | 0.1057 |
| Oil | 0.0084 | 0.0066 | 0.0021 |
| Candles | 0.0014 | 0.0014 | ..... |
| Quicksilver | 0.0252 | 0.0082 | 0.0071 |
| Lumber | 0.0054 | 0.0088 | 0.0160 |
| Total cost per ton of ore | $0.8293 | $0.6718 | 0.7012 |

The Homestake will soon have 800 stamps dropping day and night. The discovery at a depth of 900 feet that there was a vein of $8 to $10 ore has caused the company to determine to spend $500,000 in improvements this year. These will consist in the addition of 300 stamps, the sinking of a new shaft 3000 feet and the erection of a steel bridge or tramway across a gulch 1500 feet wide. A new mining company, the Golden Reward, embraces the original Golden Reward and fifteen other mining companies, all of which possessed valuable properties. The ores are of a refractory character, but run from $25 to $50 per ton. Harris Franklin has erected, about a mile below Deadwood, what is claimed to be the largest chlorination plant in the world. It treats 225 tons ore daily and is kept in constant operation. Below the works is a large smelter which is doing a big business. Five additional furnaces are now being added to the smelter. A cyanide mill of large dimensions is also in full operation in the same locality.

### COLORADO.

D. Moffat of Denver and D. R. C. Brown of Aspen are now owners of the property of the Aspen Deep Mining and Drainage Company, having paid $75,000. It is stated that they will clear the Deep shaft of water and start it up again, giving employment to 100 men.

At Florence the new mill is completed. The crushing mill, 50x100 is under way. The building is 100x200 feet in size, of stone, brick and steel. It will contain the roasters which the company will build in connection with the new 250-ton plant.

### ARIZONA.

Payson, Ariz., May 29, '96.

(Special Correspondence.)—The Golden Wonder has two shifts at work sinking on $50 ore. This mine has more work done on it than any other in the camp and has put thousands of dollars into its lucky owners' pockets, and, unless all indications fail, will make them rich.

Collom & McGraw are taking out rich ore from their Pay Rock mine. This mine is an extension of the Golden Wonder.

Colcord, Duff & Lee have struck some nice ore on the old Tonto Chief. The group of copper claims belonging to Hamilton, Sprague & Coleman were bonded on the 25th inst. to Colorado parties for $20,000, work to commence within thirty days. The ore on this property is very rich, assaying from 30 to 65 per cent copper, 15 ounces in silver and $7 in gold.

J. I. Coleman's mill is kept busy on custom ore. He intends putting in a concentrator in the near future.

Phœnix parties are thinking of putting in a custom smelter here, which, I am satisfied from the immense amount of ore in sight, would be a handsome paying institution for many years, if properly handled.

New machinery is to be placed at the Crowned King mine, but there will be no shut-down.

Seventy-five men, known as "pot-pullers," at the United Verde mines, who were receiving $2.50 a day each, went on a strike for $3 a day and eight hours' work.

The *Courier* reports that the Last Chance mine and mill is being successfully operated a few miles west of Prescott; fifteen men are employed and the mill will soon run twenty-four hours a day instead of twelve, as at present.

Dr. Theo. B. Comstock left this afternoon for Kingman and Chloride, taking with him Mr. R. J. Ferguson, who has been engineer at the University and School of Mines for five years past. The Elkhart mine at Chloride will be equipped with steam hoist and buildings and vigorously worked by the Prescott Development Syndicate, Mr. Ferguson being left in immediate charge at the mine. Dr. Comstock will return the last of the month to Prescott.—Prescott Journal-Miner, May 27.

Senator Tabor is locally credited with intention to reopen the Vulture mine "and put several hundred men to work."

Among the improvements soon to be added to the works of the United Globe mines are a 100-ton furnace and a cable tramway to connect the Buffalo mine and smelter. The company has been making some phenomenal smelting records of late; and when the 100-ton furnace is put in operation, their output of copper will be largely increased.

The underground miners of the Tombstone Mining and Milling Company, who had been on a strike for a raise of wages from $2.50 to $3 per day, won their fight and returned to work on Monday last. The *Prospector* says: The company will prosecute work as heretofore at the mine, while at the cyanide mill success and most flattering encouragement is assured. With the completion of the last mammoth tank, pipe connections, etc., the total capacity of the three tanks amounts to ninety tons.

### LOWER CALIFORNIA.

*Lower Californian*: In the Jacalitos district the Recompensa mill is finished. The mine is down 125 feet and has a four-foot ledge rich in sulphurets.

The Piedad mine is running night and day and two satisfactory cleanups were made, the ore averaging over $20 per ton. They are now stoping at the seventy-foot level and are in ten feet of ore.

At the Agua Dulce they are waiting for the stamps to complete the mill and are sinking on the mine.

### MEXICO.

The experts who are examining the Minas Prietas properties for the English syndicate, which has an option to buy them, are working very systematically, says the Nogales *Oasis*. They are taking accurate measurements of all ore bodies, stopes, drifts, etc., and have the exclusive use of the assay office at the Prietas mill for making their tests. There are four or five experts engaged in this work.

### SOUTH AFRICA.

Johannesburg *Journal*, April 25: According to the Chamber of Mines' statistics, dynamite can be landed here at 42s. 6d. per ton. At present the average price, as seen in the statement of stores consumed, appearing elsewhere, is £5. From the best evidence obtainable, the annual sale of this explosive in the Transvaal is now about 175,000 cases, which is employed exclusively for mining. At £5 per case the value of this quantity is £875,000. At 45s per case, the price at which it would be sold under free competition, the value is £480,000, making in round figures a tax of £400,000 upon the mining industry. Some of the details of the tax are as follows:

*Robinson Gold Mining Company.*

| | |
|---|---|
| 1,350 cases cost | £10,681 |
| 1,350 cases at 15s | 9,787 |
| Annual tax | £10,893 |

*Simmer and Jack Gold Mining Company.*

| | |
|---|---|
| 6,420 cases cost | £33,153 |
| 6,420 cases at 15s. | 11,444 |
| Annual tax | £18,708 |

*Meyer and Charlton Gold Mining Company.*

| | |
|---|---|
| 1,215 cases cost | £6,91 |
| 1,215 cases at 15s. | 2,734 |
| Annual tax | £3,757 |

It is, of course, impossible to apportion this tax between producing and non-producing mines. In 1895 the tonnage milled was 3,456,575 tons. If the tax were paid by the milling companies alone it would amount to 2s. 4d. per ton, but on the rock actually blasted it is not easy to arrive at the cost. Thus, the Simmer and Jack has a heavy bill for dynamite, but, as the mine is to be opened up for a 280-stamp mill, a great amount of development has been done.


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# MERCUR.

**UTAH'S NEW EL DORADO.**

**Wonderful Development of the Camp Floyd Mining District.**

The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1880 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis. The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $300,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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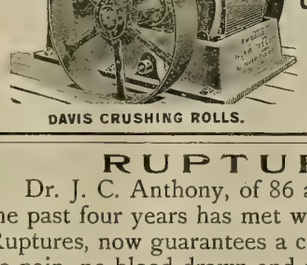
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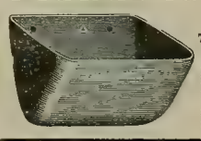
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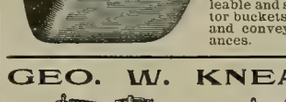
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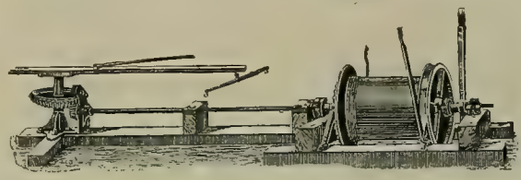
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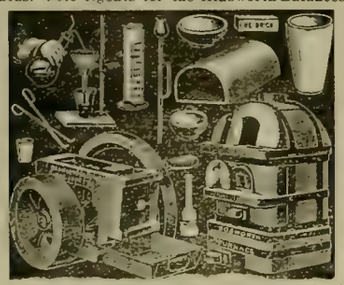


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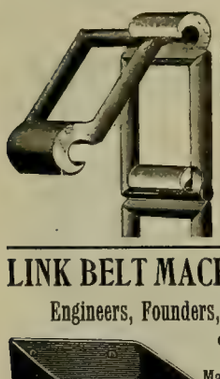
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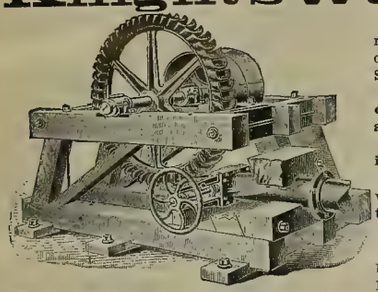
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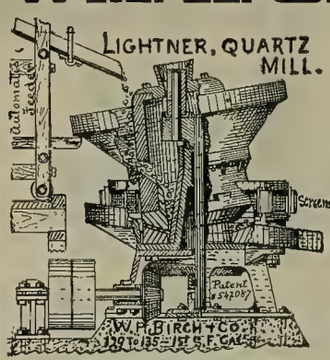
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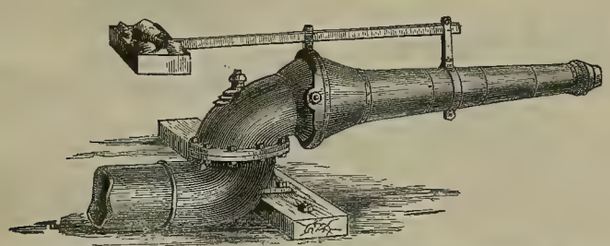
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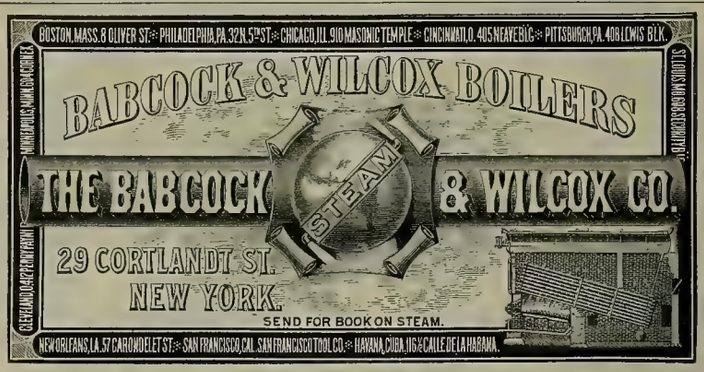
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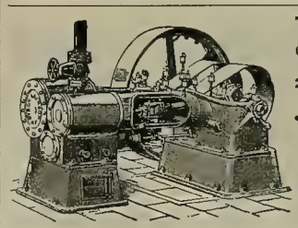
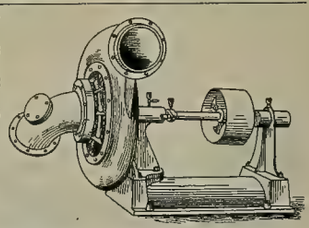
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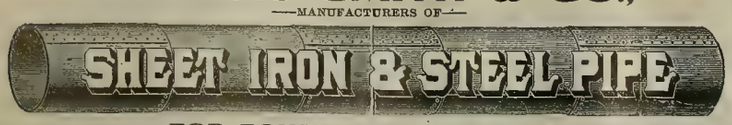


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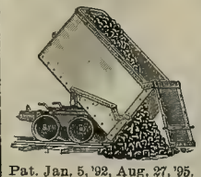
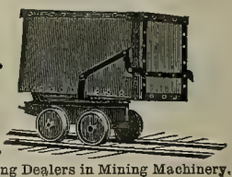
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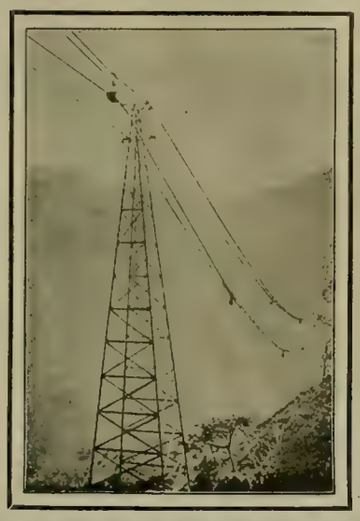
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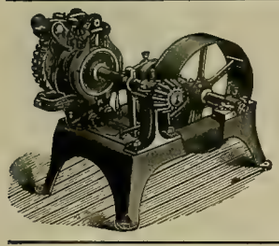
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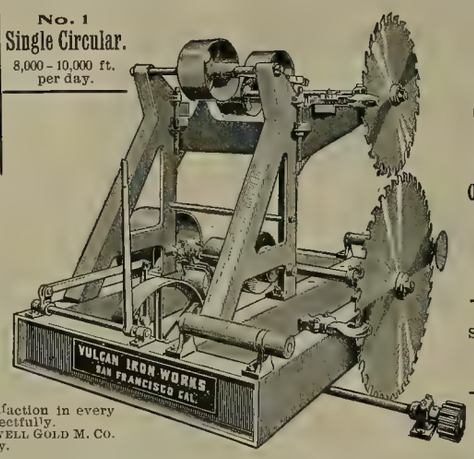
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**No. 0 Single Circular.** 4000 – 6000 feet per day.

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Alaska Treadwell Gold Mining Co.
SAN FRANCISCO.
Feb. 20, 1896.

*Vulcan Iron Works,*

GENTLEMEN: Our Double Circular Saw Mill of about 20,000 feet daily capacity, for which you made plans and built the machinery complete, including a set of three 6-inch beam Vulcan Head Blocks, 60-inch opening, has given us complete satisfaction in every respect. Respectfully,

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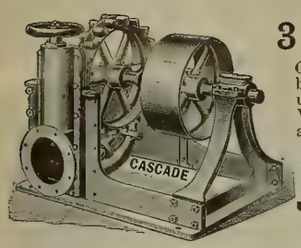
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Our experience of **33 YEARS** building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

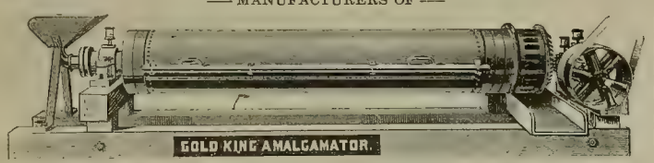
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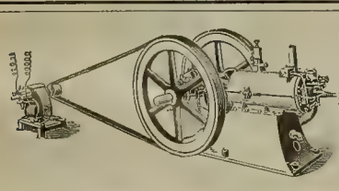
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Used for making **Electric Light** or furnishing power for any purpose required. Specially adapted for electric light in private enterprises. The latest great invention of this progressive age. Built in from 2 to 50 horse power. Stationary or portable. Is the simplest power on the market. A dwarf in size; a Samson in strength. Costs but little to run it. Has no equal for even speed and durability. Send for catalogue.

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CHROME CAST STEEL

## Cams, Tappets, Bosses, Roll Shells and Crusher Plates.







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Special attention given to the purchase of Mine and Mill Supplies.

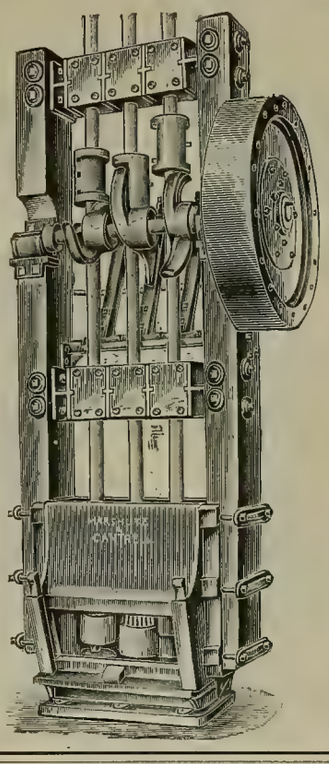


Stamp Cam.

L. C. MARSHUTZ. T. G. CANTRELL.

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OF EVERY DESCRIPTION.

All work tested and guaranteed.

IMPROVED PORTABLE HOISTING ENGINES.

**Improved Self-Contained Three or Five Stamp Mill,**

Saves bill for heavy timbers, millwright and mechanics' labor, and a large amount of space. The term self-contained means a great deal for the mine owner, and can be readily recognized and appreciated in making an estimate for an ordinary plant when the comparative cost is considered.

FIRST: There is saved a large bill for heavy timbers, in many instances obtained at great expense and loss of time.

SECOND: The saving in millwright and mechanics' labor in framing and erecting.

THIRD: The large amount of space saved.

FOURTH: The great saving of freight,

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MORRIS CENTRIFUGAL PUMPS,
LIGHT STEEL RAIL.

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PACIFIC COAST AGENTS

THE POOR MAN'S MILL AND ENGINE:

## THE . . . . . DANIEL BEST CRUDE OIL . . ENGINE. . . . .

CAPACITY, 2 to 200 HORSE POWER.

**The Cheapest Power Known; Invaluable Where Fuel is Scarce.**

The most economical motive power ever invented, costing but 10 cents per H. P. per ten hours' run, using crude oil. Cheap, safe, reliable and clean. Strong and simple to operate. Requires no engineer, and when you stop, all expenses cease, and no fire is left to endanger your building. Send for Illustrated Catalogue with full particulars, and mention the MINING AND SCIENTIFIC PRESS.



## THE KINKEAD QUARTZ MILL.

**The Kinkead Quartz Mill** will do the work of five stamps with less than half the power, and can be built and put into operation for less than half the cost of stamps. The only wear is the shoe and die, which is less than that of one stamp. The cheapness in first cost and operation of this mill makes it possible to work with profit ores so low in value that they have heretofore been treated as waste. Each mill will crush 10 tons in 24 hours through a 40-mesh screen.

It requires only a 2-horse power Daniel Best Crude Oil Engine, to operate this Mill and one concentrator. Engine and Mill can be set up and running in 48 hours.

**Price of Mill $1,000, f. o. b. San Francisco,** including Self-Feeder, Ore Hopper, Frame and Foundation Timbers all framed, and one Silver Copper Plate. Weight, 2½ tons; heaviest piece, 1350 pounds.

One ordinary mortar for a 5-stamp battery will weigh more than our whole Mill. This Mill can be made in 300 lb. sections, if desired, at extra cost. Send for Catalogue.

**Interior of Four Kinkead Quartz Mill Plant at Virginia City, Nevada, Equal to Twenty Stamps, Crushing Fifty Tons Quartz Daily Average.**

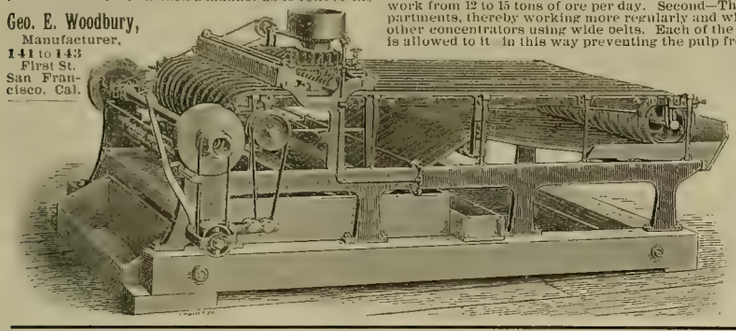
**Call and See Our Kinkead Quartz Mill in Operation. * * * 413 & 415 MARKET STREET, San Francisco, Cal.**

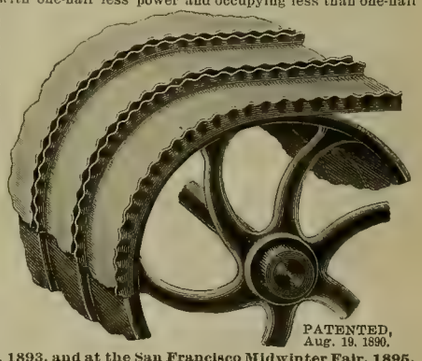
## THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

**was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891,** with one-half less power and occupying less than one-half the space of any other concentrator. Built of best Steel and Wrought Iron. Strong and durable. **Price $575 f. o. b.** Send for Catalogue and Testimonials.

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. THE IMPROVED MACHINE HAS THE FOLLOWING MERITS: First—The improved belts, which consist of seven, are constructed and arranged so as to allow each belt to receive a portion of the pulp in such a manner as to relieve the machine of its load, thereby giving it twice the capacity of other concentrators, and enabling it to work from 12 to 15 tons of ore per day. Second—The machine equalizes the load by several compartments, thereby working more regularly and with much less attention than is necessary to give other concentrators using wide belts. Each of the belts on this machine takes care of the pulp that is allowed to it in this way preventing the pulp from running to the lower side of it, as is the case when a machine becomes out of level where wide belts are used. Third—The belts run on a perfect line, needing no adjustment to prevent their running from side to side, as in other concentrators. Fourth—The belt surfaces are improved by indentations and corrugations, causing the Concentrator to save fine sulphurets and quicksilver, and perform close work. Fifth—The belts have fluted or corrugated edges, to form an expanded top edge, which effectually prevents from cracking. Sixth—The feed arrangement is perfect. Seventh—The machine is constructed of iron, with steel crank-shaft self-oiling boxes, and everything made in the most thorough manner, enabling it to run with very little attention or wear.

Geo. E. Woodbury,
Manufacturer,
141 to 143
First St.
San Francisco, Cal.





PATENTED, Aug. 19, 1890.

**This Concentrator took the 1st prize at the San Francisco Mechanics' Institute in 1890, 1891 and 1892, and at the California State Fair in 1892; it took the 1st prize at the World's Columbian Exposition, 1893, and at the San Francisco Midwinter Fair, 1895.**

# The McGlew Ore Concentrator Company.

PATENTED SEPTEMBER 19, 1893. **CHEAPEST, SIMPLEST, MOST DURABLE AND CLOSEST SAVING CONCENTRATOR IN USE.** FRANK BARRERE, Secretary and Manager.

Can be seen in operation at the Company's works, 132 **Main Street, San Francisco.**

**Office, 116 Davis Street.**

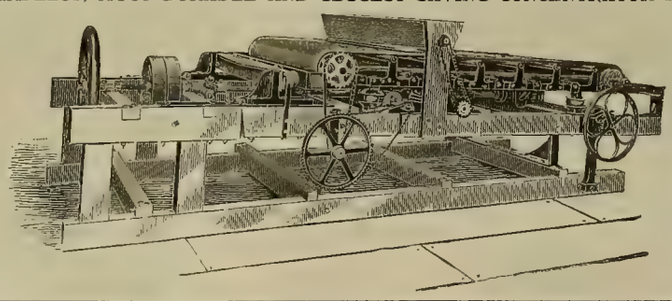
**NINETY-FOUR AND ONE-HALF PER CENT —SAVED— ON ORES DIFFICULT TO CONCENTRATE.**

A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.

SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION

CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

**PRICE.....$350 EACH**
Including prepared canvas belt 4 ft. 6 ins. wide.



FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1896.

THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,
E. L. BALLOU, Propr. Ballou Reduction Works.

# THE GUTTA PERCHA AND RUBBER M'F'G CO.

**30 and 32 FREMONT ST., SAN FRANCISCO.**

## Spadone's Concentrator Belts. Patented.

**The "SPADONE" Curved Edge Concentrator Belt is attracting much attention among mining men, its merits appealing to the millman of practical experience.**

Illustration (Fig. 1.) shows a cross-section, and (Fig. 2.) shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

FIG. 1.

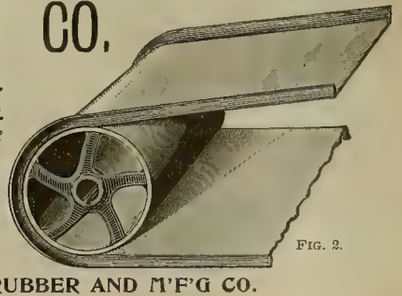


FIG. 2.

**We shall be pleased to quote you also on Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING and RUBBER PACKING. Correspondence Solicited.**

**THE GUTTA PERCHA RUBBER AND M'F'G CO.**
TELEPHONE, MAIN 1813.

# Market Reports.

## The Markets.

SAN FRANCISCO, June 4, 1896.

Jobbers report an increasing and enlarging demand for goods, with buyers from both mining and agricultural districts well represented. As fruit, hay and grain harvesting enlarges more hands will be given employment, which will cause an increase in consumption of goods and a steady increase in the disbursement of funds. From the gold mining districts come encouraging reports. It is stated that there is a steady flow of capital to this coast for investment. Considerable of this is foreign. If silver continues to appreciate within the next few weeks more attention will be given to silver mines; but it is doubtful if the market will hold up, unless there is international bimetallism. The lumbering camps report a continued active home and export demand at firm prices. This industry is said to give employment to a larger force of men than at any time within its history.

The local money market continues easy, but a steadily increasing call is expected to rule from the agricultural districts for crop moving purposes. The banks state that the supply of funds in hand is excessive for even this time of the year. Collections are said to be fairly free. The East reports a continued ease in the money markets. New York advices are to the effect that currency steadily sets from the Central States to that place, and with a light offering of commercial and manufacturing paper the rates of interest favor borrowers. The uncertainty regarding the position of the Republican and Democratic national conventions on the silver questions has an unfavorable influence on business and finance.

**New York Silver Prices.**

NEW YORK, June 4.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. |
|---|---|---|
| Friday | 31 3-16 | 68¼ |
| Saturday* | .... | .... |
| Monday | 31 3-16 | 68¼ |
| Tuesday | 31 3-16 | 68¼ |
| Wednesday | 31¼ | 68⅜ |
| Thursday | 31½ | 68⅜ |

* Holiday.

| | Copper. | Lead. | Iron. | Tin. |
|---|---|---|---|---|
| Friday | 11 40 | 3 02 | 10 75@13 00 | 13 50 |
| Saturday* | .... | .... | ....@.... | .... |
| Monday | 11 40 | 3 02 | 10 75@13 00 | 13 45 |
| Tuesday | 11 40 | 3 02 | 10 75@13 00 | 13 40 |
| Wednesday | 11 40 | 3 02 | 10 75@13 00 | 13 40 |

* Holiday.

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 6@7 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | 12½ |
| New York Telegraphic Transfer | 15 |
| London Bankers' 60 days | $4.88¼ |
| London Merchants | $4.88¼ |
| London Sight Bankers | $4.90 |
| Refined Silver, per oz., 1000 fine | 62⅜ |
| Mexican Dollars | 54@55c |

SILVER.—The market has made quite an advance the past week, closing strong with an improved inquiry. A New York exchange states from an authoritative source that the French Government is buying anywhere from 1,000,000 to 2,000,000 ounces of silver each month for coinage purposes. It is stated, also, that this coinage is not only for the French Government, but for many other Governments for which France coins money.

A leading dealer in silver says: "There is a steady demand for silver for export to London. From London it goes at present to France for coinage and to Germany and Russia. We find there is an unusually strong desire for gold and silver in European countries. We presume the silver is wanted entirely for coinage. The gold is in part probably being hoarded." Much change is taking place in the production of both gold and silver by the new electric process. Electricity is working wonders in reducing the cost of production of both metals.

Russia will unquestionably absorb large quantities of silver, so as to provide subsidiary coins to replace the small denominations of paper currency that is being retired. Referring to this the New York *Journal of Commerce* says: "The paper will be taken for gold in the new coinage, ruble for ruble, and the State Bank will receive 750,000,000 in the new gold piece for the purpose. The silver ruble will be compulsory, if required, between private persons only up to 50 rubles, while the exchequer will receive it to any amount. Only in the payment of customs duties silver coinage will not be received above 1 ruble until further notice. This important revolution in the monetary system of Russia is considered imminent."

The last steamer for Japan and China took out 217,000 ounces of silver bullion.

MEXICAN DOLLARS.—The demand is light, but the market is strong, in sympathy with an advance in silver. The last steamer took out 35,000 dollars. The market is quoted at 54¼@55c.

COPPER.—The market has held quite strong. While there has not been any advance in our market, yet buyers are not able to secure any concessions. James Lewis & Sons write from Liverpool: "The market has developed considerable activity, and not only consumers, but also the public, appear at last to be realizing the exceptionally strong position of this metal, the consumption of which is greatly exceeding the production—large though the increase of the latter in the United States be. This American increase of production appears to have reached its maximum for the present. For refined copper there has been a good demand, and there is more inquiry for manufactured for both India and elsewhere. High conductivity copper continues in request, and a contract has been placed for a French Pacific cable, which will absorb about 900 tons of wire. A considerable quantity of American electrolytic copper sold to the Continent has been repurchased by the original vendors. The increased consumption of England, Germany and France is at the rate of 52,763 tons per annum."

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

QUICKSILVER.—There is a continued good export demand. The last steamer for Mexico took out 150 flasks.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| Distant points up north | 38 00 |
| West coast of Mexico, for export | 34 00 |

ANTIMONY.—The market is quiet but steady at 8@9c cents in a jobbing way. New York mail advices quote 7⅞@7¾c for Cookson's, 6⅝@6¾c for Hallett's and 6½@6¾c for Japanese, from store.

TIN.—The advance in silver, with still higher figures looked for, is causing a stronger market at the East and abroad.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

POWDER.—An advance of 25 cents per keg has been made by leading manufacturers at the East. This will help California manufacturers to place their make at some points now monopolized by the East. Our market is firm at quotations.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " " | 8½c |

BORAX.—The market is quoted as follows

| | |
|---|---|
| Refined, in car lots | 6½ |
| Refined, in sacks | 5¾ |
| Powdered, in car lots | 6¼ |
| Concentrated, " | 5¾ |

LEAD.—The market is steady both here and at the East.

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

IRON.—The market is essentially unchanged. The consumption continues large, but the offerings are free. The East reports slightly more life, but the demand is not large. Some cutting is reported.

Our market is quoted as follows:

| | To Arrive. | Spot. |
|---|---|---|
| **AMERICAN.** | | |
| Sloss | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |
| **ENGLISH.** | | |
| Barrow | $21 00 | $23 50 |
| Gartsherrie | 21 50 | 23 50 |

COAL.—The market is reported as follows in the private circular of I. Steuart, which embraces the main features of what is reported by other brokers: "The receipts of coal at this port thus far this year are 542,100 tons, against 563,300 tons during the same time in 1895. Notwithstanding the continuance of the strike at the Australian coal mines of the Newcastle district, prices of coal have not as yet been affected in this market, owing principally to the fact of English anthracite and bituminous coal (chiefly the former) being offered for shipment at low prices, and abundant supplies from British Columbia being always obtainable at reasonable rates, assures this market against any scarcity of coal."

| SPOT FROM YARD—PER TON. | | | |
|---|---|---|---|
| Wellington | $7 50 | @ | 8 00 |
| Greta | 6 00 | @ | 6 50 |
| Nanaimo | 6 50 | @ | 7 00 |
| Gilman | 5 50 | @ | 6 00 |
| Seattle | 5 00 | @ | 5 50 |
| Coos Bay | — | @ | 4 50 |
| Cannel | — | @ | 8 50 |
| Egg, hard | — | @ | 11 50 |
| Wallsend | — | @ | 7 00 |
| Scotch Splint | — | @ | 7 50 |
| Brymbo | — | @ | 7 50 |
| **TO ARRIVE—CARGO LOTS.** | | | |
| Australian | 5 50 | | |
| Liverpool Steam | 6 25 | | |
| Scotch Splint | — | | — |
| Cardiff | 6 25 | | |
| Lehigh Lump | 9 00 | | |
| Cumberland | 13 00 | | |
| Egg, hard | 10 00 | | |
| West Hartley | 6 50 | | |

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — | | — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — | @ | 11 00 |
| " in sacks | — | @ | 12 00 |
| Cumberland | — | @ | — |

LUMBER.—There is a continued good home and export demand.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — |
| Pine | 14 00 | @ | 19 00 |
| Spruce | 26 00 | @ | 31 00 |

## Mining Share Market.

SAN FRANCISCO, June 4, 1896.

The market has been spasmodically active, with only slight fluctuations in prices. The small moves, up and down, have not been of sufficient moment to induce much outside trading, but they have been attractive to professional traders. So far as we are able to learn the impression prevails that the market value of the shares of both Chollar and Hale & Norcross has been kept up by main force, so as to keep the market from breaking before a sufficient number of shares have been unloaded. It is also the belief that for fully two weeks outside dealers have sold considerably more than they have bought, owing to the top-heavy character of the market and points put out that a "big break" is coming. At this writing the better informed dealers are giving more attention to the shares of the mines north of Chollar and Hale & Norcross, particularly those of the north end. What has brought about this change in sentimental dealing it is hard to say, unless it be that the manipulator for the pool has caused it so as to give better support to the shares he wishes to unload. Of necessity good news from the mines must be forthcoming, or else the movement will fail. A short time ago the street was full of an upmove in the Gold Hill shares, but which has not been realized, for the thing only strengthened in sympathy with the shares of the middle mines. This failure has caused quite a general selling by outsiders, which has admitted of better concentration by the Mills-Morrow crowd, and as the work in several of the mines is growing in interest an upmove is liable to be started there any day. At this writing it looks as if the market will advance along the entire line. How much of an advance will take place it is hard for an outsider to say, for the price of some of the shares is even now higher than the ore developed warrants; but, perhaps, it is the prospects that make the gamble now, and if so, there ought to be some radical changes as the work progresses.

During the past week several brokers visited Virginia City to personally inspect the work on the Brunswick lode and also see and learn what is going on elsewhere up there. Among them was Mr. Coffin, of Coffin & Sanderson, who is reported to be one of the most conservative brokers in the Board, and to find him somewhat bullish on the situation at the mines has caused surprise and make many believe that the outlook is far from discouraging, so far as the present work in the mines is concerned. This bullish feeling is enjoyed by the other brokers who went up, besides which private advices are more than confirmatory of the favorable situation. The visitors were not taken through the long crossdrift run from the Comstock lode to the east three or four years ago. It may be that what was then found induced the purchase of the ground on the Brunswick lode.

Official and private news from the mines on the Comstock lode is of increasing interest, yet it all points to time before the results can be accurately ascertained. Considerable dead work is nearing completion. With this finished, better ventilation and also manescapes will have been secured, which are an absolute necessity before active exploiting can be successfully inaugurated on the Comstock lode. From the Alta group the news is practically unchanged. From the Gold Hill group information is at hand stating that work has been resumed in Overman. Seg. Belcher and Belcher are still extracting and raising fair grade ore. It assays around $27 a ton. From what level it is taken, or whether any exploring work is being done, official letters are as dumb as an oyster. The Crown Point letter reports that connection has been made between the 600 and 700 foot levels and that in the upraise from the latter level $8 to $12 gold ore had been run into. This ore will pay to extract and mill. This dead work has been under way for some time so as to allow work to the west, owing to the ore found above having a decided western dip below the 600-foot level. The superintendent, in his annual report, writes quite encouragingly of the prospects there. On the 1100-foot level they are in ore assaying from $7 to $11 a ton, mostly gold. No work is being done in Kentuck, but some is reported in Yellow Jacket. In Confidence they are raising to the surface from the 600-foot level above the 200-foot level so as to get ventilation to expedite the work. After this is done they may (perhaps) find the lost ore found on the 200-foot level in Challenge and Confidence. The joint crossdrift run west by Con. Imperial, Challenge and Confidence is being pushed slowly ahead. The formation is favorable. In Alpha they are still fooling on and around the 500-foot level to the west. No report is had from Bullion outside of the work in the long west crossdrift. Potosi reports more or less dead work with no material change in the formation of the material encountered. The Chollar letter reports the shipment of $10,857 in bullion. There is some repair work under way in the main incline. In Hale & Norcross work is being pushed to strike the ten feet of good ore found in Savage. The milling returns of this company speak well for the management in the interest of shareholders. The Savage letter reports the raising of 110 carloads of ore assaying, as per car sample, $63.84 to the ton. The letter also says that 260 tons of ore had been milled which gave an average battery assay of $37.69 to the ton. Seeing that the company raised for the four weeks ending May 25th 271 carloads of ore, which gave an average assay as per car sample of $63.21, the battery assay is exceedingly small, provided it is the same ore. Work is still under way in the Gould & Curry long west crossdrift. Report is current that they have struck ore to the west in Best & Belcher, but particulars are not obtainable. Con. Virginia continues to raise and mill ore, which more than pays for the work that is being done on the different levels. The work on the 1000-foot level was, at last advices, in good formation. In both Ophir and Mexican, work on the 1000-foot levels is being pushed to the west. The work on the Central tunnel level is also being pushed westward. In Union and Sierra Nevada the work is the same as heretofore reported. In Utah they have started a west crossdrift.

Attention continues to be centered on the work under way on the Brunswick lode. The news from this lode is made the pivot on which to turn the share market. Private advices are of a more encouraging character than is official information. The latter, while quite conservative, gives encouragement to the belief that within the next few weeks considerable activity can be looked for in the shares of the mines on this lode. In Occidental they are running for the downward continuation of the ore found above. In Chollar they will crosscut at several places the ore found on the 200-foot level. They will also sink an incline winze, probably on the ore, from that level to the 300-foot level. In Hale & Norcross and also Savage they will soon begin running for the ore on the 300-foot level. In Gould & Curry work is being pushed ahead. So far nothing has been found on the lode to create an undue excitement. Further work is necessary to show the extent and value of what has been found. This makes the shares a gamble for something good or else for nothing of much if any legitimate value.

From the Bodie district the news is unimportant, being essentially the same as heretofore made public.

The market opened this morning dull and barely steady. After the regular Call, under the lead of Ophir, the north end shares did better, closing slightly higher at noon. At the 2:30 session this afternoon the market was quite active, with more trading, chiefly in the north end shares. Ophir sold up to $2.05 and Andes to 52c. Con. Virginia, Best & Belcher, Mexican, Union and Sierra Nevada sold slightly higher. The middle shares were firmer, but no higher. The Gold Hill shares were stronger under a better demand. The strength in Ophir is due to a reported improvement in the mine towards Andes.

The following illustrates the changes of the week:

| MINES. | May 28. | June 4. |
|---|---|---|
| Alpha | $ 27 | .... |
| Alta Consolidated | .... | $ 19 |
| Andes | 38 | 52 |
| Belcher | 79 | 76 |
| Best & Belcher | 1 35 | 1 50 |
| Bodie | 68 | 70 |
| Bullion | 28 | 30 |
| Challenge | .... | .... |
| Chollar | 2 80 | 3 25 |
| Confidence | 1 40 | .... |
| Consolidated California and Virginia | 2 85 | 3 05 |
| Consolidated New York | .... | .... |
| Crown Point | 69 | 65 |
| Exchequer | 08 | 09 |
| Gould & Curry | 1 55 | 1 55 |
| Hale & Norcross | 3 10 | 2 90 |
| Justice | 10 | .... |
| Mexican | 1 00 | 1 15 |
| Ophir | 1 75 | 2 10 |
| Overman | 15 | 28 |
| Potosi | 1 45 | 1 50 |
| Savage | 1 45 | 1 70 |
| Sierra Nevada | 1 00 | 1 15 |
| Union | 90 | 1 05 |
| Utah | 18 | 20 |
| Yellow Jacket | 56 | 58 |

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied. | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alaska-Willoughby G M Co, Alaska | 1 | 20c | Apr 6 | May 25 June 29 | T Pollard, 22 California |
| Alta S M Co, Nev | 52 | 10c | May 4 | June 9 June 30 | J E Jacobus, 309 Montgomery |
| Burlington G M Co, Cal | 2 | 3c | Apr 23 | May 27 June 17 | W C Ralston, 331 Pine |
| Central Eureka M Co, Cal | 1 | 3c | May 16 | June 22 July 18 | W Van Bokkelen, 320 Sansome |
| Horseshoe Bar Con M Co, Cal | 4 | 50c | May 12 | June 22 July 14 | D M Kent, 330 Pine |
| Mexican G & S M Co, Nev | 54 | 20c | Apr 23 | May 28 June 18 | C E Elliot, 309 Montgomery |
| Mono G M Co, Cal | 37 | 10c | June 2 | July 6 July 27 | M E Willis, 309 Montgomery |
| Mt Diablo M & M Co, Nev | 4 | 5c | May 21 | July 2 July 23 | R W Heath, 318 Pine |
| Occidental Con M Co, Nev | 23 | 15c | June 2 | July 7 July 28 | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 3 | 2c | May 11 | June 18 July 6 | F L Olmsted, 315 Montgomery |
| Overman S M Co, Nev | 75 | 10c | May 2 | June 5 June 25 | G D Edwards, 414 California |
| Peabody G M Co, Cal | 6 | 10c | Apr 28 | June 3 June 24 | B Natorp, 124 Sansome |
| Savage M Co, Nev | 89 | 20c | May 1 | June 3 June 23 | E B Holmes, 309 Montgomery |
| Silver King M Co, Arizona | 14 | 25c | May 7 | June 16 July 14 | J W Pew, 310 Pine |
| Siskiyou Con Q M Co | 11 | 1c | May 5 | June 8 June 29 | E F Stone, 306 Pine |
| Ybarra G M Co, Mexico | 4 | 15c | May 21 | June 21 July 9 | Jas Coffin, 132 Market |

## ANNUAL MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Bodie Con M Co, Cal | M E Willis, 309 Montgomery | June 15 |
| Alaska-Treadwell G M Co, Alaska | A T Corbus, Mills Bldg | June 24 |


The Jno. G. Morgan Brokerage Company,

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## San Francisco Stock Board Sales.

SAN FRANCISCO, June 4, 1896

9:30 A. M. SESSION.

| | | | | | |
|---|---|---|---|---|---|
| 100 | Alta | 19 | 100 | H. & N | 2 90 |
| 600 | Andes | 49 | 200 | | 2 85 |
| 400 | Belcher | 73 | 100 | Mexican | 1 05 |
| 200 | Best & Belcher | 1 45 | 100 | | 1 10 |
| 50 | Bodie | 70 | 150 | Occidental | 1 75 |
| 500 | Bullion | 30 | 100 | | 1 70 |
| 200 | Bulwer | 34 | 750 | Ophir | 1 90 |
| 850 | Con Cal & Va | 3 00 | 100 | Potosi | 1 45 |
| 200 | Chollar | 3 | 20 | 100 Sierra Nevada | 1 05 |
| 100 | | 3 | 15 | 200 Union Con | 1 00 |
| 200 | Crown Point | 65 | 800 | Utah | 20 |
| 300 | Gould & Curry | 1 50 | 100 | Yellow Jacket | 50 |

SECOND SESSION—2:30 P. M.

| | | | | | |
|---|---|---|---|---|---|
| 550 | Ophir | 2 00 | 100 | | 2 85 |
| 100 | | 2 | 05 | 200 Yellow Jacket | 58 |
| 200 | | 2 | 10 | 100 Belcher | 76 |
| 900 | Mexican | 1 | 15 | 100 Sierra Nevada | 1 10 |
| 600 | Gould & Curry | 1 | 55 | 300 | 1 15 |
| 400 | Best & Belcher | 1 | 50 | 200 Utah | 19 |
| 300 | C. C. & Va | 3 | 05 | 200 Exchequer | 10 |
| 30 | | 3 | 00 | 100 S. B. & M | 19 |
| 200 | Savage | 1 | 70 | 100 Overman | 28 |
| 100 | | 1 | 65 | 150 Union | 1 05 |
| 200 | Bulwer | 35 | 100 | Alta | 19 |
| 200 | Chollar | 3 | 20 | 500 Occidental | 1 70 |
| 100 | | 3 | 25 | 50 | 1 75 |
| 700 | Potosi | 1 | 50 | 200 Andes | 52 |
| 5 | | 1 | 45 | 100 Benton | 30 |
| 700 | H. & N | 2 | 80 | 200 Bodie | 67 |

## Recently Declared Mining Dividends.

THE Cariboo mine, B. C., paid a dividend of $16,000 May 16th.

THE Elkton Con., Montana, paid a dividend of $10,000 on May 25th.

THE Big Six mine, Lake county, Col., paid a $2,500 dividend May 20th.

THE Slocan Star mine, British Columbia, paid a dividend of $100,000 May 15th.

THE Ontario mine, Utah, has paid a dividend of 10c per share, $15,000, on the 1st.

THE Isabella, Colorado, paid a $22,000 dividend May 25th, an aggregate of $90,000 this year.

THE Centennial-Eureka mine of Utah paid $30,000 on the 15th ult.; this is $180,000 in '96 and a total of $1,680,000.

NEXT Wednesday the Ætna Q. M. Co., Napa Co., will pay its sixth dividend: one of ten cents per share. On the 16th the Napa Con. Q. M. Co. will pay its regular quarterly dividend of ten cents per share and an extra dividend of the same size.

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING MAY 19, 1896.

560,834—SHELF BRACKET—T. M. and R. J Anderson, New Whatcom, Wash.
560,844—RECORDING COINS—P. E. Daniels, Oakland, Cal.
560,849—CAR FENDER—M. Fernandez, Los Angeles, Cal.
561,005—BED AND SOFA—T. Langdon, Los Angeles, Cal.
561,007—BICYCLE BRAKE—J. W. Little, S. F.
561,008—MEAT HOLDER—C. P. Loughridge, Nevada City, Cal.
560,911—GAS BURNER—P. Meyer, Alameda, Cal.
561,025—WASHSTAND—R. R. Parrish, Portland, Or.
561,026—LAVATORY—R. R. Parrish, Portland, Or.
561,027—LAVATORY—R. R. Parrish, Portland, Or.
560,749—FAUCET—B. Pearson, Redlands, Cal.
561 063—TYPE MACHINE—V. J. A. Rey, S. F.
560,950—WIDOW POCKET—J. M. Thorpe, San Jose, Cal.
560,883—TIRE ARMOR—D. A. Zan, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

WINDOW POCKET AND COVER.—Joseph M. Thorpe, San Jose, Cal. No. 560,950. Dated May 26, 1896. This invention relates to improvements in the sash pockets which are formed in window stiles and the covers therefor, and the method of securing the same in place. It consists of a pocketed window stile and a pocket piece formed in the same board, the stile opening being formed with ends diverging from one side toward the other, said ends and the ends of the cover being formed by V-shaped cuts made from opposite sides and intersecting each other on lines intermediate between the opposite sides of the board, whereby tongues and grooves are formed upon the diverging ends and longitudinal vertical channels cut through the board, whereby the cover is separated and is movable edgewise, to disengage the tongues and grooves when moved in one direction and engage and lock them when moved in the opposite direction. The cover is locked in place by means of a parting bead, which fits in the channel in contact with the longest edge of the cover and when removed allows the cover to be taken out.

BICYCLE BRAKE.—John W. Little, San Francisco, Cal. No. 561,007. Dated May 26, 1896. This invention relates to a brake which is especially adapted for use upon bicycles. It consists of a fulcrumed brake-shoe, situated above the wheel, having a flexible connecting strap extending from the rear end of its leather upwardly over guiding pulleys, thence into the end of the hollow handle-bar, where it is connected with a non-rotable disk. The handle is turnable upon the end of the bar and the two are screw-threaded, so that when the handle is turned in one direction the disk will be drawn outwardly, and, acting through the connection, will apply the brake. When turned in the opposite direction, the brake will be released by the action of a spring suitably placed with relation to it.


**"HISTORY OF CRIPPLE CREEK."**

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address. *Illustrated Weekly*, Denver, Colo.


## Assessment Notice.

OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 2d day of June, 1896, an assessment (No. 23) of fifteen cents (15c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of July, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on TUESDAY, the 28th day of July, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

## DELINQUENT SALE NOTICE.

GOLD BAR CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, near La Porte, Plumas county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 3) levied on the Tenth (10th) day of February, 1896, the several amounts set opposite the names of the respective shareholders as follows:

| Names. | No. Cert. | No. Shares. | Amt. |
|---|---|---|---|
| Chas. A. Moore | 102 | 7,222 | 361 10 |
| Chas. A. Moore, Trustee | 103 | 7,222 | 361 10 |
| Percy P. Moore | 117 | 6,000 | 300 00 |
| Percy P. Moore | 118 | 7,222 | 361 10 |
| Percy P. Moore, Trustee | 130 | 468 | 23 40 |
| E. C. Godfrey, Trustee | 160 | 6,667 | 333 35 |
| N. L. Bell, Trustee | 128 | 250 | 12 50 |
| A. U. Rugg | 16 | 1,000 | 50 00 |
| A. U. Rugg | 67 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 149 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 150 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 151 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 152 | 5,000 | 250 00 |
| Louise V. Rugg, Trustee | 155 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 156 | 1,000 | 50 00 |
| Louise V. Rugg, Trustee | 157 | 500 | 25 00 |
| Louise V. Rugg, Trustee | 158 | 2,500 | 125 00 |
| Louise V. Rugg, Trustee | 159 | 2,500 | 125 00 |
| W. B. Rugg | 109 | 5,000 | 250 00 |
| G. H. Ripley, Trustee | 120 | 400 | 20 00 |
| G. H. Ripley, Trustee | 121 | 200 | 10 00 |
| E. C. Godfrey, Trustee | 141 | 1,667 | 83 35 |
| E. C. Godfrey, Trustee | 142 | 3,000 | 150 00 |
| E. C. Godfrey | 133 | 3,195 | 159 75 |
| E. C. Godfrey | 134 | 4,000 | 200 00 |

And in accordance with law, and an order from the Board of Directors, made on the 10th day of February, 1896, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Company, Nos. 37 and 38 Crocker Building, San Francisco, California, on FRIDAY, the 10th day of April, 1896, at the hour of 2 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

E. C. GODFREY, Secretary.

Office, 37 and 38 Crocker Building, San Francisco, California.

**POSTPONEMENT NOTICE.**

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until SATURDAY, May 9, 1896, at the hour of 2 P. M., at the office of the Company, Room 38 Crocker Building, San Francisco, Cal.

E. C. GODFREY, Secretary.

**POSTPONEMENT NOTICE.**

By resolution of the Board of Directors of the Gold Bar Consolidated Mining Co., the day of sale for the above delinquent stock was postponed until MONDAY, June 8, 1896, at the same hour and place.

E. C. GODFREY, Secretary.

Office, No. 38 Crocker Building, San Francisco.


## WANTED.

For free milling and smelting property (gold) near Prescott, Arizona, competent mine superintendent who can make his own assays and run his own levels. Must have gilt-edged references; developed property. Address,

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Dated San Francisco, 2nd of April, 1896.

JOHN A. WRIGHT, President.
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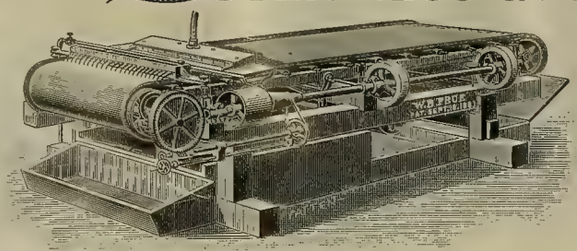
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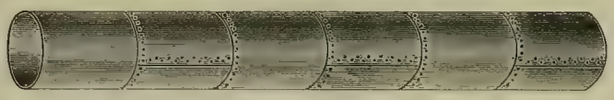
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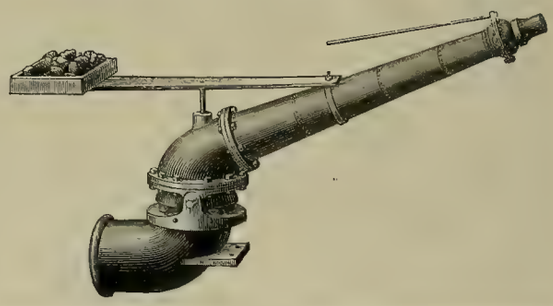
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AND PACIFIC ELECTRICAL REVIEW.

No. 1875.—VOLUME LXXII. Number 24. SAN FRANCISCO, SATURDAY, JUNE 13, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

## The Silver Situation.

In its advocacy of silver, this journal notes a narrowness of view on the part of some of its Eastern contemporaries. The parrot cry of "sound money," being devoid of argument, deserves no reply. But many who honestly seem desirous to discuss the question with the impartial earnestness that its importance demands appear to be confused as to the place this whole silver question occupies.

Papers published on the Atlantic slope, and people writing from there, seem to honestly believe that this whole effort for the remonetization of silver is a petty conspiracy on the part of the owners of silver mines for personal gain.

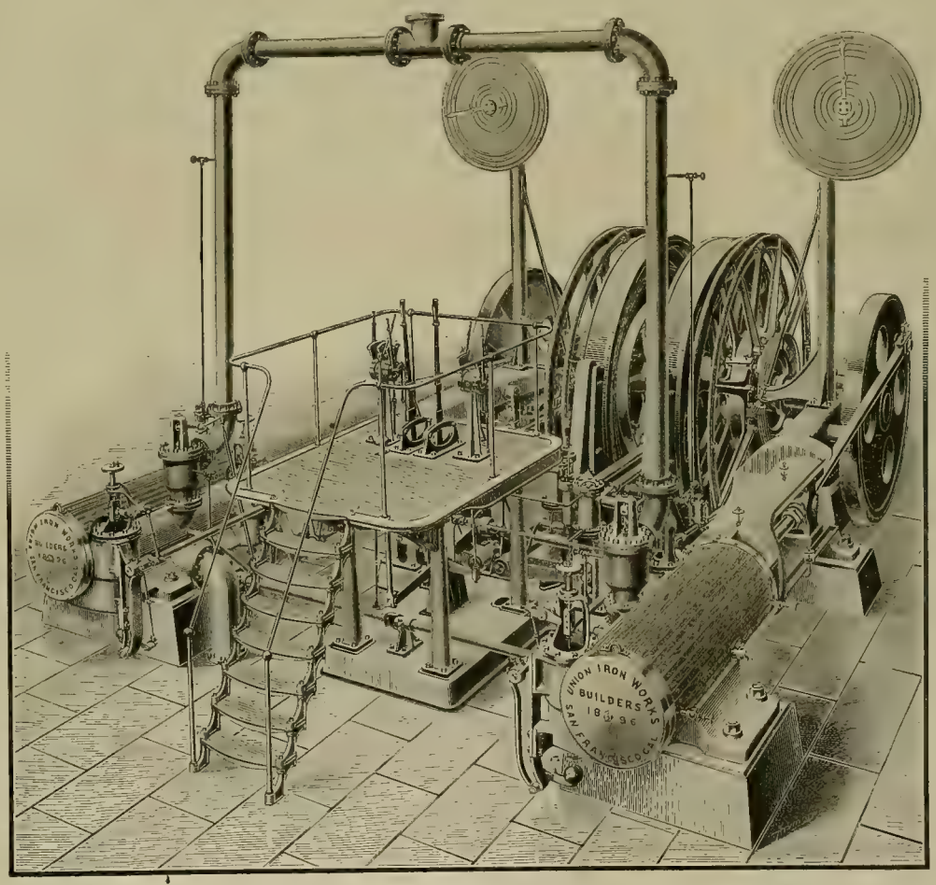
The mistake these people make is a natural one to those who approach the subject with prejudiced minds. They think the question is an industrial one, when it is purely a financial one; it is not simply a matter of concern to a few small producers; it is not a subject of personal, class feeling, like the manufacture of carpets, the production of cotton goods or the dairy interests of some State. It is of wider scope. The man who owns a corn field in Nebraska; the owners of a blanket factory in Ohio; the producers of muslin and calico in Rhode Island; the shoe manufacturers of Massachusetts; the pork packers of Chicago; the railroad bondholders of the country—these and a thousand other industries are more interested in the remonetization of silver than the few scattered silver miners of this west half of America. To all those enumerated or suggested, it means loss or gain; to the miner it means merely a choice of work. If the country refuses to care for silver, he can and will produce gold; he is the most independent one of the whole lot.

The selfish, narrow view of this subject taken by Eastern critics is the saddest part of the whole matter. The lofty assumption of superiority is irritating, the arrogating of all the wisdom and common sense is of course amusing, but the arguments made in ignorance or defiance of the plain facts must be a matter of regret to those who hope for the country's general prosperity. If those papers and people who talk so glibly of "silver barons" and "sound money," of "free silver cranks" and "the necessary gold standard," yet deplore the shrinkage of values and the general stagnation of business, would permit their sober senses to sway their sentiments, they would probably realize that the question is not an industrial one like the tariff, but a financial one, of equal importance and underlying the success or failure of all industrial schemes.

The silver mine owners of the United States produce annually one-half of one per cent of all commodities in the United States. They are interested in this matter of the remonetization of silver together with their fellow-citizens in the proportion of 1 to 200; no more. Were silver restored, they could buy no more wheat or machinery or pork or land than now, for all would advance together. Their profits would be commensurate with that of the rest of the producers of the country in the proportion of 1 to 200.

Three years ago the people who are the most stubborn now in talking round the circle on this subject scared the country into a panic that has cost twice as much as the Civil War. Now, at the beginning of a national campaign they are again trying to stampede the herd.

The logic of the situation is against the monometallists. Neither sophistry nor terrorizing; neither falsehood, ridicule nor defiance can face down the one unanswerable fact that the population is increasing, that the needs of the country require more currency of a value attained only by use of the precious metals, and that in this regard the interests of consolidated banking interests are opposite to those of nearly the whole people. So long as nearly the whole people can be fooled with side shows they will be denied their rights. Some new issue every election is as necessary to the success of the monometallists as an alibi in the successful defense of a criminal. Sooner or later the people in whose hands lie our national destinies will realize the truth, will see that this silver problem is not an industrial question, involving only the fortunes of a few miners, but a great financial Government problem, affecting alike the fortunes of every resident of the nation everywhere. When they do, whether this year or next year or the year after, silver will be remonetized, and the country resume its old-time prosperity. We of California can stand this present stagnation probably better than any one else. The California gold miner is to-day engaged in the most prosperous occupation on earth; but he realizes that, as in the human body, no part can be diseased without injury to all others; so in our national prosperity, the country cannot enjoy as a whole the fullest measure of financial prosperity while the natural ally of gold is in its present plight. Hence the California miner is an advocate of silver.




20 x 60 INCH HOIST FOR CRESTON MINE, SONORA, MEX.

## Double Reel Direct Acting Hoisting Engines.

This week's mechanical illustration is of a large hoist built for the Creston mine at Prietas, Sonora, Mexico, and now being put in place there by the Union Iron Works of this city. It is for a three-compartment shaft, which is to be sunk to a depth of 2100 feet. The cut illustrates the pair of double reel direct acting hoisting engines, cylinders 20 x 60 inches, showing the reels, designed for flat wire rope, steam-actuated brakes and band friction clutches. The engines are of the ordinary girder frame pattern, and the reversing gear has a cut-off for working the steam expansively through any portion of the stroke; the engines are connected by a crank-shaft; the reels are brought into action independently of each other by means of band friction clutches, operated by steam. The brake wheels are provided with steam-actuated brakes and the crank discs with foot brakes, thus giving perfect control of the load and insuring most rapid work with absolute safety.

An elevated platform is placed between the engines, upon which are mounted all the levers, as shown in the engraving, which gives the engineer full view of the mouth of the shaft, the reels, indicators, etc., and allows all parts to be placed above the floor and within easy reach in case of repairs when necessary.

The indicators are of the spiral disc pattern, provided with adjustable tabs, to show the position of the ascending or descending cages in the shaft.

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J. F. HALLORAN.....General Manager

San Francisco, June 13, 1896.


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## A Great Gold Field.

There is every indication that the Pacific coast will soon lead all the auriferous regions of the world in gold production. Large as is our present yield of the yellow metal, it is only the beginning. We have but commenced the development of the gold-bearing quartz veins of the country. There yet remain in our great gold fields extensive regions that are wholly unexplored. The vast majority of the gold-bearing veins of the country await the developing pick and drill of the miner. Nowhere else on earth can there be found a greater field for the industry of gold mining than here in this west half of America. We have hundreds of thousands of square miles of gold-producing territory. A man may mount a horse and ride for days, weeks and months, and at the end of a year he will not have been able to visit a tenth part of the localities in which gold is to be found.

For various reasons, so well known that no particular explanation need here be made, the work of developing the auriferous wealth of this region has long proceeded very slowly. At times it has lagged for years and almost come to a stop, so far as regards the opening of new mines. Meantime the attention of the great capitalists of European countries was attracted to gold fields in distant parts of the world, where there was a greater display of activity, rich developments and new and exciting discoveries. The eyes of the whole mining world turned toward South Africa and West Australia. There are some good mines in those far-away countries, and beginning by putting upon the markets of London and Paris the shares of mines that were paying, a great boom was presently worked up. Then, when the masses came in, all wild to become purchasers, there were put out at big prices all manner of wild-cat trash—mere mines on paper. But speculation went on all the same, and stocks that represented nothing more valuable than stretches of sandy veldt were as eagerly snapped up as though they had been shares in dividend-paying mines.

It was a long boom and a profitable one to the insiders who worked it. It began in the latter part of 1894 and held until the end of September, 1895. By that time everything was boomed to such a height that the majority of the professionals decided to go on the other tack. As soon as these professionals became bears they refused to grant the usual carrying-over facilities and thus knocked out all who were unable to pay for their purchases. Then came knock-down auction sales of stocks, several failures, a steady tumble in prices, and the great boom was a hopeless slump. However, hundreds held on with bull-dog tenacity, and are still holding on. The French in Paris thought they were very careful buyers. Mistrusting the English, they would take nothing but dividend payers, but in the boom they, many of them, lost their heads and paid the big prices that all paying mines reached during the excitement. All these Frenchmen will lose, as during the life of the mines they will only get back in dividends a part of the money they paid out for shares.

Both the English and the French doubtless now have all the South African and Australian stocks for which they have any hankering. They undoubtedly had in the cement reefs of the Rand a great gold deposit and one that will still produce a great deal of the yellow metal, but, if reports from there are to be believed, the Johannesburg mines have seen their best days; they are now on the decline—are slowly petering. The hopes of the people are now in the "deeps"—next they may be in the "dumps."

The reported outlook in the "deeps" is not good. The ore is of low grade and they must go down 4000 to 5000 feet to get it. The ore of the "deeps," or lowest workings, yields only $4 to $5 a ton, which with the old cheap labor and all else favorable could hardly be made to pay. The Robinson Mining Company, the largest producer in the Rand, under the management of Captain Thomas Mein, formerly of California, has brought the cost of working ore down to $4.58 a ton, which is considered to be the lowest possible figure. This looks bad for the "deeps." There is not likely soon to be seen any increase of production at the mines of the Rand. Few new properties are being opened up, and all the old accumulations of tailings are being worked, therefore the hopes of the people for an increased output are centered in the deep levels.

In the South African mines they long enjoyed a great advantage in the low rate of wages at which native miners could be procured. This made it possible to work the low-grade ores at a good profit. But the natives have gradually had their eyes opened in regard to the value of their labor to the whites. Where they were at one time paid but $6 a month, they now demand and get $16. Even at this rate, the number procurable is insufficient. The labor trouble began before the late political trouble, but since then the wars and war talk has scattered and demoralized the workers—filled their heads with notions of fighting. Native labor is very unreliable. Even when the notion takes them to work, the Kaffirs remain at the mines but a short time; as soon as they get a little money ahead they are off and away. There is no way of compelling the natives to work. All that can be done is to put before them inducements, and then await their notions and motions. The Portuguese Government have added to the labor trouble by demanding $5 for a passport for every native leaving their territory. This prevents hundreds from even thinking of going to the mines. The high price charged in the Rand for explosives, owing to the monopoly granted by the Boer Government, also adds greatly to the difficulty of the problem of how to get any profit out of the low-grade ores that are ahead.

It was at one time widely and wildly heralded that in Mashonaland—Rhodesia—the "gold mines of King Solomon" had been found, and many persons had visions of gold by the ton. During the big boom stocks in mines in that region were run up to a big price. The gold deposits of Mashonaland are quartz veins, not beds of auriferous conglomerate, as are those of the Rand. It seems that the ancient miners made a pretty clean sweep of the gold in both the quartz veins and the placers in Mashonaland. Little gold is coming from that section.

It now seems that the predictions and promises of the South African boomers will not be verified. The thousands who have lost can have no hope of ever getting even. For them to come out even it would be necessary for the mines to prove to be all that was reported of them during the height of the boom. The hopes of many of these people are in the "deeps," in the shares of the trust companies holding the stock in the deep-level companies, as the Consolidated Goldfields, Barnato Consolidated, Barnato Bank, and the like.

The tide of mining speculation and development is likely soon to set in this direction. The present outlook in South Africa is not such as will be likely to induce European capitalists to make further investments in that country. Already a vast deal of European money is being put into mines in this country. Although American stocks cut no figure in the markets of London, Paris or Berlin, many English, French and German capitalists own big and rich mines on this coast. These men are not buying mines for the purpose of making money by selling stock. They look to the mines themselves for their money. Their profits are derived from the precious metals they dig out of the ground. Many fine paying mining properties in different sections of this country are owned by foreign capitalists. Little is heard of them in the markets of the world, for they are not peddling their stocks; nevertheless their success is not without effect. More and more money is coming here each year for investment in mines. The men who are now coming here want mines, not stock. As there are always plenty of mining properties of merit that can be bought at fair prices, these men have only to exercise a little ordinary sagacity in order to secure paying mines.

While there are opportunities in every far western State for the acquirement of good mining properties, California is probably the most attractive field for the capitalist, either home or foreign, because of the climate and the unrivaled facilities it affords for mining.

For hundreds of miles along the western base of the Sierra Nevada mountains are gold-bearing veins and placers awaiting development that will yield a profitable return to the energy and money of the capitalist. The hundreds of millions gathered from the gravel on the surface and the other hundreds of millions that have rewarded those who have delved in the quartz mines is good evidence of this. There, along the mountain range, will be found a delightful climate and all the facilities of accessibility, cheap electrical and water power, abundance of lumber and timber and every concomitant required to make the business of mining both pleasant and profitable. Notwithstanding the vast amount of treasure California has given to the world, much more undoubtedly remains in the ground than has ever been taken out. The gold-bearing veins are practically without limit. Besides the veins of the great mother-lode belt, there are other systems of veins throughout the whole length of the State. There are even yet immense deposits of auriferous gravel lying unworked in the old dead-river channels and the deep placers. In forty-five years the mere surface gold of the country has not been exhausted.

They have no mines in the Rand at all comparable in richness to the veins of the mother lode of California. Had the same amount of machinery been erected on the mother lode, and as much development work been done as in the Rand mines the yield of gold obtained would undoubtedly have been far greater from the South African bonanza. Indeed mines that prospect better and will pay better than the "deeps" of the Rand can be found by scores in every Pacific coast State.

As regards a gravel deposit such as that of the Rand, there can only be a certain amount of pay ground and when that is worked out the mine is gone—it is dead. It is very different in the case of a quartz mine. In the latter there is always the chance of finding a parallel vein that does not come to the surface. This may prove better than the original vein. Then in the ground adjoining the main vein will most likely be found paying streaks and feeders. For years they have been working on such outside streaks on the Comstock in Nevada, and large and rich ones are still being discovered.

Gold mining is now about the only industry that pays and a paying gold mine is a good piece of property to tie to. This is beginning to be more and more understood. A man with a paying mine on say the California mother lode may consider himself fixed for life. That great lode has been worked at so many different points, has been so well tested and has yielded so many hundreds of millions in gold that no one need have any fear of it "petering." In its longitudinal dimensions the great fissure is co-extensive with the Sierra Nevada range. It is no gash vein in the surface rocks, but is a great fissure that reaches down into the fiery depths; is as deep-seated and permanent as the mountain range itself. The very rich ore obtained in the deep shafts of several leading mines on the mother lodge shows that there is no decrease of pay in depth.

In Australia gold-bearing veins are now being profitably worked to a depth of 3000 feet—in one mine to the great depth of 3300 feet—and it is there said that "mining can be carried down to 3000 feet as economically as at 600 or 700 feet from the surface." The Victorians are firm believers in the existence of gold at deep levels. When, at a depth of about 2150 feet the last payable reef at Bendigo appeared to be worked out, the miners instead of abandoning their work, determined upon going deeper, with the result that payable quartz was found at a depth of 2800 feet, and in exactly the same formation as that met with in the higher levels. On the Comstock it was found that men could work as comfortably at a depth of 3350 feet as at 1000 feet. The ventilation was good and the heat less than at some points above. The Tamarack copper mine in Michigan has reached the great depth of 4020 feet without difficulty. Evidently even the deepest of the California gold mines have long lives before them. Thus far no limit has been found as regards the depth to which mining work may be carried.

## Concentrates.

COMPARISON is constantly and cordially invited.

EVERY miners' union in the State of Montana will hold an anniversary celebration to-day.

MANAGER CRANE of the Monte Cristo, Wash., mine has been instructed to buy a $10,000 seven drill compressor and boiler.

THE law under which American mining machinery went into Canada free of duty expired by limitation on the 6th prox.

THE cinnabar claims near Wadsworth, Nev., have been bonded, and Humboldt county expects to add quicksilver to its list of productions.

ANY errors or omissions in the list of mines now being published will be gladly corrected upon notification. Absolute accuracy is not claimed.

THE Planet-Saturn, Arizona, Mining Co. talk of putting in a roaster and cyanide plant of 75 tons daily capacity. They are sinking to a depth of 500 feet.

AT the Gwin mine, Calaveras county, the shaft is down 1250 feet and is in $8 ore. It is expected the new 40-stamp mill will be ready November 1st.

'TIS figured that about thirty mills in this country are now using the MacArthur-Forrest process, treating about that many thousand tons of ore monthly.

INDIAN AGENT NEUMAN has stopped the staking off of townsites on the Colville reservation, but says he will not interfere with miners or mine improvements.

SECRETARY SMITH last Saturday approved as a basis for a patent list thirty of the selections by the Central Pacific Railroad Company, in the Redding district.

AT the Broken Hill Proprietary, Australia, the yield for the week ending May 21 was 7536 tons of ore, producing 431 tons of lead, containing 145,865 ounces silver.

RANDSBURG, Kern Co., is reported full of tenderfoot prospectors, many of whom have "claims overlapping each other, three or four deep on the same piece of ground." "Some have located twenty to forty claims apiece."

ASSESSMENT WORK can be done quicker, easier and with more effect now than later in the year. Any one who has any kind of a gold claim cannot afford to jeopardize his chances this year by neglecting this important requirement.

THE Land Department has made another singular ruling that the sale of mine improvements in place is evidence of abandonment of the mine. On a test case, however, the Department could probably reverse itself as it has done before.

QUESTIONS sent in cannot always be given immediate answer. It is easier, usually, to ask a question than to correctly and satisfactorily answer it, and what may sometimes seem easy often takes considerable time and research for reply.

CALIFORNIA'S gold production in '95 was twenty-six times the value of its silver production for that year. Recognizing, however, that the silver question is not an industrial but a financial problem, California favors the remonetization of silver.

AT San Diego on the 5th Judge Pierce granted a temporary injunction in the case of the Golden Cross Mining and Milling Company vs. the trustees, at Hedges, and appointed W. W. Stewart of that city as receiver, fixing the required bond at $25,000.

A NEW mint at Nanking, China, is to have a capacity of 100,000 silver and 1,000,000 copper coins per day. It is proposed to coin silver dollars of a value equal to Mexican dollars. Previous attempts to supplant the latter coins in the Chinese circulation have failed.

A THIRD edition of "Aaron's Assaying," Part I, is now being printed and will be issued July 1st. It is enlarged and improved in accordance with the notes of the late author, and is believed to be in every way worthy of the same cordial reception given the original work.

THE $45,000 in the General Deficiency bill passed by the Senate this week and now a law is for the building and equipment of works for the sampling and assaying of silver and other ores imported, the works to be built at El Paso, Texas, Northport, Wash., and Bonner's Ferry, Idaho.

A TACOMA, Wash., Co. is building a mill "constructed with a coil spring sufficiently strong to deliver a blow equivalent to that of a thousand-pound gravity stamp, and by the use of the spring twice the number of drops per minute are made." It will be interesting to note its working test.

IN dealing with each other partners occupy positions of trust and are required to exercise the most scrupulous good faith toward each other. Nor is this requirement confined to persons who are actual copartners, but it extends to those who are negotiating for a partnership yet to be formed.

WAGON-ROAD, horseback prospectors, carelessly riding over the country, have given way to an army of men this summer who are prospecting the whole west half of America more diligently than ever such work was done before. The makings of many a good gold mine will be started this year.

CALIFORNIA-BUILT hoists are not slow, four now being put in place in Montana giving an average speed of 45 feet a second. At the Calumet and Hecla, Mich., the deepest shaft in the United States, they claim to attain a speed of 60 feet per second, which is about as fast as one wants to travel underground.

IN the U. S. Court of Appeals, Judge Gilbert last Tuesday, affirmed the ruling of the lower court in the case wherein the Altoona Q. M. Co., of Trinity county, brought suit against the Integral Q. M. Co., for ejectment of the defendant and possession of the Boston ditch, in which the plaintiff was successful.

THE *Economist* points out that western Australia mines, land companies, etc., are capitalized for £57,000,000. This is considerably in excess of the nominal amount for which all of the companies working in the Transvaal are capitalized. It thinks that the industry is being unfairly handicapped in this respect.

THE United States Debris Commission is not issuing any hydraulic permits at present for two reasons; this is not the season of the year when such permits are applied for and the appropriation is exhausted. An appropriation of $15,000 for the biennial expenses of the Commission will be available the 1st of next month.

A PARTY who is induced to part with the possession of his property through the fraud of a purchaser has the right either to rescind the contract of sale and reclaim the property, or to ratify the sale and pursue the ordinary remedy on the contract; but having elected to sue for the price, he cannot repievin the property.

THE new dredger of the Distlehorst Dredging Company, Oak Bar, Siskiyou Co., is nearly ready for work. There are three boats joined in one, making a dredger 65 feet long by 30 feet wide. There is an engine of 25-horse power; the iron dredgers weigh 1000 pounds each. It is expected to handle 1000 cubic yards of gravel every twenty-four hours, at a daily working expense of $18.

LAST Saturday was finally concluded the sale of the old Summit mine near Sutter Creek, Amador county, to the Central Eureka Gold Mining Company, for a price approximating $40,000. For nearly a quarter of a century the property has lain idle. It was sold by John Tregloan & Co. to C. W. Randall. New hoisting works have been put in and it is proposed to sink a shaft 1000 feet deep.

LONG CONTINUED OPTIONS on gold mining properties in this State are not as frequent as they used to be. A ninety-day option is now in greater favor than the old six or twelve months' option, and in a majority of cases even a three months' bond is not forthcoming unless a forfeit is put up or the party of the second part seems to mean prompt business.

IN renewing his subscription, a Nevada mining superintendent says "The West has a reputation for higher prices, but your paper at $3 a year and a certain New York publication at $5 a year shows that there is an error somewhere the subscription prices should be interchanged. Certainly no mining man anywhere can afford to be without your paper."

THE directors of the Chicago Coliseum propose to hold a permanent mining exhibit there. The idea is worth affirmative action in this State. While we in California do not need practical object lessons in education as to the mineral wealth of the State, the millions who yearly visit Chicago do, and one of the most effective ways is by appropriate exhibit there.

DUPRE states in his German patent that a solution of chromic acid in a solution of a metallic chloride or bromide, such as sodium chloride, magnesium chloride, potassium bromide, etc., dissolves gold and is without action upon the metallic oxid, and argues that such a solution can be used as a substitute for chlorine in the extraction of gold from roasted ores, and from ores which are free from sulphides.

THE De Lamar, Idaho, M. Co. silver producers, have promised their employees an advance in wages as soon as silver touches eighty cents. They in common with other silver producers are now paying all they can afford with silver at its present prices; it is only by close economy and careful management that any silver mining company in this country has been able to keep going for the last four years.

THE Bodie Con. Mining Co. will hold its annual meeting here next Monday when it is prophesied new directors will be elected and that there will be a change in the superintendency of the mine at Bodie. It is thought that the Bodie, Bulwer, Mono, Summit and Standard will be put under the management of the manager of the Standard Con. and an electric plant erected on the river about five miles below, or north of Brigeport.

THE United States Supreme Court has decided that there is no dower interest in an unpatented mining claim. In the Montana case of Mary A. Black vs. Elkhorn Mining Co., Judge Knowles of the U. S. Circuit Court at Helena made the first decision, which, while not revoking that ruling, was on review by Judge Ross of the U. S. Circuit Court of Appeals so construed, his opinion being affirmed on further appeal by the Supreme Court.

THOMPSON'S COLT, "who swam the river to get a drink," was of similar sagacity to the unequipped prospectors who went from California to northwestern Alaska in search of gold. Lured by the love of adventure more than any real hope of finding gold, many a poor fellow will suffer bitter hardship and privation before again seeing this golden State. The ultimate result may be of benefit to Alaska in securing population and developing natural resources.

A RESIDENT of Hoboken, N. J., has received a letter from Pres. Kruger through the German General Consulate at New York. The South African diplomatist declares "that emigration to the Transvaal republic, either from America, Germany or elsewhere, would not be advisable at the present time, as, on account of the well-known political troubles, commerce and industries are at a rather low ebb, and offer insufficient opportunities to make a living for newcomers."

USUALLY a local paper, in announcing a new mining development or the general prosperity of the place, winds up by warning all and sundry looking for work to stay away, saying that there are more men there now than can be supplied with work, but the Hailey, Idaho, *Times* says that last week Supt. Johnesse of the Lucky Boy mine tried to get miners, but was unable to secure the required number, even by advertising, and that that is one place where the demand exceeds the supply.

A DISPATCH of the 9th says Kuhn, Loeb & Co., bankers, have purchased for the Rothchilds 270,000 shares of the Anaconda Copper Company stock for the approximate sum of $7,500,000. This sale to the Rothschilds, in addition to the block of 30,000 shares previously purchased by them, places nearly half the stock of the company in their hands. J. B. Haggin, when seen in regard to the reported sale, said it had been consummated, but that the controlling interest in the company still remained in the hands of Americans.

WHEN exaggerated statements are made it is as easy to use superlatives as ordinary adjectives. Capt. Cowden and Mrs. Turner of Sitka, Alaska, are now reported to have discovered "a solid ledge of gold quartz 600 feet wide and over 3,000 feet long" in the N'Squashaisky Bay district, alongside of which "the great Treadwell ledge is a mere stringer." There is enough gold ore to keep "500 stamp mills going day and night for 100 years." Coming just on the eve of the great national nominating conventions this is important.

CONGRESS adjourned yesterday, and to the last Speaker Reed refused to recognize any member from California or anywhere else who wanted to move the passage of the Mineral Land bill. This is a temporary victory for the corporation, but next winter another effort will be made to secure justice. Post mortems are useless; just what killed the bill is thoroughly understood. The thanks of the California miners are due the California delegation and other members in the Senate and House who worked so hard for the passage of the bill.

ON the stage the farce, or curtain-raiser, precedes the main play. In Congress these things are reversed. This week, in the closing days just before adjournment, Congressman Hyde of Washington introduced a bill in the House for the classification of mineral lands in Washington, Pacific coast, identical in wording with the bill introduced by Representative Johnson of this State at the opening of the session, except that it applies to the State of Washington. The impossibility of any action being taken on it makes it unnecessary for Senator Mitchell of Oregon to prepare any amendment thereto.

ACCORDING to the *Silver Belt* at Globe, Arizona, a reduction of wages to $2.25 per day for all miners, car men and surface men was ordered last Saturday, whereupon all the employes struck, the miners demanding $3 per day, the discharge of all Mexican employes about the mines, and the abolishment of the monthly insurance fee, which, under pressure, was temporarily acceded to by Supt. Parnell till such time as the owners, who reside in Boston, could be apprised of the facts and determine whether they shall continue operations or close the entire plant. It is probable the mine will be closed down.

NOT since Moses smote the rock from which gushed the water in the wilderness has anything in that line been more remarkable than the report of the discovery of a flow of water on the Mojave desert. A ten-stamp mill is being built at Kane Springs, about thirty miles northeast of Mojave station. A shaft 6 feet square was sunk to obtain water for the mill. Last Tuesday the well was down 20 feet when, according to a Bakersfield account, the bottom seemed to drop out and the water came in so fast that workmen could scarcely get out in time to save themselves from a good wetting. In forty-five minutes the whole well was filled up, and the water was running over the top. This gives great abundance of water for mill work, and it can be run directly into the battery. The mill and spring are the property of O. B. Stanton.

THE Old Glory Mining and Smelting Co., 95 Milk St., Boston, Mass., may be an excellent concern, but its statements are a little strange. It claims to have several "world-beaters" in the shape of Idaho mines, publishes a statement of their value, certified to by the Idaho State geologist, and locates one mine in the same mining belt with the DeLamar. The fact that there is no State geologist in Idaho and that the mine in question is a hundred miles from the DeLamar, in a different mountain range on the other side of a valley fifty miles wide, makes it difficult to believe all that the Boston corporation claim.

BECAUSE a mine has been abandoned is no evidence of its worthlessness. It argues only that those who abandoned it did not have enough money or stick-to-it-ativeness to make it pay. Four of the biggest and best paying gold mines in the State were abandoned or allowed to lie idle for many years even after they had been worked and were profitable producers. Reference is made to the Rawhide, Tuolumne Co., the Utica, Calaveras Co., the North Star, Nevada Co., and the Kennedy, Amador Co. Times change in mining as in everything else, and gold mining in this State is just now getting on the same basis as any other legitimate business.

A REPORT lately drawn up by Dr. Lombardo on the sulphur mines of Sicily is so fearful as to be almost incredible. Dr. Lombardo says that in his province alone 5,000 children are employed in the extraction of sulphur, and that it is an established fact that they are literally "spurred" by their overseers to quicken their movements, some of the marks frequently remaining livid on the skin for as long as ten days. These brutal creatures will even burn the shins and calves of the children with their lamps to make them work faster, these burns constantly resulting in loathsome sores, which the doctor has often been required to investigate, as also the diseases to which they give rise.

CALIFORNIA has one form of gold mining as unique and distinctively her own as the giant trees, the flowers or the climate—drift mining. Countless æons of ages ago the channels of prehistoric rivers here ran rich in gold, where, capped with lava, the yellow metal is now found. Drift mining is sometimes expensive, usually slow and tries the endurance of the miner, but is nearly always profitable. In rare instances—as at the Thistle shaft, Gibsonville, Sierra Co., the gravel is reached through a shaft, but ordinarily the pay gravel is reached and the work carried on through a tunnel. Many a man has put in all his money and considerable time, only to find that when he got through the rim rock he was too high. Usually, the only thing to do in such a case is to begin over again, lower down.

DAVY CROCKETT was out hunting one day and had secured only one coon skin when he arrived at a backwoods bar very thirsty. The coon skin, or pelt, served as currency in that part of the country then, and Crockett handed over his one pelt in payment for his drink of whiskey. The bar-tender threw it behind the bar. That bar was built of logs and there were chinks between them. Crockett pulled the pelt out through one of the chinks and bought another drink. The operation was so successful that he repeated it a number of times. When he went away the bar-tender, thinking he had done a rushing business, started to count his pelts. He found only one. That is the way when a greenback draws a gold dollar out of the treasury. It goes out again and again through the chinks, returning for gold dollars, and at last the Government has just the same one pelt.

RECENTLY the bank at Weiser, Idaho, sent to the Crocker-Woolworth National Bank in this city for $500 worth of silver from the sub-treasury. The sub-treasurer said the silver must be obtained from the sub-treasury at Chicago. The sub-treasurer at that point returned the draft to Weiser and stated that "his office did not accept drafts or checks for any purpose whatever." The Idaho banker then instructed his New York correspondent to deposit $500 in cash with the sub-treasury in that city. This was done and the Weiser man was informed that the silver would be shipped from San Francisco. The banker waited for two weeks, and, as the silver did not arrive, he appealed to the assistant treasurer at Washington. This appeal finally brought the coin from St. Louis. It had taken just two months of persistent demands to force the administration to release $500 worth of silver, which the officials say the people do not want.

THE Superior Court of Placer county, Cal., sold at public auction on the 8th inst. what is known as the Irish & Byrne placer mine for $41,000. The mine is situated a mile and a half southeast of the town of Iowa Hill in that county. It lies between the Morning Star mine and what is known as the Big Dipper or Hoorman mine. The workings of these two important drift mines are close enough to the ground sold, to establish a belief that the rich channel worked in both of them, is continuous thoroughout the Irish & Byrne. The owners of the two mines were the only bidders. Columbus Waterhouse, the owner of the Hoorman mine, was the purchaser. The area of the ground sold is 115 acres, and it is estimated that it contains about 800 linear feet of the channel. The price paid amounts to something over $50 a linear foot of channel, and is a fair indication that the bidders estimate the probable gold yield at not less than $300 a linear foot.

A PRETORIA, South Africa, dispatch of the 10th inst. says: "The four leaders of the Johannesburg Reform Committee—Colonel Francis Rhodes, George Farrar, Lionel Phillips and John Hays Hammond—have offered the Government £40,000, to be used for charitable purposes, in exchange for their release. This action on their part has given rise to a slight misunderstanding, which may retard the settlement of their case a few days." A dispatch from Pretoria of the 11th says that Jno. Hays Hammond and his three companions have finally been released, upon their payment of a fine of $125,000 each and banishment from the South African Republic. Still another dispatch of the 12th confirms the news of their release, and fine, but says they are not to be banished. It is not likely, however, under the circumstances that any of them will care to remain. Since his confinement at Pretoria, Mr. Hammond has been paying his jailers $750 per month for the most ordinary necessities of existence.

THE shareholders of the Golden Feather, Butte Co., met in London on the 28th ult. The chairman in moving the adoption of the report said only poor returns had been made during the past year in consequence of the company having worked that portion of the river bed which was worked some thirty years ago by the miners of the Cape Union. They now knew that during the coming season the gravel they would work was up to the present time untouched. He believed they would have had better returns last year had the elevator been placed on bedrock. Financially, last year's work resulted in a loss of £2283. In a letter, dated May 1st, Supt. Evans reported very favorably on the outlook, and on May 27th, he cabled: "There is a favorable change in the weather; great heat now set in. The river is now rising; hope to be able to turn the river about the same as last year. We are doing all possible to expedite matters. The dry season is now upon us. Prospects of the season good. There is reason to believe returns will be satisfactory." The chairman said they had 6000 feet to 7000 feet of perfectly untrenched ground to work over, and Mr. Evans had informed them that one patch of rich gravel left by the old miners had yielded $4,800.

## The World's Greatest Gold Lode.*

To-day is in progress a more world-wide search for gold than has ever before been seen in all the ages that have passed since the history of our race began to be written. In times past there have been gold mining excitements in various countries, but they have mostly been confined to the region in which the mines are situated. Now, however, gold and gold mining seem to be that which is uppermost in the thoughts of the people of nearly all countries and nations, civilized and savage. All the world is out gold hunting. Fearless and enterprising men are at the front leading the way. The mountains and wilds of almost every known land on the face of the earth, however remote and savage, are being explored in search of the yellow metal. Neither the malaria of the tropics nor the ice of polar regions can turn back or terrify the invading armies of gold hunters. Everywhere bands of courageous and hopeful prospectors go "marching on."

The countries in which the greatest activity in gold mining is now seen are South Africa, America and Australia. The gold fields that have made most noise in the world—particularly in the leading cities of the Old World—in the last year or two are those of South Africa and West Australia. Australia, however, was only a fair second—South Africa was the grand field of European excitement until the late troubles at the Rand began. During the time of the opening of the mines of the Rand and other South African gold fields and the building up of great and flourishing mining towns times were bad and dull in the mining regions of the Pacific coast among those engaged in mining for the precious metals. Government has given silver a "black eye" and the demoralized miners who found their property wiped out and their occupation gone had not yet plucked up heart and turned their attention to mining for gold. Thus this country, which should have held the first place in the whole world in the production of gold, fell behind the new fields of South Africa, in which more activity was displayed and an almost unlimited amount of capital brought to bear. It is not because of the richness of the ores of South Africa that she has pushed a little way to the front, but because of the great number of mines opened, each of which is producing more or less gold. Along the edge of the Rand basin hoisting works and mills are planted two or three tiers deep.

Now, as it is the number of productive mines, big and little, that count in the grand total, the Pacific coast region must very soon surpass every known country in gold production. We have thousands and tens of thousands of veins of gold-bearing quartz in every State and Territory on the coast, from the borders of Mexico to the frozen regions of the Arctic, and as these are opened over thousands on thousands of square miles of fertile mineral belts, all that is now doing or ever can be done in the circumscribed area of the Rand basin will appear quite insignificant in comparison. What is wanted is a full awakening to the value of our possessions and the thorough development of the wealth of gold that lies hidden in our mountains. A start has been made in the work of opening up the gold veins of the Pacific coast region and, though it is little more than a start, already some wonderful discoveries have been made in all parts of the country, with a find of such rich mines at Cripple Creek, Colorado, that a boom has been started almost rivaling that seen in South Africa. At Mercur, Utah, another great auriferous deposit has been found that gives promise of building up a large and rich mining town. In both States there are probably lying untouched other gold belts that are equally rich—also in Idaho, Nevada, Arizona, and other sections—and to be equally productive only require the bringing to bear upon them of men and capital.

In every Pacific coast State and Territory are found veins of gold-bearing quartz that are wonderfully rich, also auriferous belts of considerable extent made up of systems of parallel veins, but the greatest field of America—indeed, of the known world, at the present time—is that of California. Just at present California may be a little behind one or two of the more famous regions of the world in gold production, but it is merely because of her long halt in the industry of mining—because of the many years during which capital was diverted from the mountain regions, when the development of mines almost ceased. The war upon the miners of California by the ranchmen of the valleys and the suspension of hydraulic mining under adverse decisions of the U. S. Circuit Court gave mining of all kinds a "black eye." With the defeat of the miners came an agricultural and horticultural boom during which no man of means thought of anything outside of speculation in ranch lands, orange groves, and irrigation schemes. Thus it happened that for a dozen years or more—nearly fifteen years—California was resting on her "ores," and her ancient honors. Men who had money left the mountains and went down into the valleys to participate in the boom in orange lands, while those who were left poor by the shutting down of the hydraulic mines eked out a subsistence by drifting in their gravel banks or by scraping over old bedrock. Here and there the old productive quartz mines in a few leading camps were at work, but little was anywhere being done for the development of new mines. Mining was under a cloud and at a discount. Groves of golden oranges for a time drove from the minds of men visions of nests of golden nuggets. The wealth of the mountain was sacrificed to the wealth of the valleys.

Recently, however, hydraulic mining, under certain conditions, has been resumed and in places a return of the prosperity of the olden days is beginning to be seen. The development of the quartz veins of the country has been commenced and already there is to be seen quite an awakening to the value of the golden stores of the mountains, so long slighted and almost ignored. At several points there is considerable activity in prospecting, resulting in the opening of new and valuable mines, but in hundreds of other places throughout the State where the indications are equally promising the lodes lie undeveloped. Also there are probably as many veins remaining to be discovered as are anywhere seen on the surface. There is no lack of mining ground in California. Within the borders of the "Golden State" alone there is room, in the quartz mines, and the hydraulic and drift diggings, for every miner of the precious metals now engaged in the industry on the Pacific coast. The great mother lode, which was formed contemporaneously with the upheaval of the Sierra Nevada range, extends in an unbroken line along the western slope for a distance of over 120 miles. It is not a single lode but a system of parallel veins forming a mineral belt in places twenty-five to thirty miles in width. Through this auriferous belt runs that which is known as the mother lode. It is the backbone of the system of parallel veins and by certain "ear-marks"—peculiar characteristics found in the wall rocks—it is traceable along nearly the whole western slope of the Sierra Nevada range. Through county after county it runs—Tuolumne, Calaveras, Amador, El Dorado, Placer, Nevada, Sierra, Plumas, Shasta, to where the Sierra Nevada and Coast ranges unite in Siskiyou, up near the Oregon line—constituting the richest, strongest and greatest single deposit of gold-bearing quartz in the known world. Along the mother lode, between Mariposa and Siskiyou, there is room for fifty such gold mining camps as that of Cripple Creek.

For years the great auriferous region has lain fallow, but the day is not distant when the whole belt along the course of the big central lode will swarm with miners. To-day in every county through which the big lode passes there is room on it and its accompanying veins for thousands of miners, while in several counties to the northward there still remains to be opened and worked, by hydraulic or other process, many rich gravel deposits with miles on miles of the channels of dead rivers under the lava-capped mountains to be opened up and drifted out. The prevailing opinion in the world at large is that the placers—the auriferous gravel deposits—of California were worked out years ago. This is a mistake. Most of the shallow diggings have for some time been exhausted, but in the big, deep gravel deposits and in the channels of the ancient rivers beneath the mountains there still remain hundreds of millions.

Experienced prospectors always expect to find large and rich veins of gold bearing quartz somewhere above rich and extensive placer diggings, the rule being the bigger and richer the placers the bigger and richer the vein or veins from which was thrown off the gold found below in gravel deposits. This being the case, nowhere in the world can there be found a more promising region in which to prospect and mine than that along the line of the mother lode, below which has been gathered more placer gold than from any other single gold field in the known world. When hundreds of millions in gold was dislodged from the croppings through weathering and erosion what must have been left behind in the veins themselves? There must lie in the lodes a still greater store of wealth than that brought to light by the chance action of the elements.

However, there is no uncertainty in regard to either the richness or permanence of the great California lode. At several points it has been sufficiently well prospected to show that it is everywhere fertile and reliable, though gold may not everywhere be found on the surface. At Grass Valley, Nevada City, Sonora, Angels, and other places, mines have been opened on the big lode that have yielded millions and are still paying as well as at first, some much better than when first opened. The fact that some of these mines have been worked from thirty to forty years and have attained a depth of over 2000 feet, without showing any indications of exhaustion, tells well for the permanence of the big vein. There is no reason why the lode may not be worked to the depth of 5000 feet, with the improved apparatus of all kinds now available.

Although the big lode is paying so richly and is so thoroughly prospected at a few old camps widely separated, there are in every county miles on miles along its course where little or nothing is being done in the way of opening mines upon it. In El Dorado and other counties to the northward great stretches along the vein are lying idle, though good prospects can be obtained at the very surface. Such claims as are located are mostly held by men who are able to do little more than the necessary assessment work; they were quite unable to procure machinery with which to do real development work. Along the range are many mines on which some work was done in the early days, and most of these lie much as when abandoned years ago.

In all the world there is no better place in which to mine than on the big mother lode gold belt of California. No richer mines can be found in any country on the face of the globe; the gold field lies in the midst of civilization; the climate is perfection; provisions of all kinds are abundant and cheap, and mining supplies can be easily and cheaply obtained. The man who runs away to South Africa, to frozen Alaska, or to the malarial camps of South America, while there is such a field for prospecting and mining here at home in the heart of California, is "wild as an Apache."

The big gold belt of California has a great advantage over South Africa, Australia, and most other gold fields of the world in its abundant supply of timber and water. Immediately along and above the lode are the inexhaustible forests of the Sierra Nevada range, from which may be cheaply obtained mining timbers and fuel. Then all along the range are creeks and rivers that rush down to the west to the great valley regions. Among the rivers may be mentioned the Feather, Yuba, American, Mokelumne, Stanislaus, Merced, San Joaquin and Kings. There are some smaller rivers and many large creeks and canyons that carry considerable volumes of water. All these rivers and creeks, on their way to the valley regions below, cut across the line of the mother lode, and as they have their sources in the high Sierras they are, in their downward course through the mountains, filled with falls and rapids, therefore an abundance of fall may be obtained on all the streams of the region for driving machinery by water power. By means of electrical transmission this power may be used in running the machinery of the mines and mills along the big lode. Indeed, electrical apparatus is already in use at some points, and much machinery is being run by power electrically transmitted. Eventually great numbers of dynamos will be strung along the rivers and creeks, and wires will convey power all about the mountains, making it available in places to which it would be impossible to carry water, for use in driving machinery. That he was unable to make water run up hill was always a matter of regret and humiliation to the miner of the early days; now, however, by the aid of electricity, we are able to lift a big water power from the bed of a river and set it going hundreds or thousands of feet above on a mountain top.

Had the great lode been made and planted to order, it could not have been more advantageously placed for cheap working. Then, with the new and powerful explosives, the machine drills and air compressors for use underground, improved winding gear for handling the rock, improved pumps for handling the water, and improved ore-reducing apparatus and concentrators, with new and cheap processes for the extraction of the precious metals from the pulverized quartz, hundreds of veins that could not be touched by the early miners may now be profitably worked. Mining ground on the mother lode will never be worth less than at present. The immense value of this greatest of all gold-bearing veins is just beginning to be understood, notwithstanding the millions on millions that have been taken out of it from mines opened on it here and there in years past, and the millions that it is still regularly yielding. Whoever now secures a paying mine on the great California mother lode may consider himself fixed for life; he will have a piece of property it will do to "tie to."

Although California has produced over $1,300,000-000 in gold, the source of this immense yield of the yellow metal up in the big gold belt along the mother lode has only here and there actually been tapped in accordance with the rules and methods of modern scientific mining. In other places, for miles on miles, where touched at all, it has merely been scratched over on the surface. Had the English a giant lode such as this of California in South Africa, Australia, or in any of their possessions, as well proved up in value as it is, both by the hundreds of millions taken from the gravel deposits below its croppings and the millions on millions that have been taken and are still being taken from the lode itself at a few points—had the English such a gold belt anywhere, it would be all town from end to end and in every part would be filled with swarms of people. The Comstock was packed with people in the bonanza days, though the productive portion of the vein was only about two miles in length; the mother lode would make fifty Comstocks. It may be thought that paying mines can only be found in the few places where the lode is now being successfully worked, but the immense amounts of gold mined in the whole tier of counties through which the big vein runs shows that it sent down to the placers about as much gold in one place as in another. At the south end Tuolumne

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county has yielded about $220,000,000; Nevada county, toward the center, about $250,000,000; Sierra county, to the northward, about $200,000,000 and other counties in about the same proportion. These yields show that the great lode is alive and fertile through its whole course.

Outside of the main mineral belt of the mother lode are, in many places, independent systems of gold-bearing veins and many of these contain fine, paying mines. To the southward, in the southern counties, even in the desert regions, some wonderfully rich mines are being discovered and opened. In almost every part of California, in the mountains and foothills, gold-bearings quartz veins are found, and many of them constitute fine, paying properties.

To-day, a man may find any kind of mining he desires to engage in. Beginning with Placer county he may find big drift diggings all along up to Siskiyou, the ancient river channels beneath the lava-capped mountains, in many places, as Nevada, Sierra, Plumas and Trinity counties, being almost untouched. In Siskiyou, along the Klamath, are big hydraulic mines and also drift mines. Immense tracks of deep placer ground yet remain to be washed by hydraulic process, which is freely permitted along the Klamath. In this region are also fine paying veins of gold-bearing quartz. Many big foreign companies—French, English and German—are getting in here and buying up immense tracts of mining ground. They go for placer, drift, quartz—any kind of mines shown to be paying well.

In Siskiyou county is a region which this country should look after. It is an old lake basin which contains an auriferous conglomerate such as is found at the Rand in South Africa. The gold found in this formation is of the heavy, smooth variety, such as is obtained from the channels of the dead rivers. The deposit is very extensive. The western rim is seen to the east of the town of Yreka, and it has been traced north on that side a distance of twenty-five miles and there it enters what is known as the Cottonwood basin, in the southern part of Oregon. The conglomerate formation doubtless extends into the Cottonwood basin. The gold is found in a stratum of blue gravel which underlies the conglomerate. Parties who have examined this desposit say it is of the same character as that of the Rand. There is in this section of country a small system of lakes and it may be that the basin containing the auriferous conglomerate represents an ancient lake that was filled with lava-like material by some volcanic convulsion, the country being full of old cones and crates, or it may have been filled up by glacial action, as evidence of glacial erosion are abundant in all that region. Be this as it may, gold is gold wherever found, and here is evidently an immense [illegible] deposit that is worthy of critical examination by the best experts. We may have here at home a greater and richer golden basin than that which built up the big South African town of Johannesburg.



LEONARD LAKE IN MENDOCINO COUNTY.



CAMPING ON THE BANK OF THE SACRAMENTO RIVER.

## California Summer Scenery.

Our pictures suggest the season. One represents Leonard lake in Mendocino county, not very widely known out of its own region, but worthy to be described as the "daintiest of mountain mirrors." It belongs to the coast lake category—lakes hid among the hills and mountains of the Coast Range, with a beauty quite their own and quite distinct from the higher mountain lakes of the Sierra Nevada. Many California lakes are almost unknown to the State at large. The half dozen which the ordinary person can readily name are but a tithe of our lacustrine resources, which will come into greater prominence as the State advances in population. The joy of life beside a lake, mankind has known from the earliest times. In fact, some of the oldest relics of the race are from the prehistoric lake dwellings.

The other picture is demonstrative of the fact that California has not alone rivers of great volume, but of marked picturesqueness. Those who know only the lower stretches of our greatest rivers, where they flow sluggishly through marshes wide as the eye can reach, are prone to declare that California rivers have no beauty of bank nor of crystal flood. It is not in their debasement that our rivers are beautiful, for in such estate they are little more than deep, navigable canals; but higher up their banks are well defined, clad with delightful garb of tree and vine and shrub, and with sandy bars and shelving banks at short intervals which court the keel of the canoe and the foot of the bather. Higher still, in stretches of rocks and rapids, they tempt the most venturesome angler to the charming peril of his sport.

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THE industry of mining for the precious and superior metals is one of the earliest pursuits established by man, and in remotest periods, as at the present time, added much to the wealth and pleasure of many nations. It was not the masses, however, that profited then, as the operatives were mostly slaves and the beneficiaries were either of noble blood or enjoyed exceptional political advantages. The most extensive ancient mining of which there is any authentic record occurred 2,500 years ago. The mines were known as the Laurium, situated near Attica, Greece, and were actively worked for about 170 years, when the operations were brought to a sudden termination by the Peloponessian war, which afforded the slaves an opportunity to rebel and cease work. During the greater portion of the period that the mines were worked, it is estimated that 15,000 slaves were employed, some 2,000 shafts sunk averaging 250 feet in depth, and a product recovered in silver and lead, calculated at the present market value of these ores, of over $340,000,000. The mines were operated under control of and by the State.

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SOME queer reasons have been given for strikes, but the queerest is reported from England. A British trade union has refused to work with men who rode to their work on bicycles, on the ground that they have an unfair advantage in being able to work longer at the shop and get home at the same time as those who walk.—American Manufacturer.

### The American Steel Pool and Welsh Tin Plate Makers.

The news as to the American steel pool whereby the price of sheet and tin bars has been advanced $5.50 per ton, bringing up the price to $22.25 per ton, has been received with a good deal of comment by the Welsh tin plate makers, and some of their views upon the matter may not be uninteresting. They point out that American quotations for black plate have been advanced in sympathy with the advance in billets, and that this has brought forth the statement from American makers that thirty-five to forty tin plate factories will have to close, and it is further stated that $3 a ton on the price of billets is sufficient to enable Welsh makers to undersell Americans, and if the steel pool holds together long enough the Americans will tire running at a loss in the hope of better things. Before the operation of the steel pool the price of steel in Wales and America was nearly the same, but it is now estimated that the difference in the price of labor and billets will be equal to $5 a ton against the Americans. But the tariff on a full weight box of plates would be $24. Notwithstanding this, Mr. P. H. Loughman (one of the oldest tin plate makers) has expressed the opinion to the interviewers that if the steel pool should be a success it will not be ninety days until most of the American tin plate factories are closed. This gentleman, in the course of an interview, explains, what has often been asserted in Wales, that American makers are selling tin plates much under cost without knowing it. Speaking of himself, he said: "I have been in the rolling business for many years, and I know just what it costs to operate a mill. Men who have just started in the business have no knowledge of fixed expenses, and they can undersell me because I prefer to let my works stand idle rather than run at a loss. I have made practically no tin plates for nine months. I have sold as low as $3 36 a box. I was asked to deliver plates at $3.25; I declined, as I know that plates cannot be delivered from Wales for less than $3.40. When I make 6000 tons of plates a year, my fixed expenses are $6 a ton; if I do not do as much, they are more than that. By-and-by some will be sold out by the sheriff, and men of experience will buy their works at half what they cost. If the steel pool is a success, this will not take a deal of time. I bought steel billets to-day at $20." From the above showing the American tin plate trade may be said to be in desperates straits. What has been long felt in Wales is that if American plates were sold on a sound commercial basis, even with the tariff, Welsh plates would hold much of the market. One of the results of the steel pool will be to make business touch real bottom sooner. Thus its operations become a matter of paramount interest to South Wales.

The Welsh tin plate manufacturers are pointing out that Americans now claim to have ready for operation 172 mills, and sixteen more are said to be in course of construction. Seventeen new mills were completed last quarter of the total of 172 mills, thirty-four were reported to be idle, thus 138 mills were shown to be at work. This number of mills turning out the same proportion of work as is done in Welsh mills would produce at the rate of 3,874,400 boxes, or about one-half the largest number of plates imported from Wales in one year. From this showing it may be taken that Americans are able to supply themselves fully, except for plates used in the oil trade and packed exported tin goods, upon which rebate is allowed. Whilst the Americans claim to have 172 mills, they have no more than 179 tinning sets, and 2801 of these are said to have only been running from 40 to 75 per cent of their capacity. Thus it is seen that they have practically one tinning set to every mill. This is certainly a much lower proportion of sets to mills than prevails in Wales. Of course this may be explained by the production of black plates. But it may also be taken as circumstantial evidence that the make of the American mills does not average that of Welsh mills. That American plates are rapidly supplanting Welsh tin plates is clearly shown by the Board of Trade returns. The returns for the year 1895 showed that we sent to America the work of 170 mills, in January of this year the work of 117 mills, February the work of seventy-one, and March the work of eighty-nine mills. This goes far to prove that our trade with America has been largely supplanted. But the fact that thirty-four mills are idle is in itself a proof that matters are not much better in America than here, and the feeling in Wales is that at present it looks very much as if Americans, through their tariff legislation, have injured us without benefiting much by the trade which they have fostered at so much expenditure.—English Corr. American Manufacturer.

### Practical Experience With the Patio Process.

Where the climatic conditions allow of treating ores by amalgamation in the open yard the patio process by reason of the influence of the sun's heat the year round where the wages are low enough, as is generally the case in these regions, has certain advantages over amalgamation by pans for the extraction of silver alone, which may be stated thus: The quantity of pulp represented by a lot to be treated in a patio is generally between 300 and 500 tons sluiced out from the depot; such accumulated pulp at one time making a more uniform mass, both as to mixture of fineness, consistency, assay value and composition of the various characters of the ores similar to custom mills. The larger and longer contact with the air admits of oxidation of the iron in the pulp, especially where the mass would be in a dry state, not feasible in tanks as used in pan mills, the cost of wichh with the housing is excessive. The successive admixture of the materials according to the daily spoon and fire assays and according to the actual requirements of the lot in connection with the exact knowledge of quantity and values, proves more economical in itself and especially with regard to the loss of quicksilver, which could get floured only by gross carelessness. The more recent use of hyposulphites in part and in lieu of salt is a time-saver to one-fourth the former period employed in working, and the cost with the whole mass extended on a floor with cheap labor—less than divided up in pan charges of one to one and a half and two tons, kept in motion and having to be heated during most of the time required. It would take one hundred pans to treat, say, 200 tons daily, while with the patio there is no such trouble or any expense for a plant depending only on the crushing and grinding capacity. The principal advantage is the higher output of the silver contained in the pulp compared with that of the pans, dependent, however, on the character of ore. The proportion in time between one way and the other is as many days in the patio corresponding to so many hours in the pans. The dissolution and action of the chemicals in the former on the pulp may not only be regulated at will but abandoned to the influence of natural heat and just as desirable for the higher percentage of output of valuables in silver from the ore credited generally with five to ten per cent more, against which the interest means only a trifle on the capital. Where gold is associated with the silver it depends entirely on its character and previous saving as to what remains either by patio or pan process. For silver, where time and the natural heat does the work of steam and where labor is a small item all the year round, practice will be in favor of the patio compared to pans, which must be imported and put up at great cost of running partly because of the general want of fuel in those regions in high altitudes.

MAX KOELBL.

Guanajauto, Mexico, May 25, '96.

## Scientific Progress.

### The Modern Theory of Light.

By PROF. OLIVER J. LODGE.

We are living not in a Newtonian but at the beginning of a perhaps still greater era. Greater, not because any one man is probably greater than Newton, but because of the stupendousness of the problems now waiting to be solved. There are a dozen men of great magnitude, either now living or but recently deceased, to whom what we now know towards optical generalizations is in some measure due; and the epoch of complete development may hardly be seen by those now alive. It is proverbially rash to attempt prediction, but it seems to me that it may well take a period of fifty years for these great strides to be fully accomplished. If it does, and if progress goes on at anything like its present rate, the aspect of physical science bequeathed to the latter half of the century will indeed excite admiration, and, when the population are sufficiently educated to appreciate it, will form a worthy theme for poetry, for oratorios, and for great works of art.

To attempt to give any idea of the drift of progress in all directions, to attempt to explain the beginnings of the theories of elasticity and of matter, is not admissible. I will limit myself chiefly to giving some notion of what we have gained in knowledge concerning electricity, ether and light. Even that is far too much; I must confine myself principally to light, and only treat of the others as incidental to that.

For now well nigh a century we have had a wave theory of light; and a wave theory of light is quite certainly true. It is directly demonstrable that light consists of waves of some kind or other; and that these waves travel at a certain well-known velocity, seven times the circumference of the earth per second, taking eight minutes on the journey from the sun to the earth. This propagation in time of an undulatory disturbance necessarily involves a medium. If waves setting out from the sun exist in space eight minutes before striking our eye, there must necessarily be in space some medium in which they exist and which conveys them. Waves we cannot have unless they be waves in something.

No ordinary medium is competent to transmit waves at anything like the speed of light, hence the luminiferous medium must be a special kind of substance, and it is called the ether. The *luminiferous* ether it used to be called, because the conveyance of light was all it was then known to be capable of; but now that it is known to do a variety of other things also, the qualifying adjective may be dropped.

Wave motion in ether light certainly is; but what does one mean by the term wave? The popular notion is, I suppose, of something heaving up and down, or perhaps of something breaking on the shore in which it is possible to bathe. But if you ask a mathematician what he means by a wave, he will probably reply that the simplest wave is

$$y = a \sin (pt - n x)$$

and he might probably refuse to give any other answer.

And in refusing to give any other answer than this, or its equivalent in ordinary words, he is entirely justified; that is what is meant by the term wave, and nothing less general would be all-inclusive.

Translated into ordinary English the phrase signifies "disturbance periodic both in space and time." Anything thus doubly periodic is a wave; and all waves, whether in air as sound waves, or in ether as light waves, or on the surface of water as ocean waves, are comprehended in the definition.

What properties are essential to a medium capable of transmitting wave motion? Roughly we may say two: *elasticity* and *inertia*. Elasticity in some form, or some equivalent of it, in order to be able to store up energy and effect recoil; inertia, in order to enable the disturbed substance to overshoot the mark and oscillate beyond its place of equilibrium to and fro. Any medium possessing these two properties can transmit waves, and unless a medium possesses these properties in some form or other, or some equivalent for them, it may be said, with moderate security, to be incompetent to transmit waves. But if we make this latter statement one must be prepared to extend to the terms elasticity and inertia their very largest and broadest signification, so as to include any possible kind of restoring force, and any possible kind of persistence of motion respectively.

These matters may be illustrated in many ways, but perhaps a simple loaded lath, or spring in a vice will serve well enough. Pull aside one end, and its elasticity tends to make it recoil; let it go and its inertia causes it to overshoot its normal position; both causes together cause it to swing to and fro till its energy is exhausted. A regular series of such springs at equal intervals in space, set going at regular intervals of time one after the other, gives you at once a wave motion and appearance which the most casual observer must recognize as such. A series of pendulums will do just as well. Any wave-transmitting medium must similarly possess some form of elasticity and of inertia.

But now we proceed to ask what is this ether which, in the case of light, is thus vibrating? What corresponds to the elastic displacement and recoil of the spring or pendulum? What corresponds to the inertia whereby it overshoots its mark? Do we know these properties in the ether in any other way?

The answer, first given by Clerk Maxwell, and now reiterated and insisted on by experiments performed in every important laboratory in the world, is:

The elastic displacement corresponds to electro-static charge (roughly speaking, to electricity).

The inertia corresponds to magnetism.

This is the basis of the modern electro-magnetic theory of light. I will next illustrate electrically how this can be.

(*To be Continued.*)

A CURIOUS SUBJECT for investigation is proposed by T. L. Patterson, who contends that persons migrating from temperate lands to hot, or even from hot to temperate may become quickly and safely acclimatized by inoculation with the blood of healthy natives, the theory being that such inoculations set up in the blood of the foreigner the changes necessary to render him immune to diseases due to the climate. Blood-brotherhood, as practiced in central Africa, consists in drawing blood, from an incision in the right wrist, and smearing a little of it over a similar cut in each of the other participants. Europeans generally have evaded blood-brotherhood, so that little concerning its physiological effects is to be learned from past experience, but Stanley is said to have undergone the operation fifty times, causing Trumbull to declare that the blood of a fair proportion of all the first families in equatorial Africa now courses in Stanley's veins, and it is inferred that his endurance and success may in large measure be attributed to this exchange of blood with the natives. Britain has in this the means of working out new conquests in Africa. But to Gen. Weyler is given the grandest opportunity, for he may satisfy the demands of humanity by sparing Cuban captives as subjects of blood-brotherhood with Spanish soldiers and at the same time serve his followers and the cause of science by establishing the true way to outwit malaria and fever.

AN expert telegrapher says: "Between New York and Philadelphia, over a copper wire weighing 300 pounds to the mile, 3000 words per minute can be recorded, and with a copper wire of 850 pounds to the mile 1000 words per minute can be carried from New York to Chicago."

# Electrical Progress.

### Coal Mine Electric Plant.

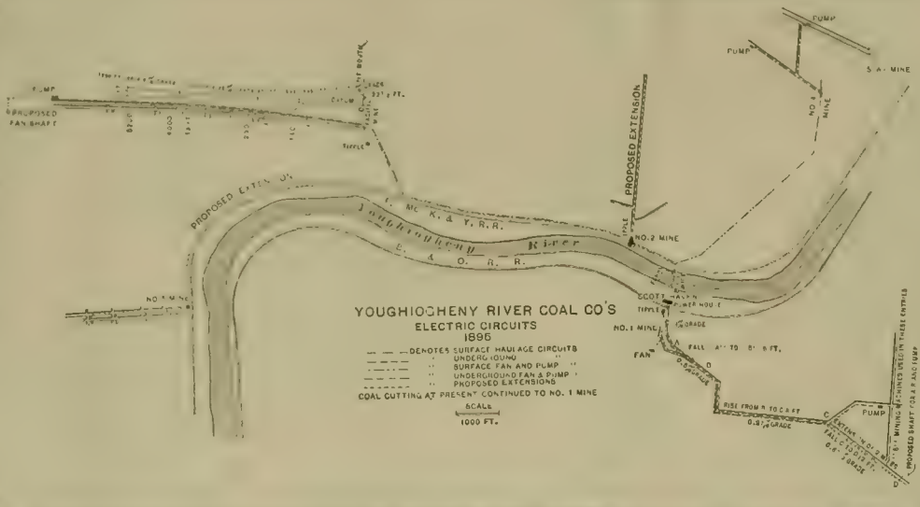
One of the most interesting electrically operated coal properties in the Pennsylvania field is that of the Youghiogheny River Coal Company at Scott Haven, Pa. The mines in which the different machines, driven by electric power, are installed are scattered over a large extent of territory, the map showing the different openings.

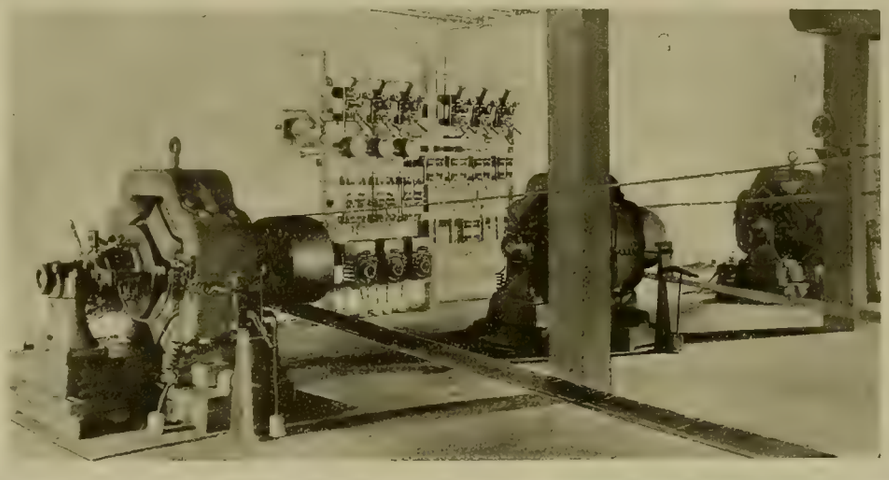
The power house is located on the east side of the Youghiogheny river, contiguous to the line of the B. & O. R. R. It was formerly a bonded warehouse and contains not only the machinery, but also the stores and offices.

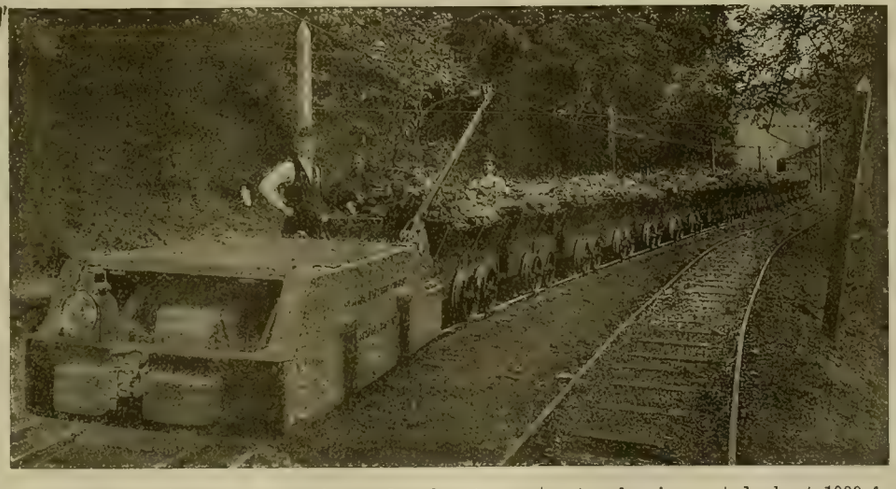
In the boiler house are three 66-inch x 18-feet tubular boilers, each containing fifty-eight four-inch tubes in diameter. Each boiler is coaled through a chute, is independent and has its own stack. Water is pumped from a well 130 feet deep, and that which is not immediately used is stored in tanks.

The engine room is 74 feet long by 54 feet wide and is separated by a brick wall from the power house. The engine installation consists of three automatic engines, each 15x16-inch, with 72-inch fly wheels running at 240 revolutions. Each engine is belted to a four-pole, 650-revolution, 100 K. W. general electric generator, wound for 500 volts and over compounded for 10% loss in the line. The engines and dynamos are erected on brick foundations. The current from the generators is carried under the floor to the switchboard over heavily insulated cables laid on porcelain insulators.

The switchboard is of the skeleton type, divided into two parts—one for the generators and one for the feeders—on a plan similar to that used in the ordinary electric railway stations. The generator board carries three automatic circuit breakers, three circular dial Weston ammeters, three main double-pole, double-throw switches and three field rheostats. The volt meter is carried on a bracket on the side. The arrangement of the switchboard is such that the plant may be run under the most economical conditions and every precaution is taken against stoppage in its operation. Two sets of circuits are run, one of which is grounded for haulage work and the other metallic for the fans, coal cutters, etc. Any machine may be run on either the metallic or the grounded circuit, and any two or all three may be run in multiple on either circuit. The feeder switchboard carries an automatic circuit breaker for each of the haulage circuits, a double-pole switch for each pump circuit, fan circuit and the coal-cutter circuit and a double-pole switch for throwing the metallic and grounded bus bars into multiple. Lightning arresters protecting the generators are placed behind the switchboard. From the power house the circuits for No. 1 mine are run on poles to the mine mouth. This mine is about 900 feet from the power house, and the circuit is used to drive fans, pumps, locomotives and coal cutters.





Mine No. 1 is provided with a triplex pump, 6½x8 inches, driven by a 7½ H. P. multipolar motor. The pump, motor and rheostat are mounted on an iron truck and may be run over the track from place to place in the mine.

The electric locomotive operated in this mine has a length of haul a little over a mile and a quarter. The grades vary from 1% against loads to .25% in their favor. The track is laid in thirty-pound rails, with a gauge of 43½ inches. The overhead construction is of the regular mining type. The pump and haulage circuits are all grounded.

In No. 4 and the Southwest mines, electricity is applied to pumping purposes only. The pumps are triplex pumps similar to those in No. 1 mine, and are driven by two multipolar slow-speed motors of 10 and 7½ H. P. respectively. These pumps are about 8000 feet away from the power house.

In the Pacific mine the haulage is effected by a locomotive, having a drawbar pull of 2500 pounds, with a length of haul of about 5000 feet underground and 800 feet in the open. This mine also contains a pump, similar in size to that in No. 1 mine, driven by a 7½ H. P. motor, located about 16,000 feet from the power house. A 30 H. P. motor fan is erected about 1000 feet beyond the pump. The installation of the electrical apparatus in No. 5 mine is not yet completed.

In the new steel tipple of No. 1 mine a 7½ H. P. motor drives a revolving screen and runs an emery wheel for sharpening bits, etc. The installation of electricity in this mine has proved of more than considerable benefit from every point of view. The two locomotives have displaced eighteen mules and their drivers.

The entire electrical apparatus used in the power house and in the mines, with the exception of the coal cutters, is of the General Electric Company's manufacture. This company has over fifty of its mining locomotives in operation in different mines in the country.

# Mechanical Progress.

### Acetylene, the New Light.

In electrical science, both ancient and modern, the present subject is the most important in its class. The value of acetylene as an agent in supplying both light and motive power was first made practical by Mr. Thomas L. Willson at Spray, North Carolina, while making some experiments with aluminum in an electrical furnace. This occurred in 1888. A mixture of burnt lime and coke dust were fused together between the poles of an electric arc. The mass, when cooled down, presented a brown crystalline compound, which was thrown away as refuse. By accident some water came in contact with the discarded slag, and immediately from this chemical affinity a gas was evolved, capable of producing a light of such intense brilliancy and power as to cast in shadow the electric arcs near by.

The elements which enter into the manufacture of acetylene are coal or coke dust, lime, water and electricity. Acetylene as a solid is known as calcium carbide. It contains in 100 parts 37.5 parts carbon and 62.5 parts calcium. One pound of carbide will generate 5.89 cubic feet of the gas; 100 pounds of calcium carbide and 56.25 pounds of water will produce 40.63 pounds of acetylene gas, in the ratio of 92.3 parts carbon and 7.7 parts hydrogen. Commercially considered, acetylene can be generated either directly from calcium carbide by being decomposed with water, or from the liquefied gas when stored in suitable receivers. The liquefied gas is manufactured commercially by decomposing the calcium carbide with water in a closed vessel and conducting the gas generated under pressure to a condenser where it liquefies and is then drawn off in tanks ready for use.

When in operation it burns with a clear white flame, odorless, as well as colorless. From burners of the same size the amount of oxygen withdrawn from the atmosphere of a room by acetylene, as compared with the ordinary city gas, is in the ratio of 1 to 6. Consequently, the new gas consumes only one-sixth as much of the oxygen in a room as coal gas, without rendering the air of the room impure to the same extent. In case of leak, it emits a pungent odor, which is easily detected. In temperature it is about the same as the electric light, and from recent tests stands at 900° Centigrade to 1400° Centigrade for the common gas light. Hence, acetylene has the advantage, as an illuminant, in throwing out much less heat than the ordinary gas light. In quality it is the most perfect light produced by human skill. In character like sunlight, since it emits the same light, proportionately, as the sun, therefore objects retain their natural color in its presence. No special knowledge is required for its use. An entire street in one of our large cities is already lighted by this gas. No main pipes are required for its distribution. A cylinder filled with the liquefied product is placed in the hollow of the lamp-post and connected by pipe with the burner. As an illuminant 1,000 cubic feet of acetylene is equivalent to 12,500 cubic feet of coal or water gas. Thus, the former (acetylene) is 12½ times as powerful as the common gas, and when burned at the rate of 5 cubic feet to the hour, is equivalent to 250 candles. As a solid in the form of carbide, it can be shipped long distances without impairment. As a gas it can be generated from carbide and applied accordingly. As a liquid, it can be utilized in the lighting of railway and streetcars, steamships and sailing craft, as well as bicycles and all other vehicles. For the isolated lighting of public and private buildings it stands unequaled.

As an example of cheapness it stands unique. At the present time it is manufactured at the low figure of $20 per ton. To quote from a reliable authority: "It is now thought that calcium carbide will eventually be produced at a cost not exceeding $5 per ton." To make the revolution most complete,

the old gas and electric light companies represented in the larger cities of the East are buying up the stock, while companies are forming everywhere, at home and abroad. Though it is chiefly as an illuminant that acetylene is heralded at the present hour, its capacity for caloric or motive power need not be overlooked. For cheapness, cleanliness and compactness it stands unexcelled by any known rival in the commercial world.

I. W. TUCKER.

413 Powell St., S. F., June 8, '96.

### Tin Smelting in Singapore.

Messrs. McKillop and Flower, at a recent meeting of the Institution of Civil Engineers, London, presented a paper giving an account of the first successful attempt of a European company to compete with the Chinese in smelting the alluvial tin ore of the Malay States, deposits of which had long formed the chief source of the metal. The works of the Straits Trading Company are situated on Pulo Brani Island, about three miles to the southwest of Singapore, and they cover an area of about eight acres. The greater part of the ore is bought in various parts of the native States and is shipped to Pulo Brani. The subsequent treatment of each parcel of ore, which is weighed on arrival, is determined by assay. The quality of the tin produced depends largely upon that of the ore smelted; and, in order to throw some part of the duty of eliminating the impurities upon the miner, the price of the ore is made to depend not only upon the amount of metallic tin it contains, but upon the nature of the impurities present, which consists chiefly of mispickel, copper pyrites and iron pyrites. Ores containing arsenic or sulphur are roasted at least once in a furnace of the "blind roaster" type, and those containing copper are allowed to stand for a considerable time between the roastings to allow the copper sulphate to drain off. The furnaces are of the ordinary reverberatory type. Their distinguishing feature is the method by which the difficulty accruing from the leakage of the molten metal has been overcome. A vault containing eight feet of water has been introduced below the bed of the furnace, and in it any tin which escapes is granulated and its further passage checked. The vault is pumped dry once a week, and the granulated metal recovered. The bed is of firebricks with ground faces, forced tightly together by screw-jacks to make the joints, and is carried by rails supported at their outer ends by the walls of the furnace and at their inner ends by a heavy iron rail placed longitudinally along the center line. The float into which the metal runs when the furnace is tapped is of wrought iron or steel lined with firebrick.

The metallurgical processes employed consist of: Smelting ore, with the production of rich slag and "ore metal;" smelting rich slag, with the production of poor slag, and "rough metal;" treatment of poor slag containing tin as prill; and refining the metallic products of the three first operations. For smelting ore the charge is made up by mixing it with about 14 per cent of culm or anthracite, about 3 per cent of refinery dross, and the time required for smelting is about eight hours. From a four-ton charge of such composition about 47 cwt. of metal, containing about 99½ per cent of tin and about 29 cwt. of rich slag, containing about 35 per cent of tin, would be obtained. Rich slag can be smelted with excess of scrap iron to produce "hard-head" and poor slag, or with culm and sufficient iron to decompose the tin silicate. A combination of these methods is also used, by which hard-head is first produced by excess of iron, and is subsequently smelted with more rich slag. The rough metal dross, containing iron oxide and tin oxide, resulting from the refining of the metal from slag, has to be worked up continuously. The rich slag is, therefore, smelted with culm and rough metal dross, producing rough metal and poor slag, or rough metal dross is used to replace hard-head in the second process. The authors urged the great need for improvement in tin smelting, perhaps the oldest and the most backward of English industries.

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AT the close of 1895 the Scientific Library of the United States Patent Office contained records of 981,961 patents issued by foreign countries, of which 647,600 are published in full with drawings, 178,150 in abstracts and 114,000 by title only. In the twenty-five years from 1871 to 1895 inclusive, the total number of United States patents rose from 98,460 to 531,619. Of the latter number, plows claim 10,342; cultivators, 10,334; threshing, 4260; tobacco, 2362; bleaching and dyeing, 1579; chemicals, 1203; medicines, 1357; surgical appliances, 3470; dentistry, 1351; railways, 9378; electric generation, 3117; electric railways, 2019; electric lighting, 3622; electric signalling, 1934; telegraphy, 3205; telephony, 2459; hoisting conveyors, 1235; hydraulic motors, 2642; baths and closets, 3481; filters, 1326; pipe couplings, 1470; air and gas engines, 1141; projectiles, 2127; firearms, 4469; pumps, 1196; stoves and furnaces, 18,972; grinding machines, 2718; artificial stone, 1198; paper-making, 3379; typewriters, 1204; spinning, 2379; sewing machines, 6214; wood-sawing, 4404; wood-working, 5675; horology, 3746; photography, 1545; railway brakes, 3061; car couplers, 6500; bicycles, 2621; ships, 2826; electric power, 1183; elevators, 1726. During the last twenty-five years twenty-five persons have been granted more than 100 patents each, or an aggregate of 4894. Thomas A. Edison received the highest number, 711; Elihu Thomson, 394; Francis H. Richards, 343; Edward Weston, 274; Charles E. Scribner, 248; Charles Van Depoele, 244; Rudolph M. Hunter, 228; George Westinghouse, Jr., 217.

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UNITED STATES CONSUL PARKER at Birmingham, England, has contributed to the State Department a special report on the remarkable development of business of making of steel tubing at that place, caused by the increase in the use of the bicycle. Incidentally he tells of a shrewd Yankee business transaction which has placed the British bicycle makers in a bad plight. The American manufacturers, foreseeing a great demand for wheels, not only purchased all of the stock of steel tubing on hand in England, but gave orders that engaged the output of many of the factories for a long time to come, so it happened when the "craze" struck England, the British bicycle makers found that they had been caught napping and were short of material. Immediately there was a rush to start up new steel tube plants, and so many have been projected that overproduction is feared in the end, but meanwhile there is a stringency. To show the extent of the increased export of this tubing to the United States, the consul says that while the entire export of 1894 was $85,899, that for the first quarter of this year amounts already to $231,200. Meanwhile there has been a great decrease in the exports of finished British bicycles to the United States, and their value has fallen from $478,810 in the first six months of 1893 to $90,968 for so much of the current year as has expired.

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ALEXANDER DECK, an English steel manufacturer, proposes to work steel in a new way and force it through a hole, instead of running it through grooved rollers. He recently described his process before the Iron and Steel Institute of Great Britain and claimed it to be a success. He uses a hydraulic press. The dies through which he forces the metal are made of steel, hardened by tungsten. The container is composed of concrete layers of steel and non-conducting material. The plunger or piston which exerts the pressure is smaller than the bore of the cylinder. In front of it is placed a block, fitting loosely and previously heated almost to the temperature of the charge. Between this block and the plastic metal is a thin elastic washer, that closes the crevice when pressure is exerted. Thus the soft metal is prevented from escaping otherwise than through the hole in the die.

## Practical Information.

### Rope and Belt Transmission of Power.

Repeated experiments have proven, in the transmission of power, ropes and belts, when well arranged, absorb almost the same amount of power. Some French trials, which have attracted attention, were made with a 200-horse power engine, fitted with rope and belt fly wheels 14¾ feet in diameter. The steam engine had a fly wheel for the belt and one for the ropes. The dynamo was driven direct off the fly wheel without a countershaft, and was provided with two pulleys, one for the belt and one for the ropes, and the dynamo was mounted on adjusting screws, so that the tension of the belt or ropes could be regulated at will. A cotton belt, a leather belt, a homogeneous leather belt and ropes were ordered from standard makers. Experiments were made alternately with ropes and belts, several tests each day.

The trials being comparative, and the double fly wheels allowing alternate runs with ropes and belts, it was assumed that the mechanical efficiencies of the engine and dynamo would not vary during the experiments. Greatest care was exercised to secure exact results. A set of indicator diagrams was taken every ten minutes. With a constant resistance the power expended in the several modes of transmission was as follows:

| | *Gross Power. I. H. P.* | *Slip per cent.* |
|---|---|---|
| Ropes | 158.54 | 0.33 |
| Cotton belt | 159.67 | 0.78 |
| Leather belt | 158.84 | 0.96 |
| Leather belt | 160.23 | 0.78 |

The diameters of the pulleys were measured at the surface and line of contact. Stated in percentage value, and allowing for the variation in the mean load, the results were:

| | *Gross Power.* | *Slip.* |
|---|---|---|
| Ropes | 100.00 | 0 100 |
| Cotton belt | 100.87 | 0.237 |
| Leather belt | 100.37 | 0.292 |
| Leather belt | 101.07 | 0.237 |

During the trials with ropes the tension gear was not used; but it was employed more or less throughout the belt trials, under the control of the belt makers, who regulated it as they pleased while running. The linear speed of the belts and ropes, and their tension per square inch of cross-section, were very nearly the same. Thus the linear speeds at the surface of contact with the pulley and the corresponding tensions were as follows:

Ropes ran at 66.9 feet per second under 156.5 pounds per square inch.

Cotton belt (Lechat) ran at 67.2 feet per second under 177.5 pounds per square inch.

Leather belt (Lemaire) ran at 67.1 feet per second under 133.5 pounds per square inch.

Leather belt (Domange) ran at 67.3 feet per second under 156.1 pounds per square inch.

The needle of the voltmeter was practically steady with the ropes, while with the belts it oscillated through one or two divisions Though sufficient at times to render the reading difficult, the oscillation did not cause any fluctuation in the light. As it coincided exactly with the passage of the belt joint over the pulley, it proves the importance of making good joints.—Engineering Mechanics.

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THE *American Machinist* has done the public a service in exposing the operations of parties operating from Cleveland, O., as headquarters and disposing of low-grade oils by crooked methods. The first exposure was made some time since; but it failed to put an end to the business. The oil sharps have simply invented new names for their supposititious companies, and sought customers in lines of business that had not been worked before. The plan of operation is as follows: A letter is sent to some mill or factory owner stating that they have a barrel or half barrel of oil in his neighborhood, shipped to some party who has been found to be unsafe, financially, and consequently the oil has not been delivered. Rather than have the oil reshipped to Cleveland, they make a temptingly low price. The oil comes (straight from Cleveland), and proves to be miserable stuff, not worth anything like the price paid for it. This old game is being worked with more or less success by a number of concerns, all doubtless mere aliases of one or two men, and because we have reason to believe that they are working the public. It will be well to ignore all offers of oil at a near-by station at cut prices. This dodge of oil at a low price to save reshipment has been practiced for at least fifteen years, at one time and another, and in different places.

### Procuring Water.

Water is produced in various ways in different parts of the globe. The explorer Condreau, for instance, found some time ago, while wandering among the Tumuc-Humac mountains, in the western part of Guiana, that it was not necessary for his men to descend to a creek when they wanted a drink of water. A vine known as the water vine is found all through that region. It yields an abundant supply of excellent drinking fluid whenever it is called upon. This vine grows to a height of from sixty to ninety feet. It is usually about as thick as the upper part of the human arm. It winds loosely about trees, clambers up to their summits, and then falls down perpendicularly to the ground, where it takes root again. The natives cut this vine off at the ground and then, at a height of about six or seven feet, they cut it again, which leaves in their hands a very stout piece of wood a little longer than themselves. In order to obtain the sap they raise the lower end of the vine upon some support and apply the upper end to their mouths.

Six feet of the vine give about a pint of water, which quenches thirst as effectively as water from the most refreshing brook. The bushmen in the Kalahari desert often live scores of miles from places where water comes to the surface. During a certain part of the year sharp storms pass over the Kalahari, covering the apparently arid region with the brightest of verdure and filling, for a few short days, the water courses with roaring torrents. The bushmen know how to find water by digging in the bottoms of these dried-up river beds. They dig a hole three or four feet deep and then tie a sponge to the end of a hollow reed. The sponge absorbs the moisture at the bottom of the hole, and the natives draw it into their mouths through the reed, and then empty it into calabashes for future use. In that enormous waste known as the Gobi desert, north of China, showers sometimes fall during the summer, and the torrents of a day fill the dried-up watercourses, through which water seldom runs. It is in these channels that the Mongols dig their wells, expecting to find a little water, when upon the surface of the plateau itself the soil has lost all traces of humidity. It is owing to the fact that a part of the moisture falling during a few rainy days is thus preserved within reach that it is possible for caravans to cross the desert.

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ARCTIC EXPLORER ANDREE has left Gothenburg, Sweden, on his steamer Virgo for the North Pole. He proposes to land on one of the northern isles in the Spitzbergen group, build a small house, make hydrogen gas, inflate his balloon, supply his car with several months' rations and some scientific instruments and charts, and, when the wind favors, start. He expects that within forty hours he will have reached the Pole, 650 or 700 miles away.

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THE census of London, just taken, shows a population of 4,411,271, an increase of 200,528 since 1891.

# CALIFORNIA MINES AND MINERS.*

## Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from issue of May 30th.

### MERCED COUNTY.

| NAME OF MINE. | Character of Mine | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| Bowman Wells | Water. | | 12 m S W of Merced | Silas Bowman, Owner | Merced |
| Bliss Ranch Wells | " | | 12 m S W of Merced | — Bliss | Merced |
| Crocker-Hoffman Can'l | " | 6 | E of Merced | Chas. D. Martin, Supt | Merced |
| Craff, Wm., Well | " | | 12 m S of Merced | Wm. Craff, Own | Merced |
| Collins, Wm., Well | " | | 7 m S of Merced | Wm. Collins, Own | Merced |
| Crew's Well | " | | 17 m S of Modesto | Wm. Crew, Own | Modesto |
| Dos Palos Artesian | " | | Dos Palos | Miller & Lux, Own | S. F. |
| Hess Artesian | " | | 12 m S of Merced | Henry Hess, Own. | San Diego |
| Howell's Well | " | | 9 m S of Merced | Stephen Howell, Own | Merced |
| Hall's Well | " | | 16 m S of Modesto | W. W. Hall, Own | Merced |
| Los Banos Artesian | " | 1 | Los Banos | H. G. Tanner, Supt. | Los Banos |
| Lewis, John, Artesian | " | | 10 m S W of Merced | Jno. Lewis, Own | Merced |
| Lewis, J. D., Artesian | " | | 12 m S W of Merced | J. D. Lewis, Own | Merced |
| Madera Canal | " | | | | |
| Newman's Art'n Well | " | | 4 m E of Volta | Simon Newman, Own | Volta |
| Newman's Art'n Well | " | | Near Ingomar | Simon Newman, Own | Merced |
| Outside Canal | " | | N side San Joaquin river | Miller & Lux (Not yet constructed). | |
| Oulds' Artesian | " | | 4 m S W of Merced | Crocker-Hoffman L. & W. Co.; E. Oulds, Supt | Merced |
| P. Johnson Art'n Well | " | | 4 m N of Volta | Peter Jackson, Own | Volta |
| Pastoral and Agricultural Canal Co. | " | | 15 m S of Merced | D. Menzies, Pres | S. F. |
| Page's Wells | " | | 10½ m N of Gastin Stat'n | Timothy Page, Own | Newman |
| Rightmire's Artesian | " | | 16 m S of Merced | Mrs. Rightmire, Own. | Merced |
| Rodener's Artesian | " | | 6 m S W of Merced | John Rodener, Own | Merced |
| Rhileigh's, M., Art'n. | " | | 6 m S W of Merced | Mike Rhileigh, Own | Merced |
| Reynold's Artesian | " | | 15 m S W of Merced | H. E. Reynolds, Own. | Merced |
| Russell Artesian | " | | 6 m S W of Merced | Crocker-Hoffman W. Co., Own. | Merced |
| San Joaquin & Kings River Canal | " | | W side San Joaquin river | D. M. Rouse, Supt | Los Banos |
| Stephens & Mitchell Canal | " | | W of Merced | Stephens & Mitchell, Own. | Merced |
| Saunders', J. J., Well. | " | | 8 m W of Merced | J. J. Saunders, Own | Merced |
| Smith, August, Well. | " | | 8 m S of Merced | August Smith, Own | Merced |
| Stephenson's Well | " | | 20 m W of Merced | J. J. Stephenson, Own | Merced |
| Smith, C. C., Well | " | | 6 m S of Merced | C. C. Smith, Own | Merced |
| Tilliff's Wells | " | | 7 m S of Merced | Frank Tilliff, Own. | Merced |
| Twitchell, Mrs., Wells | " | | 8 m S of Merced | Mrs. W. Twitchell, O'n | Alameda |

### NAPA COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Ætna | Quicksilver. | 130 | 13 m S of Middletown | B. M. Newcomb, Supt | Oat Hill |
| Buthenia | " | | 12 m E of Rutherford | S. H. Delmater, Owner | Chile |
| Griffiths Mine | Gold. | 3 | 17 m N E of Napa | Ed Griffiths and M. Silva, Own. | Napa |
| Gardner | | 2 | 10 m E of Napa | Geo. Graham, Own | Napa |
| Howell Mt | Quarry | 2 | 3 m S of St. Helena | E. F. Hall, Own | St. Helena |
| Mountain View | Silver. | | 2½ m N of Calistoga | Dr. W. D. Smith, Own | Calistoga |
| Manuel | Trachyte. | 2 | 2 m S of Napa | A. Manuel, Own. | Napa |
| Manhattan | Quicksilver. | 25 | 18 m S E of Lower Lake | | |
| Newman | Trachyte quar'y. | | 4 m N E of Napa | Newman & Wing, Own. | Napa |
| Napa Mine | Quicksilver. | 130 | 9 m S E of Middletown | Napa Con. Q. S. Co., O'n | Oat Hill |
| Oakville | | 1 | 1½ m S of Rutherford | Bella Q. S. M. Co., Own | Napa |
| Olsen | Basalt. | | 2 m N E of Napa | J. Olsen, Own | Napa |
| Paint Mine | | | 5 m N E of Pasadero | Isaac Gray, Own | Healdsburg |
| Palisade | Silver. | | 2½ m N E of Calistoga | Grigsby & Johnstone, Own. | |
| Redington | Quicksilver. | 30 | 18 m N E of Middletown | A. McMillan, Own | Knoxville |
| Snowflake | Magnesite. | 20 | 10 m S of Rutherford | S. Bartlett, Own | St. Helena |
| Summit | Quicksilver. | | 3 m S W of Rutherford | Bella Union M. Co. O'n | St. Helena |
| Silverado | Silver. | | 5 m N of Calistoga | A. Badden, Own | 513 Market, S. F. |
| Salmina | Trachyte. | 2 | 7 m N E of Napa | Frank Salmina, Own. | Napa |

### NEVADA COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Alpine Mine | Gold. | 2 | 2 m E of Nevada City | Mess. Morgan et al, Owner. | Nevada City |
| Arcata | " | 2 | 7 m N E of Washington | O. Helzeren et al, Own | Eureka P. O. |
| Atalanta | " | 1 | 1½ m S E of Eureka | G. O'Rourke, Own | Eureka P. O. |
| Big Ravine | " | 1 | 5½ m N W of Nevada City | T. P. Kirkham, Own. | Nevada City |
| Brunswick Con | " | 15 | 2½ m S E of Grass Valley | T. Niler, Supt | Nevada City |
| Bullion Con | " | 11 | 2½ m S of Grass Valley | W. B. Fowler, Supt | Grass Valley |
| Buckeye | " | 2 | 3 m N E of Nevada City | F. B. Gray, Own | Nevada City |
| Blue Jay | " | 5 | 5 m N E of Washington | M. H. Baugh et al, O'n | Washington |
| Champion Con | " | 125 | 1 m W of Nevada City | F. Beitler, Supt | Nevada City |
| Cadmus | " | 11 | 1½ m W of Nevada City | C. Kahl, Supt | Nevada City |
| California | " | 8 | 1 m W of Nevada City | Heirs of Allen, Own | Nevada City |
| Canada Con | " | | 1½ m S E of Nevada City | G. C. Gaylord, Own | Nevada City |
| Coon Mine | " | | 3 m W of Nevada City | M. Coon et al, Own | Nevada City |
| Centennial (Formerly Wide Awake) | Gold quartz. | Idle. | 3 m S E of Grass Valley | | |
| Centennial | Gold. | 2 | 7 m N E of Washington | Moncot & Nelson, O'n | Washington |
| Central Drift | " | 7 | 10 m N E of Nevada City | — Fold, Own | Nevada City |
| Central & Gray Eagle | " | | 5 m N E of Washington | Tierman & Richards, Own. | Nevada City |
| California | " | 16 | 6 m N E of Washington | D. Harmon, Supt | Washington |
| Crown Point | " | 18 | At Grass Valley | M. Chambrey, Supt | Grass Valley |
| Deadwood | " | | 2½ m E of Nevada City | J. J. Lyons, Own | Nevada City |
| Daisy Hill Mine | Gold quartz. | Idle. | 3 m S of Grass Valley | C. Kingsley et al, Own | S. F. |
| Electrical M'g Co | " | 2 | 3 m S of Grass Valley | D. Coughlan, Supt | Grass Valley |
| Eagle M. Co | Gold. | 19 | Relief Hill | R. H. Penrose, Supt | Relief Hill |
| Eagle Bird | " | 6 | 6 m N E of Washington | C. A. Lilly, Supt | Maybert |
| Federal Loan | " | 12 | 4 m E of Nevada City | J. Vincent, Supt | Nevada City |
| Forest Mine | " | 4 | 3 m W of Nevada City | W. Green and R. Hughes, Own. | Nevada City |
| Friendly Peace | " | 1 | Maybert | H. W. Cole, Own | Maybert |
| Fountain Head | " | | 3 m N E of Nevada City | Incorporated Co | Nevada City |
| Gold Tunnel Co | " | 4 | ¼ m W of Nevada City | A. D. Allen, Own | Nevada City |
| Glencoe | " | 2 | 2 m S E of Nevada City | Nevens & Sharp, Own | Nevada City |
| Gold Flat | " | | 1 m S of Nevada City | J. Kerves, Supt | Grass Valley |
| Granite Hill M. & D. Co | " | 32 | Near Grass Valley | T. F. Phillips, Supt | Grass Valley |
| Giant King | " | 2 | 1½ m S of Washington | M. L. Williamson, Own | Washington |
| Gleason | " | 2 | 1½ m S E of Graniteville | F. M. Carter et al, O'n | Eureka |
| Greystone | " | 2 | 5 m S W of Graniteville | Brander & Woodward, Own. | Graniteville |
| Gold Point | " | | 2 m E of Grass Valley | Incorporated Co | Grass Valley |
| German | " | 10 | 2½ m E of Washington | W. D. Cooley, Supt | Washington |
| Home Mine | " | 8 | 1½ m W of Nevada City | C. Kahl, Supt | Nevada City |
| Harmony Gravel | " | 56 | 2½ m N E of Nevada City | J. C. Hathersall, Supt | Nevada City |
| Imperial Paint and Copper Co | | 7 | Spencerville | Otto Woehler, Supt | Spencerville |
| Independence | Gold. | 10 | 2½ m E of Grass Valley | A. Cheranne et al, O'n | Grass Valley |
| Jackson Mine | Gold & copper. | 2 | 2½ m N E of Spencerville | — Jackson, Own | Spencerville |
| Jessie Con | Gold. | | 3 m E of Nevada City | P. Tautpheous, Own. | S. F. |
| Joseph Warren | " | 2 | 1½ m N E of Nevada City | Jacobs & Treadwell, Own. | Nevada City |
| Knickerbocker | " | 4 | 1 m W of Nevada City | L. D. Craig et al, Own | Nevada City |
| Kirkham | " | 1 | 2 m N W of Nevada City | T. P. Kirkham, Own | Nevada City |
| Lone Ridge | " | 2 | 5½ m N W of Nevada City | Kirkham Bros., Own | Nevada City |
| Lone Star | " | 5 | 1½ m E of Nevada City | A. W. Blundell, Supt | Nevada City |

—* Begun in issue of April 25, '96.

### NEVADA COUNTY—Continued.

| NAME OF MINE. | Character of Mine | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| La Belle | Gold. | 5 | 3½ m E of Nevada City | J. J. Lyons and L. Postelwaite, Owner | Nevada City |
| La Marque | " | 10 | 2 m S of Grass Valley | A. Walterman, Supt | Grass Valley |
| Last Chance | " | 4 | 2 m S of Maybert | Parsons, West & Co, O'n | Maybert |
| Lindsay | " | 4 | 5 m N E of Washington | — Tully, Supt | Maybert |
| La Grada | " | 3 | 5 m N E of Washington | W. H. Meade, Own | Washington |
| Mt. George Mine | " | 6 | 3 m W of Nevada City | Kidder & Feitler, Own | Nevada City |
| Mineral Hill | " | 8 | 2½ m N E of Spencerville | C. C. Hitner, Supt | Spencerville |
| Mountaineer Mine | " | 30 | 1 m W of Nevada City | W. A. Dennis, Supt | Nevada City |
| Mayflower Mine | " | 55 | 2 m E of Nevada City | E. A. Davis, Supt | Nevada City |
| Murphy & Grover Drift | " | 3 | ¾ m N W of Nevada City | Murphy & Co., Own | Nevada City |
| Mount Auburn | " | | 1½ m W of Nevada City | T. Snell, Own | New York City |
| Manzanita | " | | Near Nevada City | E. A. Tompkins, Supt | B. F. Snell, Sec'y, Nevada City |
| Mountain | " | | 3 m S of Nevada City | J. Garner, Own | Nevada City |
| Muller & Walling Mi'e | Gold quartz | Idle. | 1½ m W of Nevada City | Muller & Walling, Own | Nevada City |
| Mistletoe Mine | " | 2 | 1 m NW of Rough & Ready | C. J. Graham, Supt | Rough & Ready |
| Maloney & Finch | Gold. | 2 | 6 m S E of Graniteville | C. Maloney & Finch, O'n | Graniteville |
| Metropolitan | " | 1 | 1 m N of Moore's Flat | G. Abraham, Own | Moore's Flat |
| Mohican | " | | 1½ m S of Nevada City | J. S. Kerver, Own | Grass Valley |
| Mineral King | " | | 1¼ m N E of Nevada City | J. G. Jacobs et al, O'n | E. Treadwell |
| Massachusetts | " | 40 | 1 m S of Grass Valley | C. E. Foote, Supt | Grass Valley |
| Mountain View | " | | 7 m E of Washington | C. O. Anderson, Own | Washington |
| Nevada City Electric Power Co | | 10 | ¼ m from Pendar's Bridge | E. Sabla Jr., Supt | Nevada City |
| Niagara | Gold. | 2 | 1 m E of Nevada City | A. Durbin & Co., Own | Nevada City |
| New Pittsburg | " | 15 | 1½ m S of Nevada City | T. J. Finbee, Supt | Grass Valley |
| Never Sweat | " | 4 | 2½ m E of Nevada City | J. Lyons, Own | Nevada City |
| North Banner | " | 7 | 3½ m S E of Nevada City | G. Malnhart, Supt | Grass Valley |
| New Providence | " | 2 | 4 m N of Nevada City | E. D. Dean et al, Own | Nevada City |
| Norway | " | 2 | 7 m N E of Washington | Marcot & Nelson, Own | Washington |
| National | " | 3 | 1½ m S E of Graniteville | — McKilligan, Own | Graniteville |
| Nerambagua | " | 21 | 3½ m S of Grass Valley | H. Campbell, Own | Grass Valley |
| North Star | " | 142 | 2 S of Grass Valley | P. C. Roberts, Supt | Grass Valley |
| Nevada Co. Red. W'ks | " | 4 | 1½ m E of Grass Valley | A. Waltman, Supt | Grass Valley |
| North Star | " | | 5 m N E of Washington | H Kohler, Own | Washington |
| Orleans Mine | " | 2 | 2 m W of Nevada City | J. Richards, Supt | Grass Valley |
| Oro Grande | " | 9 | 5½ m NW of Nevada City | S. F. Murchio, Supt | Nevada City |
| Osceola Mine | Gold quartz. | Idle. | 1 m S of Rough & Ready | Moody & Gayety, Own | Gold Run |
| Orleans Mine | " | 10 | 1¼ m S E of Grass Valley | C. A. Brockington. Supt | Grass Valley |
| Osborne Hill Mine | | Idle. | 3 m S E of Grass Valley | | |
| Providence | Gold. | 104 | 1 m W of Nevada City | W. McKinlay, Supt | Nevada City |
| Pioneer Red. Co. | Gold & copper. | 12 | 3¼ m S of Nevada City | B. Hall, Supt | Nevada City |
| Pine Grove Quarry | Gr'n'te | 2 | ½ m E of Nevada City | E. D. Bridges, Own | Nevada City |
| Red Hill (L't'd.) | Gold. | 8 | 2 m W of Nevada City | Geo. A. Treadwell, Sup | Nevada City |
| Reward | " | 15 | 1 m S W of Nevada City | J. F. Gribble, Supt | Nevada City |
| Red Hill Specimen M | " | 2 | 1¼ m W of Nevada City | A. Muller, Own | Nevada City |
| Ragon Grand Mine | " | 18 | 3 m W of Nevada City | — Jacobs, Supt | Nevada City |
| Rising Sun | " | | 5 m N'E'of Washington | Rising Sun | Washington |
| Rocky Bar | " | 6 | ½ m E of Washington | J. O. & E. A. Hayes, Own | Washington |
| South Yuba Water Co. | | 35 | | J. Spaulding, Supt | Auburn |
| Stanford Mine | Gold. | 12 | 4 m W of Nevada City | — Curry, Supt | Nevada City |
| Sebastopol | Gold quartz. | Idle. | 2¾ m S E of Grass Valley | J. Benallack, S. Granger & J. Watts, Own. | Grass Valley |
| Sleeping Beauty | Gold. | 2 | 3 m N E of Moore's Flat | Banders & Vizzard, O'n | Moore's Flat |
| State Ledge | " | 9 | 5 m S of Grass Valley | A. F. Perrin, Supt | Grass Valley |
| Spanish Mine | " | 20 | 3 m E of Washington | D. Johnson, Supt | Washington |
| Sirius | " | | 7 m E of Washington | C. O. Anderson et al, On | Washington |
| Surprise | " | 3 | 11 m N E of Nevada City | Jud. Caldwell et al, On | Nevada City |
| The Belle Fontaine | " | | 3 m E of Nevada City | W. J. Smith et al, Own | Nevada City |
| The Monarch and Central Pacific | Gold quartz. | 3 | 1 m N of Rough & Ready | J. J. Lyons, Supt | Rough & Ready |
| The Forlorn Hope | " | 1 | 2½ m N of Rough & Ready | W W Chamberlain, Spt | Smartsville |
| Twin Sisters | Gold. | 2 | 2 m S of Eureka | J. Holligan et al, Own | Eureka |
| The Dillon | " | 7 | 1 m S E of Graniteville | Foley & Hibbarb, Own | Eureka |
| The Culbertson | " | 20 | 2 m W of Graniteville | D. Moore, Own | Eureka |
| Union Quartz | " | | 3 m E of Nevada City | G. Nihel, Supt | Nevada City |
| Unison | " | 27 | Relief Hill | — Jepson, Own | Relief Hill |
| White Wings | " | 4 | 6 m N W of Nevada City | C. Moody & Part's, Own | Nevada City |
| Willow Valley | " | | 3 m E of Nevada City | G. W. Welch, Own | S. F. |
| Wisconsin-Illinois | " | | 4 m S of Grass Valley | J. M. Lakeman, Own | Grass Valley |
| Waykeshaw | " | 10 | Relief Hill | J. R. Jones et al, Own | Relief Hill |
| Yellow Diamond | " | | 4 m W of Nevada City | A. F. Derington, Own | Washington City |

### PLACER COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Ackerman | Quartz | | Bowman | B. Berry, Supt | Auburn |
| Alta | Drift. | | Alta | J. E. Doolittle, Supt | Towles |
| American Bar | Quartz | 15 | 2 m S of Michigan Bluff | J. McCall, Supt | Michigan Bluff |
| Barton | Drift. | | 2 m E of Rocklin | O. L. Barton, Supt | Westville |
| Bald Mountain | | | 17 m NE of Michigan Bluff | F. W. Venzke & Co, Own | Westville |
| Bellevue | Quartz | | Ophir | Edw. Tremelling, Own | Ophir |
| Big Channel Con | Drift. | 4 | 7 m S W of Forest Hill | A. Clark, Own | Forest Hill |
| Bigelow | " | 4 | 9 m NE of Michigan Bluff | J. Abram, Own | Michigan Bluff |
| Bishop | " | 4 | Last Chance | A. J. Bishop, Own | Michigan Bluff |
| Blackhawk | Quartz | 20 | 6 m E of Towles | | Fowler |
| Black Oak | | 20 | 3 m S of Weimer | J. T. Judd, Supt | Weimer |
| Bowen | Drift. | 4 | 3 m N of Michigan Bluff | F. A. Bowen, Own | Michigan Bluff |
| Boulder | Quartz | 12 | Ophir | C. Handy, Supt | Ophir |
| Bacarat | Gravel | 4 | 3¼ m S E of Lincoln | A. V. Oliver, Supt | Lincoln |
| Burlins & Temple | Quarry | 5 | 2½ m N E of Lincoln | Wm. Burlin, Supt | Lincoln |
| Borghese, The | " | 3 | 2 m N E of Lincoln | C. Borghese, Supt | Lincoln |
| Burns, The | " | 5 | 3 m N E of Lincoln | M. Burns, Supt | Lincoln |
| Black Rock | " | | 1¼ m S E of Penryn | L. Griffith, Own | Penryn |
| Calf Pasture | Quartz | 12 | 2 m N of Auburn | B. Berry, Supt | Auburn |
| California | " | | 1 m S of Auburn | W. J. W. Hubbell, Own | Auburn |
| California | " | | Ophir | Wm. Pellow, Own | Ophir |
| Cedar Creek | Hyd'l'c | | Dutch Flat | J. E. Doolittle, Supt | Towles |
| Chicago | Drift. | 6 | 2 m E of Newcastle | G. L. Threlkel, Supt | Newcastle |
| Christmas Hill | Hyd'l'c | 4 | ½ m S E of Butcher Ranch | E. W. Gilbert, Supt | Butcher Ranch |
| Columbia Con | Quartz | | 2 m N W of Ophir | B. F. Harley, Supt | Auburn |
| Cranage-Small Hopes | Drift. | 6 | 2 m N W of Forest Hill | W. Cranage, Supt | Forest Hill |
| Copp's | Quarry | 18 | ½ m S E of Rocklin | R. H. Copp, Own | Rocklin |
| Carlow Bros | " | 6 | ¾ m E of Loomis | A. W. Turner, Supt | Loomis |
| Dam | Drift. | | 1 m N of Sunny South | Harold Power, Supt | Sunny South |
| Dardanelles | " | | 1 m S W of Forest Hill | L. L. Chamberlain, O'n | Auburn |
| Decker | Quartz | 4 | 1½ m E of Newcastle | Jas. Butts, Own | Newcastle |
| Drummond | " | | 8 m S E of Iowa Hill | C. T. Reed, Own | Auburn |
| Dunn | Quarry | 3 | Rocklin | D. Dunn & Co., Own | Rocklin |
| Dorer | Quartz | | 5 m E of Towles | E. A. Frenzel, Supt | Towles |
| El Dorado | Drift. | | Last Chance | G. T. Ray, Own | Michigan Bluff |
| Erie | River bed. | | 4 m N of Colfax | J. Morgan, Sec'y | Auburn |
| Eureka Con | Drift. | 20 | 2 m S E of Damascus | F. Chappelet Jr., Supt | Forest Hill |
| Eureka | Quarry | 12 | ½ m E of Rocklin | J. P. Allen, Own | Rocklin |
| Eclipse Con | Quartz | 2 | 3 m S of Westville | F. Schultz, Supt | Westville |
| Eclipse | " | | Ophir | | Ophir |
| Franklin | Drift. | | 3 m N of Michigan Bluff | A. Dixon, Own | Michigan Bluff |
| Fletcher | Quarry | 10 | Rocklin | Levi Fletcher, Own | Rocklin |
| Gold Blossom | Quartz | | 1 m N W of Ophir | C. F. Reed, Own | Auburn |
| Golden Gate | Drift. | | ¼ m E of Iowa Hill | S. M. Sprague, Supt | Iowa Hill |
| Golden Nugget Con | " | | 4 m N E of Westville | F. Howell, Supt | Forest Hill |
| Gold Run D. & M. Co | Hyd'l'c | | Gold Run | J. E. Gould, Supt | Dutch Flat |
| Good Easter | Quartz | | ½ m N of Ophir | Otto Walter, Own | Ophir |
| Gould | Drift. | | 3 m N E of Iowa Hill | Willis Gould, Own | Iowa Hill |
| Gray Eagle | " | 25 | 5 m S E of Forest Hill | T. G. Durning, Supt | Butcher Ranch |
| Green | Quartz | | 1 m N of Ophir | E. W. Chapman, Supt | Auburn |
| Gray Eagle | Drift. | 4 | 15 m NE of Michigan Bluff | Fred Hoffman, Supt | Forest Hill |
| Gladding, The | Quarry | 6 | Lincoln | G. R. Chambers, Supt | S. F. |
| Grimes, The | " | 7 | 2 m E of Lincoln | Amos Grimes, Own | Lincoln |
| Griffith, The | " | | ½ m E of Penryn | D. Griffith, Own | Penryn |
| Golden West | Quartz | 2 | 6 m E of Blue Canyon | Smith Bros, in charge | Blue Canyon |
| Gold Ring | Drift. | | 3 m S E of Towles | — Ames, Supt | Towles |
| Haskell Con | " | 12 | 2 m S of Auburn | Harold Power, Supt | Auburn |
| Hathaway | Quartz | | Ophir | | Ophir |
| Herman | " | 20 | 2½ m S of Westville | O. L. Barton, Supt | Westville |
| Hermit | Drift. | | 3 m N of Michigan Bluff | J. Gould, Own | Michigan Bluff |
| Hidden Treasure Con | | 200 | Sunny South | Harold Power, Supt | Sunny South |
| Homeward Bound | Hyd'l'c | | 1 m S E of Iowa Hill | A. Rossi, Own | Iowa Hill |
| Hoorman | Drift. | 45 | 2 m S E of Iowa Hill | — Blood, Supt | Iowa Hill |
| Hoosier Bar | River bed. | | 8 m E of Auburn | Frank Bell & Co., Own | Auburn |
| Horseshoe Bar Con | " | 6 | 3 m S of Michigan Bluff | Wm. Muir, Supt | Michigan Bluff |
| Hytimen & Wickman | Quarry | 4 | ¾ m S of Rocklin | Hytimen & Wick'n, O'n | Rocklin |
| Hoyt's | " | 10 | Rocklin | Howard Hoyt | Rocklin |
| I. X. L., The | " | 4 | 2 m E of Lincoln | T. H. Jeter, Own | Lincoln |

(To Be Continued.)

# Mining Summary.

## CALIFORNIA.

### Amador.

*Republican:* On the Bellwether work was started last Monday. The point selected for the shaft is 1400 feet north of the old shaft and about 1100 feet south of the north boundary of the combined Bellwether and White claims, which are owned by the present company. The shaft will be sunk about 40 feet west of the lode line and will follow the incline of the lege as near as it can be ascertained. It is to be a three-compartment shaft and will be put down as fast as possible. Mr. Adams, the superintendent, accompanied by the foreman of the mine, went to the eastern part of the county Wednesday to look at an engine and boiler, with a view to its purchase if suitable. If found unsuitable for the work, it is the intention to get one from San Francisco. With three shifts per day, it is expected to sink nearly 100 feet per month. A depth of at least 500 feet is to be reached before any crosscutting is done.

The South Spring Hill Consolidated group consists of the South Spring Hill, the Talisman and the Median mines. This week a fine body of ore was encountered within the boundaries of the Median ground, but a distance of 400 or 500 feet from the point at where they have heretofore been extracting quartz from that mine. It is the intention of the company to sink the old South Spring Hill shaft to a considerably greater depth without delay.

The bond on the Loyal Lead mine near Drytown has been forfeited by non-payment of first installment.

Operations at the Amador Queen mine were suspended for a few days last week, on account of awaiting advices from the head office in London. Mr. Dye is the local manager.

The Alma shaft has reached a depth of 670 feet. The slate was entered this week, indicating a near approach to the ledge. Sinking will be continued until a depth of 1,000 feet is attained.

The shaft of the Argonaut has passed the quarter-mile mark, 1,320 feet. It is still in soft gouge.

*Dispatch:* Near Riverside Park the Belden, or Contention, mining shaft, under the foremanship of Mr. F. H. Murry, is 100 feet deep.

The Wallace mine, which has been closed down for some months past, will start operations again in a few days under the management of a new company.

### Butte.

*Mercury:* The Morning Star mine, near Yankee Hill, is now owned by C. Waldeyer, who has had a 5-stamp mill built and has begun crushing ore. The ore is what is known as sulphate of baryta, which is nearly twice as heavy as quartz. Mr. Waldeyer has a 10-foot ledge that assays from $5 to $25 per ton of free milling gold. He has over 2,000 tons of ore on the dump ready for crushing. This is the only mine in Butte county known to be composed of sulphate of baryta.

The Aurora mine, near Nimshew, started up again on the 1st.

### Calaveras.

(Special Correspondence).—The Esperanza Quartz Mining Co.'s principal office is in San Francisco; the stock is principally held in the East. The mine is situated three miles E. of N. of Mokelumne Hill, J. O. Stewart resident acting supt. The ore body is about one-half mile in length, runs N. and S. and pitches to the E. on an angle of from 45° to 50°, with a ledge of from 40 to 60 feet in width. The hanging wall is of a micaceous slate, the footwall of syenite. The improvements consist of a fine hoist, a 20-stamp mill, complete chlorination works run by water power, and ten other buildings. The mine is being developed through a tunnel 440 feet in length and a shaft down 350 feet. With 70 men in mill and mine, they are extracting and crushing 55 tons ore daily. The ore carries from 2 to 3 per cent of sulphurets that pay well. They are adding 10 stamps to the mill.

Roanoke Mining Co., 1½ miles SE. of Mokelumne Hill; principal stockholders reside in Stockton. W. T. Harris is superintendent. The character of this location is gold quartz, and consists of the Moser and Lamphere mines. The Moser mine is bonded to the corporation which owns the Lamphere. The whole comprises about 64 acres, covered by U. S. patent. The improvements consist of two sets of hoisting works, one on each mine, and a 20-stamp mill nearing completion. A shaft is down 200 feet on the Lamphere and an incline shaft down 160 feet on the Moser mine. The ore body will average about 5 feet thick in both mines, confined between walls of slate. The quartz is of several varieties, but it all carries about 1½ per cent of sulphurets. This company is working 30 men and seems satisfied with the output. The outlook of the mines at San Andreas, the county seat of Calaveras county, at the present writing is bright.

The California Exploration Co., formed in San Francisco in April of this year with a capital stock of $2,000,000, to operate in the vicinity of San Andreas, Calaveras county, has its principal office in the Crocker building in your city. Mr. E. H. Brandt, now residing at San Andreas, is the superintendent. The object of this corporation is to bring electrical power into this section for mining, manufacturing and transportation purposes; to accomplish which, this company has a water right extending for four miles on the Mokelumne river. The water is to be brought from a point known as Sandy Bar, some twelve miles north of San Andreas, by ditch and flume. At this point (San Andreas) the company will obtain a pressure of 211 feet, and from the past record, it will have at least 3000 inches of water to operate with the year around. In addition to operating mines for itself, the company proposes to furnish power for the development of mining enterprises at so cheap a rate that many prospects now dormant will again be in operation. The company anticipates that the maximum charge will not be over 25 cents per H. P., as against 55 cents per H. P., the average price now, and it expects to be able to furnish Mokelumne Hill and San Andreas with electric lights at the rate of 60 cents per month for each light of sixteen-candle power, and it also contemplates an electric railroad from Valley Springs to San Andreas. The company has bonded twelve mines along the lode within a few miles each way from San Andreas, upon which four shafts are to be sunk to a depth of 1000 feet each. No thought will be given to the erection of mills for the next two years, or until the company has thoroughly tested its property and finds out whether it has paying mines.

The Donnellan mine is located two miles north of San Andreas, on the Mokelumne Hill road. Mr. E. H. Hackett, superintendent, residing at San Andreas, is managing this mine for a company from Salt Lake City, to which syndicate it was bonded a little over a year ago. This property consists of two locations of 1500 feet in length each, covered by a U. S. patent over an area of 250 acres. The ledge is on the east vein of the mother lode; it runs north and south, pitches east and runs from 40 to 200 feet in width, of gold quartz of a low grade. This mine at present is being developed through an open cut. The improvements consist of a 15-stamp mill, run by water power taken from the north branch of the Calaveras river, with a head of about 50 feet. The company has free water from this source the year around. The ore body of this mine is of a talcose slate formation. With ten men working at this time in mill and mine, about sixty tons of ore is extracted and crushed daily. I am informed by the superintendent that the ore is paying the company a net profit of $2 per ton, and costs an average of 50 cents per ton to mine and mill the rock.

The Thorpe Mining Co., located one-half mile southeast of Fourth Crossing, or about (6 miles) midway between San Andreas and Angels Camp, is corporation of $5,000,000 capital stock, with its principal office located in your city. Mr. L. Allgewahr is supt. This company owns 450 acres of land covered by U. S. patent, upon which they have already developed an ore body 250 feet long by an average width of 10 feet. This mine is being worked through a shaft 500 feet deep. The shaft is double compartment, over which they have a fine steam hoisting works, with 10-inch Cornish pump. At present they are working fourteen men. The superintendent says he has 450 tons of ore on the dumps that will pay $8.00 per ton, the character of which is about two-thirds free milling ore, and about one-third of the value is carried in the sulphurets. They are opening up the 4th and 5th levels, from which points they are able to designate the depth and width of their ore body as above stated.

Angels and Altaville mining district are at present probably the most active mining camps in this State. The principal working mines, of course, are the Utica and Stickle mines, owned by Hayward & Lane; Mr. C. D. Lane, general manager, at present is absent in Alaska; Theo. Allen is superintendent. This company keeps 450 men at work in mines and mills. The Utica mill has 60 stamps; the Stickle mill 60 stamps, and the Madison mill has 40 stamps; all running to their full capacity. Their chlorination works are among the largest in the State, to which they run a tramway to carry the sulphurets from the mills. They run 80 concentrators.

The Gold Hill Mining Co.'s works and mine are located 1½ miles west of Angels, on the Milton road. This is a corporation with a capital stock of $75,000, principal office Chicago, where all the stock is held. Mr. S. V. Ryland is the general manager. This company owns about 100 acres of mining ground, on the mother lode, covered by U. S. patent. The ore body runs northwest and southeast, pitches to the east and runs from 60 to 70 feet in width between slate walls, the whole of which will pay a small profit; portions of the ore body are rich. The improvements on this mine consist of hoisting works, rock-breaker and a 20-stamp mill (900-pound stamps), all of which are run by water power under a head of 155 feet, operating four hurdy-gurdy wheels. This mine, up to the present writing, has probably been run at the least cost per ton of rock extracted and crushed of any mine in the State. It is only recently that they have added 10 stamps to the capacity of their mill. All last summer this mine was worked through an open cut, 65 tons were mined daily, and with 10 stamps it was crushed at an average cost of 57 cents for mining and milling the ore per ton. They are now sinking an incline shaft, double compartment, keeping about 30 feet from the vein. When completed, at each 100 feet, levels will be run on to what is called the "blue quartz vein," which is 22 feet thick at the heart of the main vein. At present they are working but ten men.

At the Carson Hill mining district it is authentically stated that the great mining suit and misunderstanding between the Morgan mine owners and Irwin & Fair, which has extended over one-third of this century, and cost over $1,000,000 and several valuable lives, is about to be or has been settled. It is now expected that Carson Hill will again resume activity, and that in the near future. On the road to Carson Hill, southwest from Angels, the Blyth mine, one mile southwest of Angels, A. N. Butts owner, is being worked.

The Bruner, or Bald Hill, mine, located about 1½ miles south of Angels, is one of the most promising mines on the road, is bonded to Capt. Macfarlane of the U. S. Army, and is now under the management of H. C. Woodrow. They have a very complete hoisting works, run by steam at present, but expect soon to run by electrical power. This mine is being developed through a shaft, now down 120 feet. The ore body of this mine runs, like all others on the mother lode, northeast and southwest, and as far as penetrated averages about 25 feet thick. Several men are employed. The manager reports that a mill is to be erected on this property next fall.

The Tulloch mine, located 2½ miles south of Angels, is being operated by the trustees of the late Mr. Tulloch. This mine is completely equipped with hoist and 10-stamp mill run by steam power. Their shaft is down 250 feet, working a full force of men. Louis Tulloch is the superintendent.

The Santa Ana and Missouri mines, located opposite the Tulloch, are bonded to a Salt Lake capitalist. Under the management of H. C. Woodrow, these mines are being developed, working a full force of men eight-hour shifts. This property is 3,000 feet in length, located on the first raise of the vein after it leaves Carson Hill. These mines are being developed through a shaft now down 200 feet, over which they have a fine steam hoist, with all the usual appurtenances. Their shaft will be sunk to a depth of 1,000 feet before a mill is contemplated. The width of the ore body and value of the ore thus far extracted has proved satisfactory to the management.

At Carson Hill are the Morgan, Reserve and Iron Rock mines, all owned by San Francisco parties. The latter is now working a full force of men, and the others will be by the time this is in print.

Then there are the Carolina, the Woods and Calaveras Consolidated, all working and large machinery recently put in position. The above-mentioned are all mines of history and are paying and satisfying their owners.

In Washington Flat mining district, five miles south of Murphys, are the Birney quartz mine, at present idle; it has lately changed hands, and it is stated that it will again be prospected and worked in the near future; the Ozark gravel mine, located 4½ miles south of Murphys, is being worked at this time through a shaft down 78 feet to bedrock, from the bottom of which they are crosscutting, and will drift and work the whole channel, which is over 50 feet wide. The hoisting is done by a whim. The character of this mine is cement gravel, which, after being extracted, has to be slacked in the sun before washing. The gravel body, which would pay to hydraulic, is over 40 feet in depth; in drifting only about 6 feet is taken out. For this portion it prospects about 50 cents per tub of 1000 pounds. At present they are working four men. Mitchler Bros. of Murphys are the owners and W. M. Hamilton is the superintendent. The Central Hill hydraulic mine, located one mile south of Murphys, is owned by Bisby, McCormick & Thomas. At the present writing they are working 14 men, and I am credibly informed that the output is large and satisfactory to the owners.

My next will be from Tuolumne county.

L. P. Mc.

*Prospect:* In the Gwin mine the shaft has reached a depth of 1245 feet. The foot wall has been reached, and shows a body of quartz 14 feet from wall to wall. The shaft is now about 30 feet below the point where the drill encountered the water from the old works. The water comes from the hanging wall gouge, but does not show any increase. The plans for mill are being prepared as fast as possible, and with the intention of having the stamps dropping by the 1st of September.

### El Dorado.

Placerville, Cal., June 9th, '96.

(Special Correspondence).—Phelps & Wood of Oakland have closed a deal with Snow brothers for 600 acres of drift gravel and will begin immediately to run a 600-foot tunnel. Eastern capital is interested with these gentlemen. The property is ten miles east of here. A. A. Wood will be superintendent.

The Gold Bug Mining Co., an eastern organization have begun work two miles from Georgetown, on the great mass of tailings accumulated during the past forty years from the Georgia Slide properties.

The shaft on the Lucky Marion near Greenwood, has reached 120 feet on a large ore body said to be of good value. The property is operated by people from St. Louis. Greenwood is on the stage road about fourteen miles north of Placerville.

The Boulder Mining Co., sixteen miles to the southwest has about finished eight miles of ditch. Work on this property is progressing rapidly.

On Sam Kaiser's mine, known as the Ohio near Greenwood, the shaft has reached 140 feet on a 4-foot ledge. The property is being developed by San Francisco people, operating under bond.

Frazer & Varozga have reached 182 feet on their tunnel two miles west of town. The tunnel will strike the shaft after 15 feet more work, and top the ledge at a depth of 70 feet.

Head & Clark at the end of the old tunnel they opened on the Theisen copper property twenty miles east of here struck an ore body of 26 feet. Active prospect work will now be pushed forward.

The *Democrat* announces the closing down of the Lady Emma. Supt. Beardslee tried to keep things going, but the stockholders declined to meet the indebtedness. It is to be hoped that an adjustment will be reached to pay the incumbrances and continue work. Great mines are not made nor discovered in a few months, neither are they often built up on a small sum of money.

### Inyo.

*Register:* The Cometti mine at Fish Springs is working six men. The ledge runs from 8 to 15 inches in width averaging $80 per ton. The Rose mine near by is also working six men.

Some of the dry-washer placer mines in Mazourka canyon are doing well. Labarge & Hamilton average about one ounce a day. The ground generally is yet too damp for effective work.

### Kern.

The Barossa Mining and Milling Co., No. 150 South Broadway, Los Angeles, is pushing the erection of the stamp mill on the Christopher Columbus claim in Kern county. This is one of the six claims owned by this company. M. P. Freebey, president of the company, now at the mine, reports that the stamps will be dropping by June 15th.

### Mariposa.

Coulterville, June 9th, '96.

(Special Correspondence).—The all-absorbing topic here is the reported sale of the Mariposa grant. There is no responsible person connected with the property in Mariposa county, and the report yet lacks confirmation.

At the Kohler Hill group of mines, on Bean creek, ten miles northeast of Coulterville, B. S. Hill, the managing owner, expects to spend $3000 during the next two months, principally in sinking. In the Coward shaft, now down about 45 feet, there is $20 ore, and Mr. Hill intends to go down 250 feet to see if it holds.

The Louisiana mine in the upper Coulterville district has been sold by J. T. Gove to C. R. Treat, of Chicago, and C. B. Rustin, of Omaha. The superintendent of the Louisiana proposes to sink as rapidly as possible to considerable depth. The operations of this mine are likely to be on an extended scale.

The old Bondurant mine, owned by Messrs. Bruner, of St. Louis, Mo., Charles Bruner, superintendent, was recently pumped out with a view to inspection. Two tons of ore were taken out and shipped to Selby's sampling works. If the test proves satisfactory the Bondurant will be purchased by Mr. French, the secretary of the Red Cloud company of Boston.

At the Red Cloud mine, in the same district, nothing is doing and there is only a watchman in charge. It was a very rich mine in its day, as much as $150,000 having been taken out of one chute. The ore was sometimes so rich that the gold would "hinge" when the quartz was broken. The mine never had a fair chance owing to mismanagement. There is a 22-stamp mill on the property, but no concentrator or rock-breaker. The ore when work was discontinued was very highly sulphureted. From time to time there are rumors that the Red Cloud is to be started up, but there are no signs of activity yet.

The Feleciana mine, twelve miles from Mariposa on Sweetwater creek, has been sold to E. S. Davis of Fresno. In the Sherlocks and Whitlocks districts there are several Fresno mining investors looking at properties. Fresno is taking more interest in mining along the auriferous belt than any other of the valley towns.

The Merced company is working as usual. There is no change of any kind to report.

At the Virginia most of the men have been laid off, pending the arrival of Professor Clarence King this week. It is stated that on Professor King's arrival, there will be a change in the method of working the property and that a shaft will be sunk to tap the north and most valuable portion of the ground.

There is no change to report at Pinon Blanco. Capt. A. H. Ward has returned from San Francisco and is now at the mine.

The Merced river is running bank high with snow water owing to the recent hot weather. When the snow waters run off, there will be a great deal of work on the river all the way up to the National Park boundary.

### Mono.

At Dunderberg, preparations are making to erect a mill. Superintendent Kermeen has sixteen men employed.

Iron pipe for the Mono Lake Hydraulic mine is arriving.

### Nevada.

The following is condensed from a recent article in the Marysville *Appeal*, describing the inspection by anti-debris representatives of present hydraulic operations on the San Juan ridge. It is from a point of view avowedly hostile to the hydraulic miner and illustrates the inability of those antagonists to find any just cause for complaint:

On the invitation of W. T. Phipps, manager of the State Anti-Debris Association, Supervisor Burns of Sutter county, L. P. Farmer of that county, a member of the Executive Board of the Association, and the editor of the *Appeal* took a trip last week through that portion of the mountains south of the main fork of the Yuba river, lying in Nevada county and comprehended in the general application—San Juan ridge. The trip occupied the better part of five days and resulted in a very thorough inspection of a district in which the greatest mining operations known to this or any other time have been prosecuted during the last thirty years with varying success to the promoters.

The initial stop was made at Smartsville. The operations at the Campbell place are confined to an arrastra process and a pick, bucket and shovel brigade, though the surface of several of the elevations in the distance were suspiciously tinted with a shade of aqua pura. Various reports concerning operations at this point have reached the Anti-Debris Association from time to time, and with the expected resumption on the part of the Excelsior company, will result in a closer investigation and more frequent inspection. The water supply is said to be copious and in perfect condition for extensive operation.

At Mooney's Flat Messrs. Phipps and Burns undertook to seek the source of a decidedly red stream, but were not successful and investigations into the character of the work were passed until the return trip.

At Bridgeport we crossed the South Yuba, the stream dashing over the huge boulders with a velocity that gave no promise of making a deposit of the heavily charged debris waters. Mr. Phipps here took a sample of the water, as has been the custom of anti-debris representatives for years past. From the sample it was quite evident that it came from a region where the monitor was shaking hands with Mother Earth in a vigorous manner.

From this point altitude is made at every

step until French Corral is reached. The town has the appearance of having once been hastily built. Its denizens look askance at the wayfarer and to us the few on the roadside turned suspicious gaze. Several complaints have been made from that quarter by the valley watchman but not of a serious character, since the operations were generally considered to be small. The smallness of the operations are no doubt due very largely to the fact that the diggings have been pretty well worked out and that owing to the lay of the ground restraining works of moderate cost could not be built to satisfy the requirements of the Federal Debris Commission. From the elevation at the road it is to be observed that in years past much hydraulic mining had been done. It was out of this section of the Ridge that the Milton company, now known as the Kate Hayes, a Boston and New York corporation, obtained its earliest and greatest revenues. Mr. Phipps was relating some historical facts in relation to the concern when the eyes of one of the party lighted upon two large streams of water shooting their pressure against the embankment to the south but partially hidden from the view of travelers by clusters of trees.

"There's one," said Supervisor Burns.

"You bet," said Mr. Farmer.

Three of us were out of the conveyance in a jiffy and headed for the scene of operation. We had hardly started before the men in the pit began to scramble and in no time at all there was nothing but the sound of gurgling pipes and their discharging ends. We were upon the grounds in a few minutes and were greeted by the men with very doubtful politeness.

Instead of finding monitors we found two good seized nozzles of something larger than the ordinary fire department pattern with canvas hose connections. The men very plausibly pleaded that they did not know that such work, without permit, was in violation of the Caminetti or any other law. They gave their names as B. W. Eckman and W. E. Moulton. Mr. Phipps told them that the character of their work under a 100-foot pressure could not be countenanced, and that they were liable. The watchman will be told to keep them under careful guard and further operations will mean the usual legal proceedings. Right near them a man by the name of French was turning up the dirt and rocks, but as he was not disturbing the "natural bank," as the codes define it, no exception could be taken to him or his "sluicing" head of water.

Tuesday we were on our way through Sweetland diggings. The first view from the hillside revealed the works in the distance. The men and the monitors were mere specks. Down through the great washout from which enough material had been taken to make one of the Marysville Buttes with its spreading base we went. Supt. Miller was absent and we were shown about the place and had explained the modus operandi of the mine under the Debris Commission by Foreman Rooney. They were then cleaning up the sluices and a part of the great 3300-foot tunnel. The material in this mine looked as though it would easily dissipate under the influence of the monitors. There were two of them here with 5½ and 6½-inch nozzles, operated with water of 225 feet pressure. Leaving the mine and walking back to and down the ravine something over a mile we came to the dam, said to be the best in the mountains, and not considered any too stable at that. It is of rock, earth and brush. From its foundation to the top it rises 74 feet, has a 220-foot base, measures from bank to bank 160 feet and is 90 feet through on the top. The debris is filling it very rapidly and but 60 feet more can be added in height until the grade will be lost. As it grows the cost increases and it is doubtful whether the output will stand the expense. This company, the Kate Hayes, is not giving much trouble and seems to be conforming to regulations. From the dam one gets a view of the Browns Valley irrigation ditch flume on the opposite side of the Middle Yuba.

From Sweetland we went through San Juan and on to the Cherokee, noting the many excavations and washes that had left ugly gashes on the mundane surface as a remonstrance against the devastation. In many little ravines could be seen many small miners working away with pick and shovel and little hose lines. To the north of Cherokee we observed the old marks of the 49'er and his rocker. On reaching Badger Hill we went to the homes of James and John Quick. They, with their sons, were operating in a great excavation some two miles long and a half mile or more wide. They were handling rockers when our party came upon them, and denied that they had been using a monitor. The dampness of the banks contradicted that, as did the statements of several of the family to the effect that it had been in use two days before. The Quicks' mine had a good supply of water, good pipes and they reach the 5-inch monitor with about 100 feet fall. They tail directly into the Middle Yuba and it is said have a tunnel so as to overcome the grade from the lower part of the pit out. They don't like valley folks a bit but treated us very nicely except in the matter of information. Such a mine can undoubtedly do much harm. On one or two occasions they have been detected using the monitor.

We returned to Cherokee and after dinner started for the Hustler mine on Shady creek. The great fillings in this stream are enormous, beyond the picturing of words and are not to be comprehended even by the tale of the camera. The first startling revelation was the broken dam which the Debris Commission had accepted and said was good. We saw where water had been running through the aperture, contrary to the rules of the Commission, under whose jurisdiction this mine has operated. The water had cut away and carried out through two cuts fully 100,000 yards of the debris that the dam had been constructed to hold. It undoubtedly was a flimsy affair, but no more so than the one further up where they claim to be retaining the debris of to-day. When we reached there it was quite evident the water from the sluices had been turned back from the old outlet into the new because there was barely a discoloration of the surface on the damsite water and the rocky bed to the north over which it would have to flow to the broken dam outlet was covered with fresh and sparkling slickens. This mine, which is practically operated by three men, has a 5-inch monitor with a pressure of 60 feet. If all the dirt torn down in a week's operations was retained behind the dam now permitted by the Debris Commission it would be filled and more too. The Hustlers are very cheerful ones and demonstrated to their own satisfaction that their work was devoid of harm to the streams.

Columbia Hill mine has an excavation of old works that is easily a mile square. It is now known as the Ferral claim and is operated by Mr. Bigelow. He walked us to the dam behind which the debris is being settled in part. It has thus far stood the action of the elements but it is really no better than the one at Hustlers. It has been accepted by the Debris Commission, however, and with that the valley representatives will have to be content until it has been proved that it is of no account. Mr. Bigelow showed us over the diggings and related that within five years, from 1876 to 1880, off of one little end he took a profit of $650,000. They are now operating with a force of about twenty men, a 5½-inch monitor under a pressure of 80 feet. The gravel is panning out twenty-five cents to the cubic yard.

One little mine reported to have operated with a 3-inch monitor under light pressure from rain water storage was not visited, as the Dudley brothers, who conducted it were in town, having exhausted their water supply.

We reached Lake City, having an elevation of about 3,700 feet, for the night. The next morning we passed the Backbone House, which Mr. Farmer was anxious to see having heard the bills of watchman read during the last eighteen years for entertainment at that place. On the road to Moore's Flat there was a continuity of the gaping wounds to the green coating of the earth that told additional tales of the devastating influences that have given so much trouble to the rivers and the valley. Moore's Flat is a hard place to get to. The hydraulic mine there is now operated by about twenty Chinamen playing a 6-inch monitor with a 200-foot pressure against banks of extremely soft material that tails into a canyon leading to the Yuba river down something like a precipiece, In this canyon, about two miles distant, is a dam. It is made of logs and brush in a very flimsy manner, as can be readily determined by the photographs as well as personal inspection. The logs are a foot and eighteen inches apart and not fastened so that they will stand more than a few season's wear. It is filling up rapidly and is one of the kind of structures which will cheat the regulations of the Debris Commission with very little difficulty. The service of papers on these Chinamen to restrain their operations was made on the grounds. Charles Hagerty, the merchant at that point, entertained the *Appeal* man with some interesting reminiscences in which he made the names of early pioneers at that place, Marysville and Sacramento, figure quite conspicuously. The return was made to Bloomfield in the afternoon. In passing the Derbec drift mine on the way an illustration was obtained of the value of such enterprises over hydraulic mining as a sustainer of population. The town of North Bloomfield derives its life from the operation of drift mining, which gives employment to many fold more men than hydraulicking.

On reaching the Bloomfield mine we were taken in charge by Supt. Myers and escorted all over the works. This mine, as has often been repeated, was the largest known in the world. Certainly at this time it presents an imposing sight. Its great walls extend up over 500 feet. The great pipes systematically wind themselves around the embankments and to the monitors, and these play against the dirt with terrible noise and force. About fifty men are engaged in this work. The monitors on the banks have 7-inch nozzles and operate under about 250 feet pressure. The monitors used in creating the elevator process each have a 7-inch nozzle and about 400 feet pressure. These are set at the mouth of an old tunnel and force both the water and the gravel from the sluice boxes over a high embankment or dam, thus taking the material into two monstrous settling reservoirs or pools. It does the work well. There is a bazy doubt in the minds of many as to whether or not the elevator process is not dropped and the tunnel, a much more convenient means, used. This is a charge that has frequently reached the anti-debris people. Since Mr. Myers' superintendency Mr. Phipps stated that no such complaint had been made save in one instance, and that was by the father of a retiring superintendent.

Our party was very hospitably entertained here by Supt. Myers, Foreman Thomas and one of the directors, A. J. Bowie.

On the fourth day we headed for Nevada City, taking observations of the old works at Blue Tent and vicinity. This side of Rough and Ready Messrs. Phipps and Farmer examined two small hydraulic claims known as Hackett's and Spanish John's. Neither use more than 100 hundred inches of water, with slight pressure, and confine their slickens fairly well.

At Mooney Flat a small nozzle with canvass hose connection is used on the Sanford & Loomer hydraulic claim. They retain their slickens in a remarkably good manner, as does one of the sluice mines in that neighborhood. One of the others does not do so well in the matter of restraint, but is so small as to be of little consequence.

At this point ended the revelations as to the hydraulic operations, past and present, on the San Juan ridge.

*Union*: The Junction mine on Slate and Deer creeks is looking well and shows rock worth $78.50 a ton.

The miners at the Delaware won their point for an eight-hour shift on Sunday and resumed work Tuesday.

The mill and chlorination works of the Providence mine will be closed the latter part of this month to make needed repairs.

### Placer.

*Sentinel*: At the Pioneer mine the company expects to have steam up in the new boiler the first of the week.

Ex Governor N. B. Willey, the present superintendent of the Redstone quartz mine near Blue Canyon, has contracted for five additional stamps and two concentrators. Twelve men are now employed at the mine.

The Ralston Divide Gold Mining Company will operate their gravel property extensively this season. W. C. Ralston and E. H. Benjamin went over on that divide this week. The company, which is backed by French capital, own nine mines of lava-capped channel on the Ralston Divide.

### Plumas.

The Plumas *National-Bulletin* says N. E. Boyd and S. W. Rex, employes of the Anti-Debris Association, came in on the Reno stage, hired a team and went up to the Spanish Ranch country to inspect such hydraulic mining as was in progress, particularly the operations of the Quincy Mining and Water Company. At Gopher Hill, they found the work conducted in conformity with the conditions imposed by the Debris Commission. Samples of water were taken below the dam, and the parties returned to Quincy well satisfied, we are informed, that no damage was resulting from the operation of this and other mines in that section, by the hydraulic process. Next day they went on a tour of inspection as far as Shoo Fly, and at several points took samples of water from Spanish creek. They also investigated the Higgins mine and found it to be working satisfactory.

A Quincy dispatch says the largest restraining dam in the State is to be built across Spanish creek at Devil's Elbow by the Quincy Mining and Water Company. Flumes will fill up the bed of the stream for the length of 400 feet and to the height of 180 feet with rock and debris, forming a settling reservoir. This will require over 300,000 cubic yards of material for its construction. It is estimated that 15,000,000 cubic yards of debris can be held above the dam.

### Riverside.

The Bess mining claim, about one and a quarter miles southeast of the Good Hope properties in Riverside county, is improving daily. According to the Perris *New Era* this is probably the most valuable mining property in the section. The shaft is down 25 feet and there is a ledge about 10 inches in width that sparkles with free gold.

### Sacramento.

*Record-Union*: Constable Spinks has attached the boat belonging to the Golden Sands Mining Company, which is at present lying above the Twelfth-street bridge in the American river. The attachment was sued out by W. S. Doane for $300 for wages alleged to be due. The boat was engaged in an effort to extract gold from the sands of the river.

### San Bernardino.

Redlands *Citrograph*: The Mint group of mines, near Kleinfelter station, west of Needles, was sold last week to an Irish syndicate for $120,000, who will soon begin active work on the property.

*Investor*: Reports of rich strikes continue to come in from the desert, which seems destined to become the great mining section of southern California, although various other sections are rapidly becoming better known as promising mining fields. But while there are many parts of this southern country which will well repay investigation, there are a few places which will not. Such an instance is given in the Goler mining district, which, according to a San Bernardino miner, is a good place to keep away from. Last February there were about 400 prospectors around Goler and now only fourteen can be found. Wood and water are scarce and very costly, and the high winds, which blow the sand in all directions, make work almost impossible. The Goler placer mines, which are believed to be rich, lie from 25 to 75 feet under the surface.

### San Diego.

At Julian the Owens mill started on the 1st, improvements are being made so that as much as possible of the concentrates can be saved. It is estimated that not a larger average than fifty per cent of the gold in the Julian ores can be saved from the stamp mills by the most experienced and careful mill men, and from some recent assays of tailings even a less per cent than that is free milling. The Owens ore in common with others contains a larger amount of sulphurets as depth is reached and as the ores have always been considered free milling, no particular effort was ever made to reduce them. The amount of Julian or Banner ores ever treated in a smelter is very small.

The Cincinnati Belle Company is making preparations to resume operations at the Gold King. J. M. Farley is superintendent.

The Golden Cross Mining and Milling Co., with mines at Hedges in San Diego county, has brought suit against the trustees, to whom the company recently turned over its mines for the benefit of its creditors. The mines, among which are some very valuable properties, were to be worked by the defendants as trustees, and the proceeds were to be devoted to paying off the company's debts. The company prays for their removal, and for the appointment of new trustees; $150,000 is also asked for alleged damages.

### Shasta.

*Free Press*: McLean brothers, contractors on the Iron Mountain railway, filed a suit in the United States Circuit Court, May 27th, against the Mountain Mines, Limited, to recover $51,000, alleged to be due upon grading contracts.

G. R. Graves, at the Nicholas mine, Little Backbone creek, has cleaned up the lower tunnel, which was fifty feet in length, and has run fifteen feet farther in, where he struck sulphuretic ore at a depth of 250 feet on the ledge.

At the mine at Portuguese Flat, owned by Supervisor Conant and others, a 45-foot shaft was sunk on the ledge, but at that depth the water became troublesome and a tunnel was started to crosscut the ledge. It is estimated that the drift will have to be run 170 feet to strike the ledge. One hundred feet of it has already been completed. The ore is rich in free gold.

Bass & Joiner contemplate putting in a stamp mill on their mine near Round mountain.

### Siskiyou.

*Journal*: A couple of miners made $80 in eight days in a small placer mine on Humbug. There are some good placer mines in that section, and there has been plenty of water to work them during the present spring.

Means & Mahan, of the Nebraska mine on Cherry creek, brought over 30 ounces of gold dust this week, realizing about $500.

The placer miners at Hawkinsville will soon begin to clean up, as their supply of water is running short. They have been able to run a little longer than usual this year.

Mining operations at Oro Fino are unusually active. Work is progressing on the Columbia mine at Scot Bar.

At Scott Bar the Columbia Co. has fifty men working on the new road for hauling ore from the mine to the mill. At the Mabel mine, owned by Timmons & Chamberlin a five-stamp mill will be erected.

At the Gumboot mine a shaft is being sunk, which is expected to tap the main ledge at a depth of 100 feet. At the Montezuma mine an air shaft is being sunk which will strike the main tunnel at a depth of about 80 feet.

Garrett & Co., who were putting in cribs, have had to suspend operations on account of high water in the Klamath.

### Trinity.

The Trinity Placer Mining Company of this city will work its 100 acres of ground on Cedar Flat.

### Tuolumne.

Groveland, June 8th, '96.

(Special Correspondence).—There is a great deal being done in opening up new and reopening old quartz mines in this section of Tuolumne.

The Two Brothers and Wheeler group of mines, 1½ miles west of Groveland and one mile northeast of Big Oak Flat, have been amalgamated by John P. James and bonded to Captain A. H. Ward, of Pino Blaneo mine, near Coulterville. Work is likely to commence shortly, under the charge of Captain H. H. Todd of Alameda. It has passed the stage of a single man's operation, and now requires extensive pumping and other machinery. What ore Mr. James has taken out for crushing during the past fifteen years has averaged $35 a ton. It has sometimes gone as high as $50, and never less than $30 a ton. The general average, as a steady milling proposition, will probably be about $12. About a mile below the property, by an easy gradient and good road, is a very convenient mill site, with water power, on Deer creek.

The Mount Zion is about one-half mile east of Groveland. It has recently passed into the hands of the Tuolumne County Mining and Development Co., a corporation of which the directors are Fresno men. The president is N. W. Moody; John Baird is superintendent. Some years ago Mr. Hunter, a former owner, took about $14,000 out of it, but was choked off by the water. Supt. Baird is now sinking a shaft in a new location. The prospects of this property are good. The owners have also bonded the Eclipse, Clipper Gulch and other mines in the same locality. Work on these is to be commenced at once.

The once well-known Mount Jefferson mine is about one-fourth of a mile north of Groveland and is owned by parties in Boston. There is considerable machinery on the ground, including a ten-stamp mill, all in very bad shape, owing to disuse for many years. There is also the remains of a small chlorination plant completely in ruins. The Mount Jefferson was a good paying mine until there was a disagreement among the owners, which resulted in the employment of three "supes" to six miners. More money was spent on the bosses than on the mine and it eventually was abandoned. The shaft is down 240 feet and is the deepest yet sunk in the Groveland district.

The Rhode Island is the eastern extention of the Mount Jefferson. Recently it has been bought by John Callaghan of Boston. Work is now beginning, and the prospects appear favorable. The Rhode Island property is likely to attract some attention in the future.

The Belcher Consolidated Gold Mining Company, Limited, of London, has taken over the old Belcher mine near Groveland. F. H. Hill is the superintendent. This property has been in operation since the ten-stamp mill was burned down some years ago. The hoisting and other machinery is in good condition and the mine is now being put in running order. The present shaft is down 125 feet, and when work was discontinued was on a 5-foot vein of $25 ore. Mr. Hill says that from now on the Belcher is to be worked in earnest, and that he intends to sink to a depth.

Two miles below Priest's on the Sonora road is the Wheeler Hill, also under the charge of F. H. Hill. This mine is owned by the Wheeler Hill Gold Mining Company, Limited, of Glasgow, Scotland. Next to the Wheeler is a claim known as the Morning Star. It is being incorporated in Scotland for working purposes, and will be known in future as the Golden Star. Mr. F. H. Hill takes charge of this property also.

The Grizzly and Eureka mines are about

half a mile from Priest's, and are owned by Harper brothers, who have worked on them for about five years. There is a pay streak of rich ore from 1 to 4 inches in thickness which the Harper brothers have been following for pockets and not taking out milling ore. In this they have been so far successful as to render them careless as to systematic development of their property, which appears to be well worth it.

The Never Sweat is owned by James Ballantyne and is situated about one mile from Big Oak Flat and one and one-half miles from Priest's. There is a tunnel in about 300 feet and a raise to the surface about 125 feet. Some rich crushings have been taken out of the Never Sweat, on one occasion rising to $90 per ton. The mine is remarkable from the fact that it is in most excellent order. Everything is ship-shape and in the most approved style of scientific mining, and it is all the unassisted handiwork of Mr. Ballantyne, who is in his 80th year. This fact says much for the healthiness of the district for working miners.

At Big Oak Flat there are now about thirty families, all more or less dependent on mining. Work is starting up in a small way at several of the surrounding mines, including the Longfellow, the Mississippi (McLaughlin & Callaghan, owners) and the Accident, an extension of the Longfellow (William and Arthur James, owners). Nearly all the rock raised in this district is crushed at the Big Oak custom mills. There are two 5-stamp mills, both being very much out of date. One belongs to E. B. James and the other to Oliver Fiske. They save some proportion of the free gold and none of the sulphurets. There are indications of gold everywhere, and the district deserves better appliances for the reduction of its ores. The present cost for crushing amounts to from $4 to $6 per ton, according to the distance for haulage; but it is the gold that is lost in the mill leavings that is the most expensive feature of the process.

The Kanaka mine is about five miles northeast of Groveland and is owned by Louis Casseretto. There is a 10-stamp mill at the Kanaka that has been running for a number of years continuously. It is about one mile back from the river and is driven by Indian creek, a tributary of the Tuolumne. The mine is worked from the gulch by five successive tunnels of from 300 to 500 feet in length. No returns are to be had, but it is understood that the Kanaka has paid handsomely all along. At present the lower level is being driven to the pay chute of the mine.

At Humbug, 3¼ miles northeast, a new mine is being opened up by an incorporated company, of which Mr. Lowe is the president and John McLauchlin of Alameda is a prominent stockholder. The company sank a shaft 120 feet with a windlass and then drifted on a vein between walls 30 feet apart, having quartz on both walls, sometimes on one and sometimes on the other. From this about 200 tons of rock was crushed, giving an average of between $12 and $13 a ton. The prospects are satisfactory to the owners, who are putting on substantial machinery at once.

The Slapjack mine, near Second Garrotie, is owned by Urquahart & Argall. They have shafts down on large veins 70 and 100 feet. The rock is very heavily sulphuretted, but is rich in gold.

The Cosmopolyte is an old mine about one mile west of Groveland. It is now worked on a lease by Messrs. Poole Bros., Smith & White. They are working out pillars and running a tunnel to get into new ground. The Cosmopolyte has turned out large quantities of gold in the past and its owners are confident that it will repeat the process. In fact, there is an air of general renewed confidence throughout the district around Big Oak Flat and Groveland—or, as most of its inhabitants call it, "Garrotie," as it was known in the '50s.

**Yuba.**

The Marysville Tunnel and Quartz M. Co. is working the Bullard mine, near Smartsville. Work will soon be resumed on the Mark Antony, adjoining the Bullard. It is locally stated that the Yuba river will be worked by hydraulic elevator.

**NEVADA.**

H. H. Beck, superintendent of the Reno Reduction Works, will put in a gold mill and concentrating plant, in addition to the silver chlorination works and the water jacket smelter now in place.

The lot of ore recently brought in from the property of the Dexter Mining Company, at Tuscarora, Nev., was purchased on the 3d by the management of the Germania smelter. It consisted of twenty-four tons and netted the owners $5,608.58.

William Zirn, the discoverer and principal owner of the mines at Pine Nut, was killed at his mine on the 6th inst. An overhanging boulder fell upon him, crushing out his life. Zirn evidently heard the boulder start and crowded toward the wall, but his chest was crushed in and both legs broken. The accident occurred just after the noon meal, when Zirn was alone.

ESMERALDA COUNTY.

The first load of ore from Aurora to be practically tested by Parr & Tyack has been hauled to the Syndicate mill. The tailings will be submitted to the cyanide process, and if there is an encouraging profit it is probable that reduction works will be erected at Aurora.

LINCOLN COUNTY.

*Tribune*: R. R. Tanner of Milford, through whom the gold bars produced at the DeLamar are shipped, says that the bullion coach continues to arrive regularly under armed guard, and that the first clean-up at the April Fool mill will be made about June 15th.

Last Monday's issue of the De Lamar *Lode* says: It is currently reported on the streets that the De Lamar property changes hands to-day, the new owners being the English syndicate who have been making an examination of the property for the past month. The consideration is reported to be $6,000,000, and it will be remembered by many here that Capt. De Lamar paid something in the neighborhood of $175,000 when he purchased from the locators, and while he has spent a very considerable sum since, the property has maintained itself. Thus it may be said that $6,000,000 is velvet.

**OREGON.**

BAKER COUNTY.

W. P. Russell tells the Spokane *Chronicle* that in the Gypsum mine, on Snake river, the gypsum is 95 per cent pure, and he can mine and manufacture the article ready for use and place it in the market at Portland for $3.50 a ton. A plant will be put in that will mine and manufacture the calcined product at the rate of 200 tons a day.

The French syndicate is developing the Flagstaff, Gertrude and Empire, three miles from Baker City.

JACKSON COUNTY.

Thomas & Daw, who sent fifty pounds of ore from their ledge in Uniontown precinct to the Selby Smelting Works in San Francisco, last week received a check for $146.50, the net result of the reduction. They had previously taken $650 from the same place.

JOSEPHINE COUNTY.

The Grants Pass *Courier* says the copper mines will employ some 200 men this season. A new smelter is to be erected at Waldo, and one at the Illinois river works.

Wm. Bybee has bonded his mining property in Josephine county, consisting of several hundred acres, to A. J. Paul and others for $30,000.

A new camp is reported at the mouth of Biggs creek, where the mining industry is assuming greater proportions than ever.

LINN COUNTY.

In the Lawler mine on the Santiam river the 20-stamp mill is running on full time and the ore bodies show well.

**WASHINGTON.**

Nearly 5,000 mining locations have been made on the Colville reservation, and the county auditor keeps eight clerks busy.

Prof. Langhammer is going to erect a large milling plant on the property of the Wyandotte Mining and Milling Company in the Similkameen district. The mill as at present constructed will treat from fifty to sixty tons per day, but it is being equipped with machinery of 100-ton capacity. It is what might be termed a combination mill, the principal feature of which is a cyanide process of Mr. Langhammer's own invention. It will be built in terrace style, five stories high, and lighted by electricity.

**BRITISH COLUMBIA.**

Manager Hendryx of the Pilot Bay smelter, talking of his bullion there, says he will build refining works, and two or three additional stacks to the smelter.

At Vernon, A. H. Craven, representing English capitalists, has a working bond on the mineral claims owned by the Swan Lake Mining Company—$120,000; $1000 to be paid within a month, and the balance by the 15th of December next if the company decide to complete the bond. Mr. Craven states that if he finds an average value of $4 per ton he will be well satisfied to go ahead and complete the purchase, in which case he will build an 80 or 100 stamp mill.

**ALASKA.**

The Juneau *Mining Record* says an immense auriferous gravel deposit, carrying $5 in gold to the yard, has been discovered at Anchor Point, on the north side of Kachemak bay, the ground having been taken up by a Boston syndicate. A ledge has been discovered in the Silver Queen mine, on Sheep creek, running $400 in gold to the ton.

**IDAHO.**

Hailey *Times*: The Crœsus mine hoisting works is completed. The Idaho Democrat people will begin work on a deep tunnel as soon as the survey is completed. The Red Cloud has resumed operations with twenty-five men. The Fortuna Mining Company will soon add to its force, both at the mine and mill. These are a few only of the mines where more men are to be put to work.

Mr. Johnesse having failed to secure a complement of miners, even by resorting to an advertisement in the *Times*, it is evident that miners are scarce and that the demand exceeds the supply.

At Wardner, on the 5th inst., Harvey Jackson, shift boss on the Bunker Hill and Sullivan mines, was struck by a falling rock and killed.

**MONTANA.**

The Anaconda Mining Co. has closed down all its mines at Camp Creek on account of water encountered, which it was found impossible to handle. The company has spent a quarter of a million dollars in development work there in the last two years.

No action, says the Anaconda *Standard*, resulted from the meeting of Red Lion stockholders relative to the new process now under consideration. The treatment of the ores in question is as follows: The pulp coming from the stamps is run through an immersion amalgamator, in which it has to pass through about 10 inches of mercury. On its way through this apparatus it leaves all its free gold, however fine or coarse it may be. The remaining pulp runs from the amalgamator through a separator in which the mercury which may have been carried along is recovered. From the separator the pulp goes to the concentrator, and from there to the leaching tanks, working by the electrolytic clorination process. A series of leaching tanks forms a battery; while the first tank is filling the last one is emptying the intermediate ones being in the different stages of leaching. The liquid is constantly regenerated by the electric current, and the gold is obtained in the shape of a dark brown slime, ready to be submitted to the ordinary melting of bullion. The amount of gold saved by this process, as demonstrated in a mine in the Caucasus and in another in south Siberia, is about 90 to 95 per cent of the assay value.

**SOUTH DAKOTA.**

Black Hills *Times*: Eleven hundred pounds of phenomenally rich ore from the Reddy mine, situated in Lead City, was shipped yesterday by express to the Omaha refinery to be reduced to bullion. Previous to the shipping the lot was put through one of the crushers at the D. & D. smelter and fully sampled. It was then sacked and shipped. The lowest assays yet made gave returns of $6018 and the highest $60,142 gold per ton. Of this character and grade of ore there is now exposed a seam 7 inches thick and 19 feet wide. The width of the face of the present workings, as a cap or roof of this seam, is an ore shoot from 2½ to 3 feet thick and 10 feet wide that varies from $187 to $250 gold per ton. Only six men are employed in getting out ore, three on day and three on night shifts, yet the average amount of ore daily extracted is two tons. In addition to the rich stuff taken from the lower seam, the latter is increasing in size as the workings are advanced.

The Black Hills *Mining Review* of the 1st inst. says plans are nearing maturity for the building of an additional 150-ton cyanide plant in Lawrence county, together with the purchase of mineral land involving an investment of upward of $1,500,000, under the auspices of J. S. Childs, president of the G. & S. Ex. M. & M. Co.

**COLORADO.**

W. F. Kendrick reports: "There is being heavy sifting out of stocks, separating the worthless, or those in which the people have no confidence, from those of merit. The people of America made the same mistake that the English people did in South African shares. Many London operators put worthless shares on the market on the strength of the good ones, which has also been done in the United States by both Eastern and Western people. In weeding out the worthless stocks many good propositions are injured, although the better class of Colorado mining shares is advancing at the present time. The profits from the dividend-payers are so large that they command a price, although many are selling below their value as an investment.

"The rebuilding of the town of Cripple Creek with brick stone and steel structures that would do credit to a large city, shows that large wealth is being taken from the ground. The Florence & Cripple Creek Railroad Company are employing every engine they have and hiring from the Rio Grande to transport the building material. The same is true of the Midland Terminal Railroad.

"The two lower levels from the main shaft of the Victor have opened larger ore bodies than anything before discovered in the property, increasing the large reserves. The development work of the Isabella has been as satisfactory as that of the Victor, and these two properties have reserves from which to pay dividends for a long time. The shipments of ore from Cripple Creek have increased materially the last thirty days, the burning of the town having affected but little the working of the mines.

"At Leadville there is more systematic mining than in any other portion of the State. There are several companies that have miles of underground workings, from which millions of dollars have been taken, and are producing to-day the heaviest in their existence. The daily output of ore from Leadville is about 1,500 tons for the smelters.

"At Alma immense reserves of ore are being blocked out. It is situate on the opposite side of the mountain from, and of identical formation to, Leadville. This district is showing considerable activity, with several new reduction works built and in process of construction for handling the ores at the mines.

"A new district is being opened in Allen's Park, at the base of Long's Peak, in the northern part of the State. The veins are similar to those of Black Hawk and Central City, as are those of the Pine Creek district, which is but a few months old and has twenty shipping mines.

"The increased production of the San Juan and the Gunnison districts over that of last year is phenomenal. The discoveries in Routt county, in the western part of the State, give promise of opening some of the veins which have aided in supplying the immense placer deposits existing in that district.

"In summing up the mining condition of the State, it is in the best condition of our history; the silver output will be an increase over 1895, with a gold output probably 50 per cent greater. Colorado has nothing to complain of, but much over which to feel good."

**NEW MEXICO.**

Silver City *Enterprise*: At Mogollon the Confidence mill is running to its full 30-stamp capacity and crushing about seventy-five tons of ore per day, which the mine easily supplies.

The Maud S mill is running steadily and producing as much bullion as ever in the history of the property.

**ARIZONA.**

Near Jerome the Etta mine and mill is doing well. In '82 a 10-stamp mill was built to work ore from this mine. They could not make it pay—tenderfeet being placed at the head of every department. It stood idle until the mill had almost fallen to pieces and the mine workings had caved in, when, last February, J. L. Giroux, took a lease and bond on the mine and mill, and has since had a weekly clean-up of $2000.

Yuma *Sentinel*: Supt. R. M. Strauss of the La Fortuna mine reports the mill running night and day and the camp in a prosperous condition. The work consists of three levels. The first is down 65 feet, showing 14 feet of ore. A drift has been run last on this ore body 120 feet. On the second level, at a depth of 130 feet, the ore body is larger and shows 18 feet. One hundred feet of drifting has been done on this level. The third level is at a depth of 215 feet, with a crosscut showing the ore body to be 30 feet. The quartz is equally divided between white and pink. The pink quartz seems to be the most valuable. The estimated value of the ore is $40 per ton. The mill consists of 20 stamps, erected on the mine. The working shaft is on an incline of 60°. The steam hoist operates a grizzly directly to the rock broken and then by gravitation to the stamps. The framework of the stamps is the heaviest in the Territory. The runs are each 25 feet long and of heavy plates. There is a drop after the first run, making 50 feet of plates to be run over. The water reaches the mine from a well in the Gila valley through a 4-inch pipe, twelve miles long, at an elevation of 650 feet. There are sixteen men employed in the mine.

News reaches Yuma of another big strike in the Bonanza mine at Harqua Hala. For the past year the mill has been running only on tailings, treated by the cyanide process, and for the past six months the mine has been leased to a number of old miners, headed by J. M. Murphy. The old workings had indeed been stripped of ore, but on the new incline a streak of iron oxide ore had been passed with little notice. This streak was remembered by the leasers and upon it they sank at a venture. At a depth from the surface of 200 feet, and but a short distance from the incline, the streak expanded into an ore body, strong and continuous, averaging 4 feet in width and running in gold, free milling, $5 to the ton. The mill is already at work on the ore and the leasers are hiring all the miners who apply.

**MEXICO.**

*Mining and Metallurgical Journal*: It is authoritatively stated that certain Spanish capitalists in Mazatlan, who have been investigating the output of the Minas Prietas mines, in behalf of home correspondents who have investments in the Transvaal, and are now seeking investments in Sonora, after careful inquiry, reported that the mines at Prietas, during the year 1895, yielded $2,600 in gold per month for every stamp dropping, against a yield of $1,300 per stamp per month by the best two mines at Johannesburg.

**AUSTRALIA.**

Sydney, N. S. W., May 2, '96.

(Special Correspondence). — At Lucknow, seven miles from Orange, less than one hundred miles from Sydney, is a group of mines belonging to the Wentworth Goldfields Proprietary Co. The total product of these mines in 1895 was 66,656 ounces of gold. The dividends paid during the same period aggregated £170,000. One of the remarkable characteristics of the Lucknow mines is that there is no lode. The essential feature is a contact joint between two distinct formations—diorite on the footwall, serpentine on the hanging wall. At very irregular intervals along a limited section of this contact joint occur ore bodies, varying greatly both in extent and in richness. Whilst this contact joint can be traced for a considerable distance, amounting certainly to several miles, the area in which these ore bodies manifest themselves is comparatively restricted. So extensive are the underground workings in this property that it would not be possible to walk through them in a day, though the total length between the extreme points is only 3520 feet. This is due to the erratic nature of the ore bodies. The workings in following them up are very intricate, and form a perfect labyrinth. The deepest shaft on the property is now nearly 900 feet, and the deepest stopes yet being operated upon are 650 feet, so that there is a promise of a very long life before the mine. The workings are remarkably dry, only surface water having to be contended with. There appears to be a tendency in the ore to increase in richness as depth is attained. The ore has peculiar features of its own which render it an easy matter to identify it with certainty. Although the composition is of the ordinary character, represented by the familiar mineral mispickel, or arsenical pyrites, the manner in which the crystals range themselves is very interesting, the crystals radiating from a central point, and looking very beautiful. This peculiar feature led to a recent conviction of some men who had stolen or received ore from the mine. Another feature of the ore is that instead of being associated with the almost universal matrix of gold, viz., quartz, it is invariably associated with carbonate of lime, and though the property is intersected by several very well-marked and persistent quartz reefs, these reefs do not afford sufficient gold to pay for extraction. The remarkable richness of the mines is partially indicated in the returns, which, however, embrace a great deal of barren rock necessarily broken down with the ore. It is not an uncommon thing to ship five or ten-ton lots of special ore from these mines carrying 250 ounces of fine gold per ton, and many hundredweights of picked ore could be selected which would exceed 1000 ounces to the ton. The very rich ore in the mine is so rich that they do not attempt to treat it here. It is shipped direct to Swansea without any treatment whatever. In addition to 145 tons of such ore shipped to Swansea, the total bullion sent direct to the Sydney Mint during 1895 exceeded one ton.

**NEW ZEALAND.**

Official statistics show that the quantity of gold entered for exportation through the New Zealand Customs for the year ending March 31, 1896, was 222,981 ounces, representing a value of £889,545; the quantity for the same period of the previous year was 240,702 ounces, valued at £970,220, a decrease of 17,721 ounces. The West Coast and Otago supplied 72 per cent of the entire production of gold.

## Coast Industrial Notes.

—The Escondido, California, Oil and Gas Company have begun boring for oil.

—The Nevada Southern Railway has been bought in by the California Eastern Company.

—It is thought at South Vallejo the Southern Pacific Company may build repair shops there.

—The Denver & Rio Grande railroad has declared a dividend of one per cent, payable July 15th.

—The plant of the Union power-house at Portland, Or., was totally destroyed by fire on the 8th, loss $75,000, insured.

—Of $130,000,000 deposited in the savings banks of this State, $104,000,000 is in the savings banks of San Francisco.

—The shut down of the Colton Cement Works, caused by quarreling stockholders, throws seventy men out of employment.

—Successful tests were made this week with the motor and machinery at Big Creek which are to supply power for Santa Cruz electric lights.

—The railroad from Stockton to the Corral Hollow coal mine will be formally completed to-day. It is the ultimate idea to extend the road to Oakland.

—The wine bill which passed both houses of the Honolulu Legislature this week, admits duty free all California wines under 18 per cent alcohol for five years.

—The Nevada hatchery this year will distribute over 1,000,000 young trout. There are 450,000 eastern brook and 50,000 rainbow trout in the hatcheries at Carson.

—Columbia river canners and fishermen have not got together. The river is full of salmon, for which the canners offer four cents. The fishermen want five cents, and neither side yields.

—A company has been incorporated in The Dalles, Or., capital stock $35,000, for a general freight and passenger line between Goldendale, Wash., and The Dalles. The corporate name is Dalles & Goldendale Transportation Company.

—Reclamation District No. 673 (the "Pocket") and the Pacific Dredging and Reclamation Company have contracted for the construction of a cross levee near the Sacramento drainage canal, two and one-fourth miles in length. 175,000 cubic yards.

—The Spokane, Wash., Lumbermen's Association has advanced prices about 5 per cent, and the new schedule is as follows: Common rough, in yard, $8.50; common rough, delivered, $9; common rough, s. 1 s., $10; common shiplap, $12; No. 2 quality, $16; No. 1 quality, $21.

—Irving and Ford, of Everett, Wash., have a contract with the Everett Pulp & Paper Company, for 35,000 cords within twelve months, amounting to about $80,000. Of this 35,000 cords, 20,000 are to be fuel wood, and 15,000 pulp wood, 5,000 each of fir, spruce and cotton wood.

—The Trade Mark Committee of the Manufacturers' and Producers' Association has reported in favor of granting the use of the trademark to all members in good standing. It will be used on goods or products made in California. An electro is to be sent to every paper in the State.

—Over 5000 people attended the reception to the Union Iron Works at the Mechanics' Institute in this city last Saturday evening, in honor of the builders of the battleship Oregon. Addresses were delivered by Pres't Denicke of the Mechanics' Institute; Oscar Lewis, one of the trustees; Irving M. Scott and Geo. W. Dickie.

—The Dunsmuir *News* says the firm of Sisson, Crocker & Co., will build a railroad from Upton to the McCloud river. Mr. Cooley is now in the field surveying the road. They have already bought their rails and are ready to commence grading. The road will run along the upper side of the town of Sisson.

—On the 9th the San Francisco and San Joaquin Valley Railroad made another 10 per cent assessment, the eighth call of 10 per cent, aggregating $1,955,600, out of the total subscriptions of $2,444,450. The remainder will be called before August 1st in two 10 per cent assessments. Chief Engineer Storey says the track is now laid to a point three miles south of Merced.

—The Alpine Land and Water Company, recently incorporated at Carson, Nevada, proposes to reclaim and put under cultivation 80,000 acres of arid land and place settlers thereon. The company says it will build twenty small reservoirs to supply water for the 80,000 acres of land along Carson river, commencing at Alpine county, Cal., and continuing on through Douglas and into a portion of Churchill county, Nev., cut this track up into forty and eighty-acre lots to be colonized.

—In the case of Smilie vs. Fresno county, it is held that where a county contracts for the erection of a building, the payment to be made in instalments each year as the work progressed, the debt or liability created is not the aggregate amount of such instalments, but only that which arises from year to year on the separate instalments; and if the instalment is within the income each year it is not illegal, under a provision of law forbidding counties to incur an indebtedness or liability in any year exceeding the income and revenue provided for that year.

—Japan has learned not only to fight, but to manufacture, and with the abundance of cheap labor, and the plentiful supply of raw material close at hand which she possesses, she may well become our rival, she has the enormous advantage over gold-using countries, that she pays her labor-bill in silver. The silver-using countries have an immense advantage over the gold-using countries in all manufactures owing to the depreciation of silver. In America one gets about $5 for an English sovereign, in Japan about $9, yet the silver dollar in Japan buys as much as the gold dollar in America, and very nearly as much now as it did when it was worth one dollar in gold instead of the 57 cents it is about worth here now. The result is that labor in Japan is extraordinarily cheap when reckoned in English or American money. In the Government works at Tokyo and at Yokosuka the men work from ten to twelve hours a day, and earn from 20 to 50 sen—from about 10 cents to 25 cents. The women work (and female labor is employed very largely) the same hours and earn from 15 to 35 sen—7½ cents to 17½ cents. Gold men deny there is any danger to be apprehended, and the only reply yet given is that our exports to silver-using countries have increased at a greater rate than our exports to gold-using countries, so that clearly we have not suffered so far; which is no answer at all.

—The Oregon Improvement reorganization committee have prepared a plan of reorganization which provides for the issue of the following new securities: $5,000,000 of first mortgage 5 per cent fifty-year gold bonds; $5,000,000 of 4 per cent non-cumulative preferred stock, and $9,000,000 of common stock. First mortgage bondholders receive in cash the amount of the coupon on their bonds maturing June 1, 1896, namely, $30 per bond and 110 per cent in new five per cent bonds, bearing interest from June 1, 1896. The new first mortgage bonds not set aside for the present firsts are to be issued at no greater rate than $100,000 per annum, and only for the purchase of new steamships and other needed property, which is to be added to the security for such bonds. Holders of consolidated mortgage bonds who pay 12½ per cent, or $125 per bond, receive 62½ per cent in new preferred stock and 75 per cent in new common stock. Holders of preferred stock who pay 12½ per cent, or $12.50 per share, receive 62½ per cent in new preferred stock and 75 per cent in new common stock. Holders of common stock who pay 10 per cent, or $10 per share, receive 10 per cent in new preferred stock and 50 per cent in new common stock.

—The *Union* reports that the Marysville and Nevada Power and Water Company has been organized by residents of Grass Valley, Marysville and Smartsville. Work will begin at once and a dam will be built at the "narrows" on the Yuba river. The company will commence business with the right to 70,000 inches of water, and in addition will own over twelve miles of ditches already in use, with clear title to the rights of way for sufficient ditches to supply a large area east of Marysville. The company also owns the land where their dam will be built, and have acquired the entire system of water rights and ditches of James O'Brien of Smartsville, who is one of the leading promoters. The capital stock of the corporation is $2,000,000, divided into 200,000 shares of a par value of $10 each. The following are the incorporators of the company: John Spaulding of Auburn; James O'Brien, Sr., James O'Brien, Jr., William O'Brien and Louis Conrath of Smartsville; W. H. Carlin, D. P. Donahue and Hugh Maguire of Marysville; R. C. Walrath, W. F. Englebright, George L. Hughes and W. W. Waggoner of Nevada City. The principal place of business will be at Smartsville.

## Personal.

CLARENCE KING will be in this city next week.

W. C. RALSTON has returned from the Atlantic slope.

JNO. HAYS HAMMOND is returning to California via England.

MANAGER RUST will spend $250,000 in improvements on the Tacoma smelter.

STEPHEN J. FIELD of the U. S. Supreme Court, is here from Washington, D. C.

JAS. BURKE of Grass Valley is the new foreman of the Gold Valley mine, Sierra Co.

WM. MOOREHEAD succeeds Geo. Quinn as superintendent of the App mine, Tuolumne Co.

J. R. THOMAS has the foremanship of the Florida Mountain Mining Company at Silver City, Owyhee county, Idaho.

A. R. MEYER, president of the Consolidated Kansas City Smelting and Refining Co., has returned from a trip to Mexico.

S. KOENIGSBERG, general manager of some Ural mountain, Russia, mines is here to study California mine methods, and to buy considerable American mining machinery.

DENNIS RYAN of St. Paul, Minn., is here on a brief visit. He was once owner of the Horn Silver which he sold to the Cunards for, it is said, $4,000,000. He still owns the Gold Hunter mine in the Cœur d'Alenes.

AT the graduating exercises of the Boston Institute of technology on the 9th, Aug. J. Bowie of this city, was honored with two degrees in mechanical and electrical engineering, passing first in a graduating class of 188.

J. E. SPURR, H. B. Goodrich and F. C. Schrader, members of the United States Geological Survey appointed to make a report on the mineral resources of the Yukon basin, Alaska, took passage at Seattle, Wash., this week on the steamer Queen for Juneau, and will journey thence across the pass to Forty Mile creek, about which region their work will center. The survey will probably take a year and a half, and the winter will be spent at Circle City. When complete the party will return to Washington city, and a report setting forth the results of their investigations will be published.

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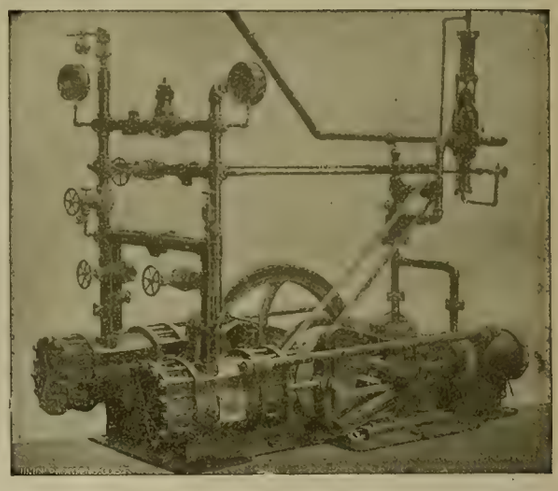
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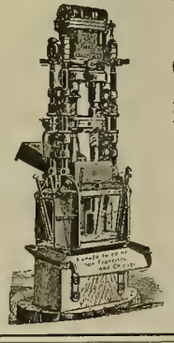
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This is a cut of the Double Pipe AirCompressor, the Compressor that is guaranteed to save 30% in power over any other make. It is cheapest to buy, cheapest to carry about and cheapest to run. If your fuel or water costs you anything, you want this Compressor. If you can get railroad freights free, and can carry machinery to your mine without cost, and your power costs you nothing, any make of Compressor will do you. You will be under no necessity to write to us at 306 Pine St., San Francisco, Cal. We could save you money though in cost of foundations, as our Compressors are half the size of other makes.



Tremain Steam Ore Stamp.

COMPLETE FREE-MILLING PLANT FOR $1,000.

Consisting of One TREMAIN STEAM STAMP, with Automatic Feed, capacity from 8 to 12 Tons a Day; One Upright Boiler; 20 Feet Electro Silver Plate, and all Pipes and Fittings necessary to connect Boiler and Mill.

Total Weight, About 5000 Pounds.

It requires no belting, shafting, pulleys or building.
Can be transmitted in section or whole. Well adapted to localities difficult of access. Weight, 3000 pounds.
Its practicability was fully demonstrated by its enormous sales of 1895, which exceeded those of two former years, and is now in successful operation in Africa, Alaska, Mexico, Colorado, South America, California, Canada, Montana, Oregon, Central America, Arizona, Dakota, New Mexico, Wyoming, etc.

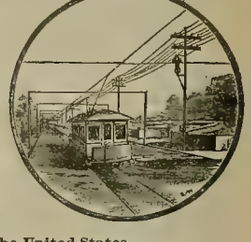
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Dr. J. C. Anthony, of 86 and 87 Chronicle Building, who for the past four years has met with universal success in the cure of Ruptures, now guarantees a cure in from 10 to 16 days. There is no pain, no blood drawn and absoutely without danger. Usually but a single treatment required.

## Commercial Paragraphs.

THE San Francisco Novelty and Plating Works, Justinian Caire agent, has the contract for covering with copper the dome of the New City Hall.

THE Colorado Iron Works recently completed and shipped twenty-one cars for W. S. Stratton, of Cripple Creek. The cars were made from a special design originated by Mr. Stratton.

A HOISTING plant for the Corral Hollow coal mines is being built by the Fulton Engineering and Shipbuilding Works—two direct-acting, 20x60-inch engines, weighing 175,000 pounds.

THE Washburn & Moen Manufacturing Company, at its annual meeting held at Worcester, Mass., on May 26th, voted to increase its capital stock from $3,500,000 to $4,000,000. The old board of directors were re-elected as follows: Wm. E. Rice, president; Philip W. Moen, treasurer and general manager. A quarterly dividend of 2 per cent has been declared.

THE diversity of uses to which electric motors are now being put is forcibly exemplified by a glance at the orders which the power and mining department of the General Electric Company received during the first two weeks of last month. The motors were called for to operate printing presses, saws and planers in a box factory, an assortment of mining machinery in a coal mine; machinery in a large bakery; blowers in a stove works; a Gould fire pump; a mine pump; large Brush arc lighting dynamos; a jib crane; travelling cranes; machinery in an oil cloth works; inclined railway, etc., etc.

JAS. S. BROWNELL, Western agent Frue Vanning Machine Co., this city, reports the following sales: Eight 4-foot patent lip flange corrugated belt Frue vanners, Golden Gate mine, Sonora, Tuolumne county, Cal.; two 6-foot plain belt Frue vanners, Kinkead M. & M. Co., Virginia City, Nev.; Julian G. M. Co., Funter Bay, Alaska, four 4-foot patent lip flange plain belt Frue vanners; Roanoke Mining Co., Mokelumne Hill, two 6-foot plain belt Frue vanners; Dutch Mining & Milling Co., Quartz Mountain, Tuolumne county, four 4-foot patent lip flange belt Frue vanners; Gold Park Mining Co., Austin, Nev., one 6-foot plain belt Frue vanner; New Citizens G. M. Co., Coarse Gold Gulch, Madera county, one 6-foot plain belt Frue vanner; Parke & Lacy Co., Sydney, Australia, four 4-foot patent lip flange plain belt Frue vanners.

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING JUNE 2, 1896.

561,192—ROTARY PUMP—Bartlett & Lewis, Portland, Oregon.
561,485—LOAD DUMPER—T. Carroll, Anaheim, Cal.
561,494—GATE HINGE—W. J. Crawford, Spokane, Wash.
561,308—BUCKLE—C. F. Francisco, Lakeside, Cal.
561,267—LIFE SAVING DEVICE—W. H. Martin, Military Home, Cal.
561,429—ENGINE EXHAUST—Perry & Hancock, Needles, Cal.
561,518—MALT KILN—F. Rademacher, Los Angeles, Cal.
561,240—ABSTRACT BOOK—S. H. Rice, Ukiah, Cal.
561,354—BUTTER MOLD, ETC.—R. A. Simpson, Ferndale, Cal.
561,464—CORSET—Mina Woodruff, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

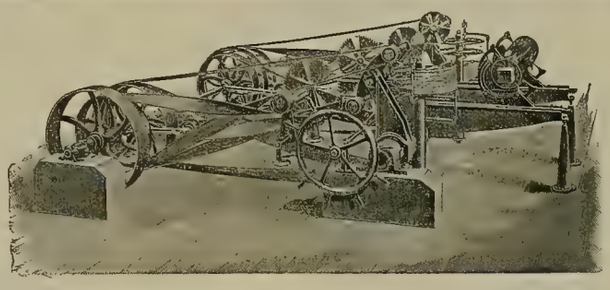
BUTTER MOLDING AND CUTTING MACHINE.—R. A. Simpson, Ferndale, Cal. No. 561,351. Dated June 3, 1896. This invention relates to a machine for moulding and cutting butter, in which independent removable strips are mounted upon a suitable bed which is bounded by removable walls, forming a receptacle within which the butter is packed and molded; the molded mass being subsequently cut into proper squares, and the walls gradually removed in sections. The object of the invention is to simplify the construction of this class of machines. It consists of a stationary bed having cleats extending across from its opposite side; a temporary and removable bed above the stationary bed formed by a series of transverse bottom boards placed side by side, with their ends resting loosely on the cleats; mold sides hinged together in pairs at diagonally opposite angles, so that the sides are separable laterally and independently of the bottom boards. Blocks are pivoted to the cleats, turnable thereon, so that their ends may project beyond the cleats and form a support for the mold side and increase the depth of the box or mold. When longer and heavier rolls are desired, a partition wall is removable, fitted within the mold sides and adapted to be introduced at any point to reduce the capacity of the box. The butter is cut by wires stretched upon a frame, and this frame has slidable foot strips with means for adjusting it from the main frame, and using it thereon as required.

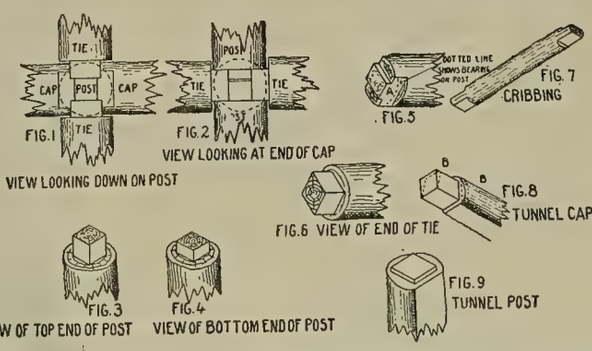

THE CHRYSOMETER.

A CHEMICAL ASSAY OUTFIT. Anyone can use it. Chemicals enough for 100 assays with each $25 outfit. J. W. PETTEE, Sole Manufacturer, 907 17th Street, Denver, Colo.










## The Denver Engineering Works Company.

Herewith are three illustrations of part of the works of the Denver Engineering Works Co., manufacturing and consulting engineers, corner of Thirtieth and Blake streets, Denver, Col. The works, under the name of Hendy & Myer, were originally started in 1876, and are pioneers in the West in the construction of mining, smelting, milling and concentrating machinery. They have made many improvements in this line of late years and have lately finished the largest silver-smelting furnace in the world.

Among their many special machines for the saving of labor, we here illustrate their patent mine timber framing machine, which will do the work of twenty skilled carpenters and do it more accurately.

It will make the tenons equally true on *round* or *square* timbers, no matter how crooked or winding they may be, and the shoulders and sides of the tenons will be parallel and true to each other; also the ends.

Every stick will be of *exactly equal* length between shoulders and every tenon will be the same length. Should a round log be two or three inches larger at one end than the other, the tenon will always be exactly in the center.

Any length of timber can be framed up to ten feet between the shoulders and up to sixteen inches diameter on the standard machine.

By referring to the cut shown, it will be seen that there are ten saws—five at each end—so both ends are framed at the same time and at the one setting. It is usually the practice to make the tenons of mine timber to have a clearance of one-half inch to one inch between the ends of the tenons, depending on the shoulders and side grain of the sticks to sustain the weight. By so doing, the best part of the log is not used for direct strain endwise.

This machine enables the framer or timberman to make full use of the whole stick or log, by having the tenon cut the proper length, to allow for the shoulders setting into the cross grain to a solid bearing, and then meeting, end to end; in this case leaving the tenon as large as possible and bringing most of the weight to bear on the ends, thus relieving the shoulders of the great strain and preventing the settling of the timbers, so often seen in the lower sets of large veins and chambers.

Round logs are much cheaper than square timbers and are far superior, as the outside is the strongest part of the log, and, by their use, the price of the machine is saved every month or two; but, if square timber is preferred, it handles it equally well. To describe the operation, if round logs are used, they are cut in lengths about one-half to one inch longer than they will be when finished in the frame.

The saws being adjusted to cut the right size and length of tenon, the log or stick is rolled into position with the proper angular bolster under each end to bring it in the center, and made fast by the dogs shown, thus holding it firmly in position.

The company takes pleasure in referring to any of the following companies who are now using their machine, and will send special circulars and letters on application: Aspen Mine, Aspen, Colo.; United Verde Copper Co., Verde Station, Arizona; W. A. Clarke, Butte, Montana; Bunker Hill & Sullivan M. & C. Co., Wardner, Idaho; Colorado Smelting & Mining Co., Butte, Montana; Bullion Beck Mining Co., Park City, Utah; Centennial-Eureka Mining Co., Eureka, Utah.

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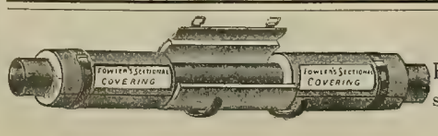
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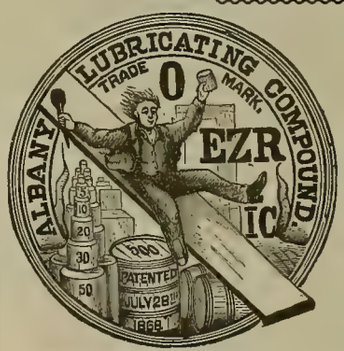
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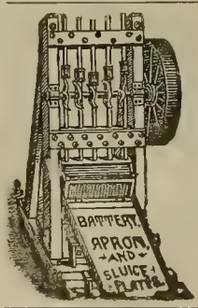
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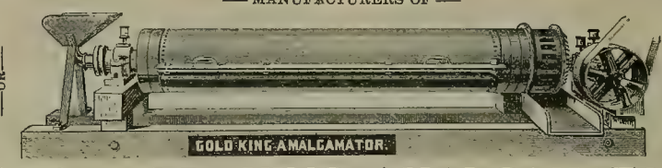
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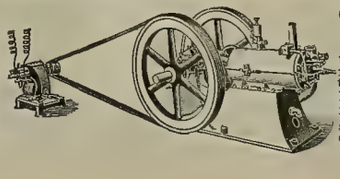
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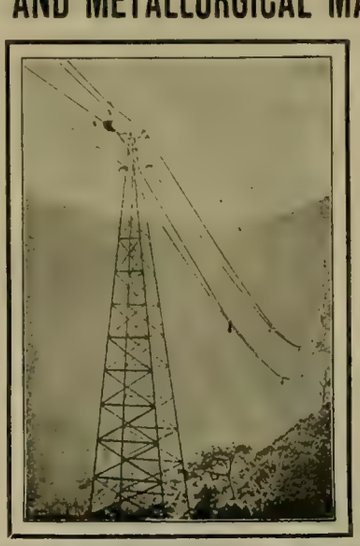
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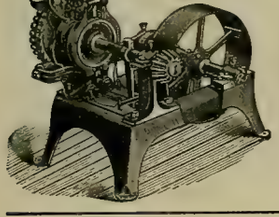
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To MINE OWNERS and others having Refractory Gold and Silver Ores hitherto untreatable at a profit, the MACARTHUR-FORREST (Patent) Process of Gold and Silver Extraction offers a solution of the difficulty.

Advisory Board in the United States: Thomas W. Goad, Manager; Hugh Butler, Attorney; John F. Bell; P. George Gow.

California and Nevada Agency and Experimental Plant, 23 Stevenson Street, San Francisco, Cal. P. G. Gow, Sole Agent.

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The Kendall Process is the most efficient method of using cyanide for the extraction of precious metals from their ores. Wherever this process has been adopted the result has been increased percentages of values recovered and saving of time. Material reduction in consumption of chemical has also been demonstrated with respect to several classes of ores.

*The Kendall system is covered by patents which this company will defend.*

The American Cyanide Gold and Silver Recovery Co., organized in Denver more than a year ago to introduce and operate the Kendall Process in several States, have closed contracts with some ten mines for the use of this process after exhaustive comparative tests with the ordinary plain cyanide method.

Capt. De Lamar has adopted the process at his Nevada mines, where a 250-ton plant is being completed. He writes that he is saving 95 per cent of his gold values, and regards the Kendall Process as the cheapest and best he is aware of for the treatment of gold ores.

*All ores, without exception, amenable to cyanide treatment can be treated to better advantage by the Kendall Process. This can be accepted as an axiom.*

Owners of mines and reduction works can obtain full information on application to

**KENDALL GOLD AND SILVER**

**Extraction Company,**

47 BROADWAY, - - - NEW YORK CITY.

**THE ROESSLER & HASSLACHER CHEMICAL CO.,**

**73 Pine Street, New York.**

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Guttenberger's Roller Quartz Mills, Larabee Street-Car Indicator. Write for estimates.

## Gold in Ecuador.

It is now claimed that among the gold-producing countries of the world Ecuador will be noted. The placer gold fields, situated in the Province of Esmeraldas, in the northeastern part of Ecuador, cover nearly 200 square miles. The most of this tract, it is said, is held by four companies, prominent among which is the Playa de Oro Mining Company, which has already expended over $600,000 on its plant, which is being rapidly pushed on to completion, and already shipments of gold have been made by the company of over 1150 ounces from the washing done during the progress of development operations. The three other companies working in the district are also engaged in active development, and the necessary machinery for the treatment of the gravel is being erected. The deposits are situated at the foot of the Andes, and from their location can be worked economically, the water power for hydraulic mining being supplied by the Santiago river and other large streams in the neighborhood of the properties, while the lands are well timbered. Under the amended Ecuadorian mining laws, mining property, mining machinery and the output of the mines enjoy immunity from any description of taxation for a period of twenty-five years. Cable communication is being established by the Ecuadorian Government, and negotiations are in progress with the Pacific Steamship Company for the establishment of a service.

## Recent California Mining Incorporations.

Waterford Mining Co., S. F.; F. L. Pritchard, W. F. Ambrose, E. F. Campion, P. Walsh; capital stock $2,000,000, $500 subscribed. The company proposes to operate in Paterson district, Mono Co.

The Chivato Mining and Milling Co., San Francisco; capital stock $1,000,000; W. J. Sutherland, E. S. Spring, W. G. Holmes, B. Royce, W. E. Greene.

Bunker Hill Mining, Milling and Power Co., San Francisco; capital stock $500,000, $375,075 subscribed; W. B. McSherry, G. W. Osborn, T. M. Carroll, E. W. Burke, M. M. Miller, J. B. White.

## Recently Declared Mining Dividends.

On the 15th the Portland of Colorado pays a 1c per share dividend. The Moon-Anchor Co. pays a similar dividend on the same date.

The Morning Star gravel mine, Placer Co., has declared a $6 dividend per share—its sixtieth dividend.

The miners should be partial to San Francisco. The MINING AND SCIENTIFIC PRESS estimates that fully $5,000,000 of San Francisco capital has been invested in California mines during the past year.—Placer Herald.


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"HISTORY OF CRIPPLE CREEK."

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address. *Illustrated Weekly*, Denver, Colo.

An Experienced Millman

Desires position in mill; understands concentrators; has had 8 years' experience. Address Amalgamator, care MINING AND SCIENTIFIC PRESS.

## GOLD MINING PROPERTIES.

Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

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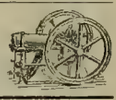
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This Riffle is just what placer miners want whether they are working large or small claims, as it is the only riffle ever invented that holds the mercury entirely exposed to the material, no matter what force of water is used. A large number of these Riffles have been sold, and are now in use in Colorado, Montana, New Mexico and elsewhere, and the first complaint has yet to be made against them. Many testimonials have been received from parties who have used and are now using them, giving them the highest praise. Are made of chilled cast iron, cheaper and more durable than any other process. Agents wanted. County and State rights for sale. These Riffles are manufactured at Denver only. Address all orders and communications to

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# MERCUR.

UTAH'S NEW EL DORADO.

Wonderful Development of the Camp Floyd Mining District.

The Camp Floyd Mining District of Utah, distant but forty miles from Salt Lake City, is now attracting the attention of the mining world as the only Western rival of Cripple Creek, Colo. The district has had a most remarkable history. The town of Lewiston rose, flourished and passed into decay twenty-five years ago, on the very spot on which Mercur has been built within the last eighteen months. It was renowned as a silver camp in '71, and from that time until 1880 old timers tell of the many big strikes in the district, but it was not until 1890 that gold was found. Attention was then called to the MacArthur-Forrest cyanide process, and a test of the ore was made in Denver, with such elaborate results that the old mines and many new ones were put on a dividend-paying basis. The formation at Mercur is very similar to the region about Johannesburg in South Africa, except that the Camp Floyd ore bodies are larger and richer. Geologists and mineralogists differ as to the origin and formation of the ore body, some claiming three distinct gold-bearing veins, while others seem to favor the single blanket vein theory. On one point, however, all agree, that no such gold deposit has ever before been discovered. In the Mercur mine the ore bodies average $15 in gold to the ton, while some assays run into the hundred's mark. With the aid of the cyanide process this ore is mined and milled at an average cost of $2.50 to $3 per ton, leaving a profit of $12 to $12.50 per ton. On this basis the mine has, in the year just passed, paid dividends to the extent of $810,000. The adjoining properties—the Golden Gate, Marion and Geyser—are equally as rich. The vein or veins have already been traced from the cluster of mines at Mercur to Sunshine, a distance of six miles, where the Sunshine mine and mill, another large property, is located, together with numerous claims of less magnitude. If the discoveries recently made, twelve miles west of Mercur and far to the south, are uncoverings of the same vein, then there is strong evidence that the great deposit covers an area of from 100 to 150 square miles and is the greatest ore body in the world.

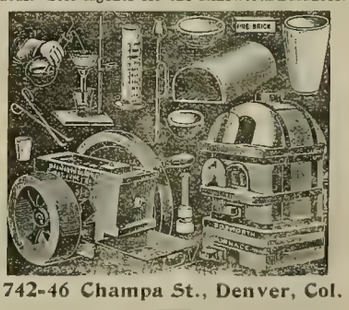
Mercur or the Camp Floyd Mining District is best reached by the Rio Grande Western Railway to Salt Lake City. For further particulars or for printed matter apply to F. A. WADLEIGH, General Passenger Agent, Rio Grande Western Railway, Salt Lake City. *

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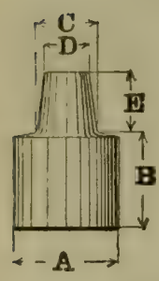

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## MINERS, ATTENTION!



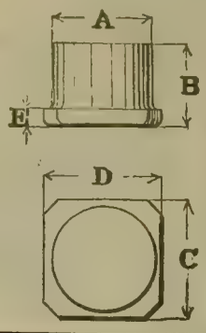

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These Shoes will outlast any other make and will not chip or cup.

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**IMPROVED MILLS**
That successfully take the place of stamps.

**AMALGAMATORS,**
Doing away with plates on all kinds of mills for saving gold.

**DISTRIBUTORS**
That save a vast amount of care and labor, divide the pulp and water evenly to two or more lines of concentrators.

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Sizes the ore from the mill, separates the sands for the jig, and slimes for the slime concentrator.

**JIG CONCENTRATOR**
For working the sands from the separating box.

**SLIME CONCENTRATOR,**
Works the slimes from the separator.

**DRY JIG,**
Concentrates ores where there is a lack of water.

**MILLS,**
To crush to any degree of fineness desired.

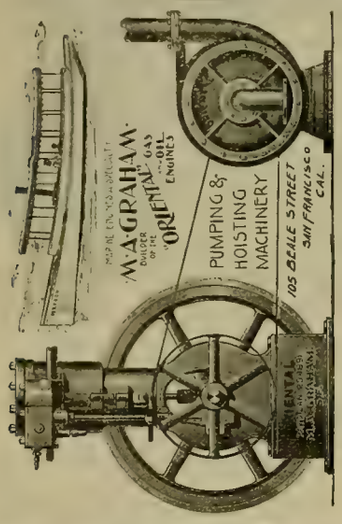
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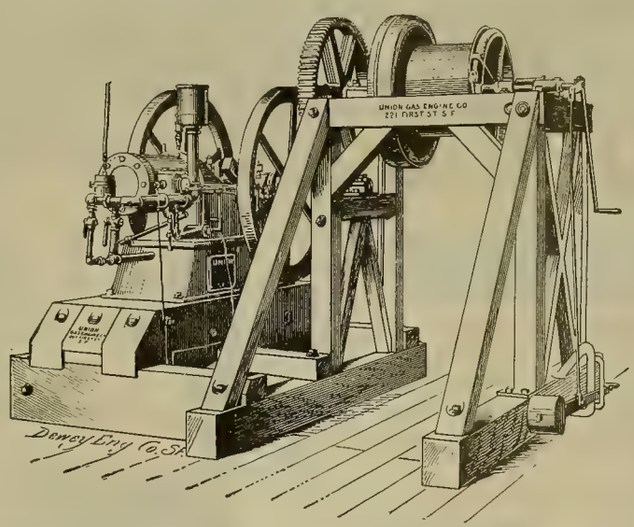
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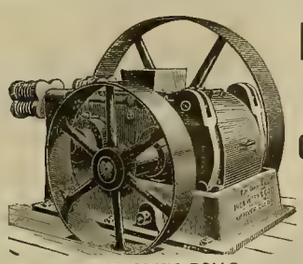

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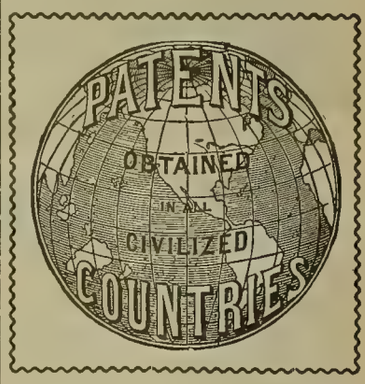
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For information concerning this process for the reduction of ores containing precious metals, and terms of license, apply to

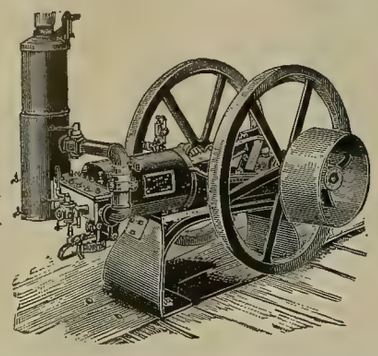
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**Will furnish power for one-tenth of a cent per horse power per hour. It is the cheapest power ever produced, as shown in the following table, and which is based upon a test of ten hours' run with one of our five-horse power Gasoline Engines,** using gasoline (74°), coal gas, common domestic coal oil, crude petroleum, asphaltum base, crude petroleum, paraffine base, as follows:

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| Coal Gas, ten hours' run, 1000 feet | $2 00 |
| Gasoline (74 deg.), ten hours' run, 8¾ gallons @ 14c. | 1 25 |
| Coal Oil, ten hours' run, 7½ gallons @ 10c | 75 |
| Crude Petroleum, asphaltum base, 16 gallons @ 3c | 48 |
| Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c | 65 |

On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon—21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1½c per horse power per hour; and on gasoline, 2½c per horse power per hour.

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## Stamp Mills

Of the Latest Improved Design for

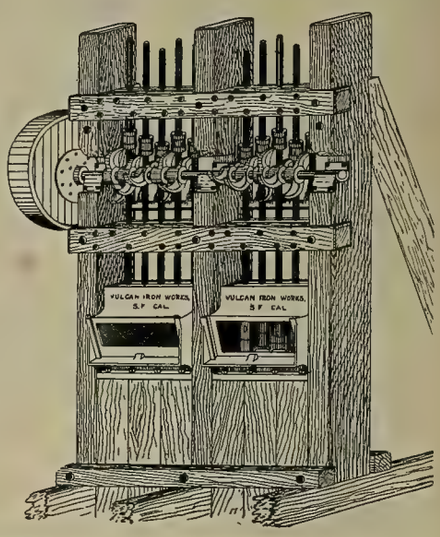
## Gold Milling.

## VULCAN WIRE ROPEWAYS

For Conveying Ore, Etc.

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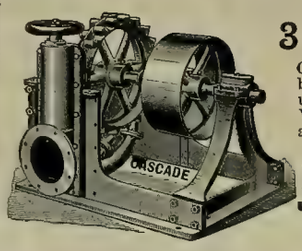
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# Mining Pipe!



**STEEL OR IRON.**—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.

**COATING.**—We use great care in COATING our pipe with a HOT solution of Double Refined Asphaltum and Maltha.

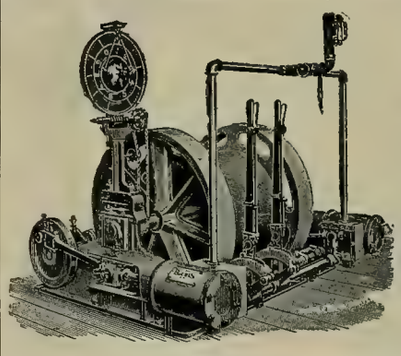
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CHROME CAST STEEL

## Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



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These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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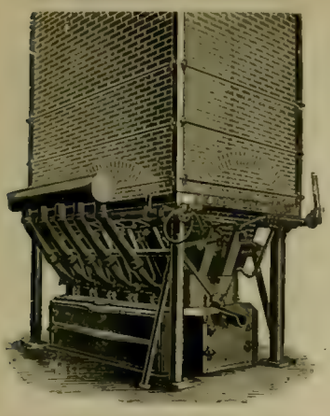


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MANHATTAN RUBBER BELTING, PACKING AND HOSE,
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Standard Silver-Lead Water Jacket Smelting Furnace.

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FOR THE REDUCTION OF GOLD, SILVER, LEAD AND COPPER ORES.

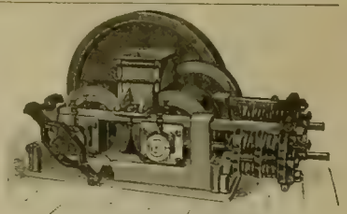
..... We can furnish on Short Notice MACHINERY and GENERAL EQUIPMENTS for .....

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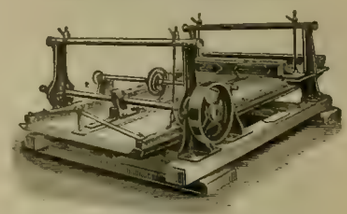
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*Catalogues on application.....*

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CAZIN'S] IMPROVED [CRUSHING ROLLS.
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Capacity 5 to 15 tons in 24 hours. A machine that will do the work.

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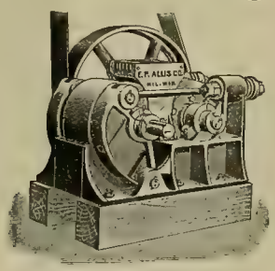
The Reliance Crushing Rolls.

RELIANCE WORKS.

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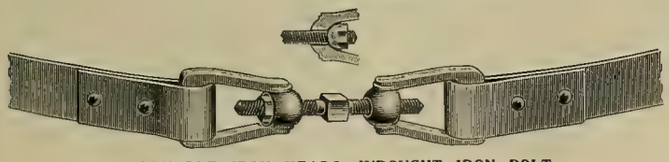

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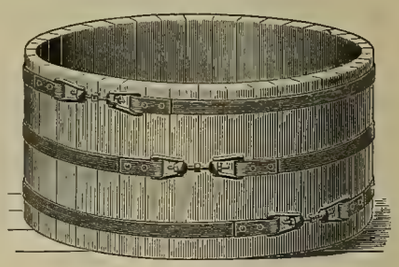
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MALLEABLE IRON HEADS, WROUGHT IRON BOLT.

These couplings are the best. They are the most powerful. They have a direct pull with right and left screw. They work freely on ball and socket joints. They are easily applied. We use them extensively in our tank building department.

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IN QUARTZ, GRAVEL OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.

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# Market Reports.

## The Markets.

SAN FRANCISCO, June 11, 1896.

Business continues good. The demand is not increasing but enlarging for all lines. It is the belief that general trade will continue fairly active during the summer months with a very decided increase this fall over that of several years past. The attention of the capitalists and investors generally is still attracted to gold mining properties. Transfers are reported daily, but particulars are withheld. Referring to the demand for mining properties, the *Wall Street Journal* says: A prominent mining man, speaking of the mining situation in the west, says that the lull in the mining matters in the east does not extend beneath the surface. Underneath, there is great activity, which is placing things in shape for a genuine mining boom. He named six or eight leading houses, any one of which could justly claim a national reputation, that have acquired options on or interest in genuinely good properties. This movement is still going on, and buyers are naturally bears at the moment. They have attempted in a legitimate way to discourage all expansion in the East until they secured their position. The time will come when they will be ready, and then we may look for an excellent market for mining stocks in New York City. From data at hand it is perfectly safe to assume that the properties bought out by these houses will be moderately capitalized, and there will be no 5 and 10 cent shares.

Up to this time the Cripple Creek region has been the favorite, although some excellent properties have been secured in New Mexico, Arizona, Utah and Southern California. Gold mine investments are about the only ones in this country that could not be hurt by free silver. English capital is expected to find mining channels in this country before it goes into rails and industrials.

The local money market is without essential change. The supply of available funds is quite large, in excess of present requirements, but the usual crop moving demand is expected to set in soon. It is the impression that more funds will be advanced on wheat than usual owing to farmers having bullish ideas regarding the future of the market. The large increasing output of the mines is adding still more to loanable funds as is the investment of eastern and foreign capital in mining properties. The East reports continued ease in the money markets. So soon as crops begin to move a strengthening in the rates of interest is looked for.

### New York Silver Prices.

NEW YORK, June 11.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. |
|---|---|---|
| Friday | 31⅜ | 68⅝ |
| Saturday | 31⅜ | 68⅝ |
| Monday | 31 5-16 | 68⅛ |
| Tuesday | 31 5-16 | 68⅛ |
| Wednesday | 31 5-16 | 68⅛ |
| Thursday | 31 5-16 | 68⅛ |

| | Copper. | Lead. | Iron. | Tin. |
|---|---|---|---|---|
| Friday | 11 40 | 3 00 | 10 75@13 00 | 13 35 |
| Saturday | 11 40 | 3 00 | 10 75@13 00 | 13 35 |
| Monday | 11 40 | 3 00 | 10 75@13 00 | 13 25 |
| Tuesday | 11 40 | 3 00 | 10 75@13 00 | 13 20 |
| Wednesday | 11 40 | 3 00 | 10 75@13 00 | 13 25 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 6@7 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | 12½ |
| New York Telegraphic Transfer | 15 |
| London Bankers' 60 days | $4.88¼ |
| London Merchants | $4.88¼ |
| London Sight Bankers | $4.89½ |
| Refined Silver, peroz., 1000 fine | 68⅝ |
| Mexican Dollars | 54@55c |

SILVER.—The market has held steady and fairly firm throughout the past week. For the first five months of the calendar year the exports from this city aggregate $2,336,440 in bullion. The last steamer for Japan and China took out $342,000 in bullion. A New York exchange of June 6th says: The bullish feeling on silver seems to be based on the idea chiefly that everything unfavorable in regard to the metal is already known, and it can receive no further important blow in the near future. There is evidence, moreover, that the low price has begun to tell on production which is not so great as it was, and is declining. Besides this, foreign coinage demand has absorbed most of the floating supply, and the market is in a condition where it would readily respond to anything favorable. Nobody takes much stock in politics, as a serious factor in the case of silver, but as conditions favor a rise anyhow, it is easy to make bullish sentiment effective for the time being. People who have interested themselves rather actively in the silver market say that there might very easily be a 2 or 3c. advance in the price at any time. Quite a considerable amount has been speculatively bought in the last two or three days. The figures of silver exports from this port:

In 1891 exports from New York were $21,000,000; 1892, $23,000,000; 1893, $32,000,000; 1894, $34,000,000; 1895, $38,500,000; 1896, (5 months) $21,000,000.

The present rate of exports so far this year would indicate exports of perhaps $45,000,000 for the year.

MEXICAN DOLLARS.—The last steamer for China took out 339,867 dollars, which is more than has been taken at any one time for some time past. The exports for the first five months of this year aggregate 3,323,400 dollars. The market is steady to firm at quotations.

COPPER.—The market has held firm. The East continues to report a good demand for both home and export. A New York exchange of recent date says: "The violent fluctuations in copper in the London market this week are reported due to the unusual demand and supply coming upon the market suddenly. The demand for copper has become enormous for the transmission of power. Mines which heretofore could scarcely be operated because of the scarcity of fuel to generate power are now being operated easily and economically by the transmission of power over copper wires from distances of from fifteen to seventy-five miles. The growth of the trolley system and telegraph and telephone systems all over the world has also increased the demand enormously."

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

QUICKSILVER.—The market is steady. The East reports a good movement, with the market weaker.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 39 00 |
| Distant points up north | 38 00 |
| West coast of Mexico, for export | 34 00 |

ANTIMONY.—The market is quiet but steady at 8@9c cents in a jobbing way. New York mail advices quote 7⅛@7¾c for Cookson's, 6⅝@6¾c for Hallett's and 6½@6⅝c for Japanese, from store.

TIN.—Our market is easy, with a light demand ruling. The East reports slightly easier markets, in sympathy with a slight decline abroad.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

BORAX.—The market is quoted as follows

| | |
|---|---|
| Refined, in car lots | 6⅛ |
| Refined, in sacks | 5⅞ |
| Powdered, in car lots | 6⅛ |
| Concentrated, " | 5⅝ |

LEAD.—The market is steady both here and at the East.

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

POWDER.—Manufacturers continue to report an active demand, almost entirely for mining purposes. The market is strong at unchanged quotations.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " " | 8½c |

IRON.—The market is fairly steady. The consumption continues large. Eastern mail advices state that there is a lighter call and with more selling offers there is some cutting in prices by those outside of the combination. Our market is quoted as follows:

AMERICAN.

| | To Arrive. | Spot. |
|---|---|---|
| Sloso | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |

ENGLISH.

| | | |
|---|---|---|
| Barrow | $21 00 | $23 50 |
| Gartsberrie | 21 50 | 23 50 |

COAL.—Notwithstanding light imports of Australian and no vessel being able to load at Australian coal ports, our market continues steady. The liberal supply of coast coals is against higher prices. Advices from Kelso, Washington, are confirmatory that in the Anchor coal mine they have run into a good grade of coal, which improves as the deposit is worked. It is the opinion of experts that it will prove superior to any in that State.

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — | — | — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — | @ | 11 00 |
| " in sacks | — | @ | 12 00 |
| Cumberland | — | @ | — |

LUMBER.—There is a continued good home and export demand.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — |
| Pine | 14 00 | @ | 19 00 |
| Spruce | 26 00 | @ | 31 00 |

## Mining Share Market.

SAN FRANCISCO, June 11, 1896.

The market made quite an advance, with the highest prices reached on Monday. The move was chiefly in the middle shares, under the lead of Chollar. As usual, the Gold Hill shares did very little. The highest call prices were as follows for the leading shares in each group: Con. Virginia $3.25, Ophir $2.40, Gould & Curry $1.75, Savage $1.90, Hale & Norcross $3.40, Chollar $4.30, Potosi $2, Belcher 81c, Crown Point 76c, and Yellow Jacket 73c. The market began to ease off towards noon of Monday and fluctuated down for the middle and north end shares up to yesterday, when a slightly steadier tone set in. The lowest prices yesterday on call were as follows: Con. Virginia $2.70, Ophir $1.90, Gould & Curry $1.30, Savage $1.50, Hale & Norcross $2.05, Chollar $2.90, Potosi $1.55, Belcher 76c, Crown Point 68c, Yellow Jacket 69c. At the informal morning session the prices were lower than the above. While the middle and north ends were selling down the Gold Hill shares sold up a few cents. At the decline there was liberal selling by outside holders and shorters. The bulk of the shares sold were taken in by strong parties, which would indicate that the deal is not over. It seems to be an open question whether the pool can make outsiders buy enough shares on the present prospects in the mines to admit of levying and collecting the line of assessments that is contemplated. From all that can be learned there are at least ten companies that must levy assessments within the next thirty days, for the banks will not allow them to overdraw much, if any, unless secured against the possibility of loss. The banks will not only not advance much money to the companies, but they will not loan money on shares unless to brokers of sound financial standing, and even then the latter have to give a note which draws interest, even if there is money to their credit. This makes it difficult to promote a large-sized deal, for the trading public is not blessed with sufficient funds to pay for many shares when the latter get up to from two to over four dollars each. It must be conceded that more ore must be shown up than has, as yet, been found to induce moneyed outsiders to come in as large operators. While saying this, it must be admitted that the work under way in some of the mines is of a highly interesting character, and as it progresses the shares in these particular ones will be subject to lively fluctuations—quick jumps and breaks or setbacks. This may possibly make the market sufficiently interesting as to induce more persons to come in as traders who care little, if anything, what is in the mines or how many assessments are levied, so long as the market is made active, with lively fluctuations.

An assessment of 25 cents a share was levied the past week by the Chollar Mining Co.

From the Comstock lode the news is about the same as heretofore made public. Everything points to time and assessments—how much time or how many assessments it is hard to say. The work in the mines on this lode requires to be done with the utmost care, so as to avoid loss of life through poor ventilation and caves by the moving character of the ground. There is not a mining district in the world which calls for such a systematic working as does that of the Comstock—therefore the heavy expenses and many unavoidable delays. In the Alta group the only work reported is in Alta, and this is about the same as heretofore made public. In the Gold Hill group work has been resumed in Overman. Stringers are reported as having been cut. Seg. Belcher and Belcher continue to report raising ore, but not enough to pay running expenses. In Crown Point the work under way points to time; but while it is being pushed more or less ore is liable to be cut, but it is not at all probable that it will be of sufficient size or value to count for much yet awhile. No news is allowed to leak out from Yellow Jacket, outside of a pending assessment. In Confidence they are still raising from the 60-foot level, above the 200-foot level, to the surface, so as to get ventilation. Slow progress is still being made in the joint west crossdrift of Confidence, Challenge and Con. Imperial. In the latter mine they are at work on the surface tunnel level. Work is continued on the 500-foot level of Alpha. No work is being done in Excheq. er, so far as the public is advised. The long west crossdrift in Bullion and also that in Gould & Curry are being pushed slowly ahead. In Potosi they report more or less stringers of ore on two levels. The work in Chollar is essentially unchanged. About 50 tons of ore are raised each week. In Hale & Norcross work is continued on several levels and some ore is raised, but not enough to pay expenses. The official letter from Savage reports that 202 cars (about 190 tons) of ore were raised the past week, which assayed over $62, as per car samples. The letter also stated that 260 tons of ore had been milled, which gave over $41 a ton, as per battery assay. This small return, it would seem, ought to be inquired into by the management, so as to find the reason for it. In Best & Belcher the work is on the same levels as heretofore made public. There was quite a falling off in the number of tons raised by Con. Virginia and also the car sample assays, but this was generally expected by miners. The work in this mine continues to be closely watched by mining men. The work in Ophir and Mexican is on the same levels as heretofore reported. It ought to be near an interesting point in each mine. The work reported in Sierra Nevada and Union is not materially changed. In Andes they have raised and are milling some ore left from former working.

Advices from the Brunswick lode are decidedly mixed and conflicting so far as private information is concerned: The ore has not as yet developed enough in quantity to warrant any great excitement in the shares of the mines working on that lode. What will be found is a problem which time alone can solve: at present there is nothing to justify the expectations of finding a bonanza. The crosscuts run on the 200-foot level of the mines are of an encouraging character, but what will be found when the crosscuts are run on the 300-foot level is an open question. Many look for an improvement over the 200-foot level. Active work is being done by Chollar, Savage, Hale & Norcross, Gould & Curry, Best & Belcher and Con. Virginia on the 200-foot and 300-foot levels. In Occidental they are working as low down as the 750-foot level. While the work in the above mines is underway considerable activity and rapid fluctuations in the shares will be in order.

The market opened this morning barely steady with moderate trading. After Call, prices shaded off, with Chollar sold down to $2.65. Towards noon the list strengthened under fairly active trading. At the 2:30 session business was light, with a disposition to sell. The impression prevails that top prices were touched on Monday and that the market will fluctuate to still lower figures. The news from the mines is not of a discouraging character; but, on the contrary, it is such as to encourage the belief that better things can be looked for before long. It is said that outsiders have been selling quite freely. If this is correct, then there ought to be a rally soon.

The following illustrates the changes of the week:

| Mines. | June 4. | June 11. |
|---|---|---|
| Alpha | | $ 22 |
| Alta Consolidated | $ 19 | 25 |
| Andes | 52 | 44 |
| Belcher | 76 | 76 |
| Best & Belcher | 1 50 | 1 30 |
| Bodie | 70 | 65 |
| Bullion | 30 | 34 |
| Challenge | | 45 |
| Chollar | 3 25 | 2 85 |
| Confidence | | |
| Consolidated California and Virginia | 3 05 | 2 75 |
| Consolidated New York | | |
| Crown Point | 65 | 64 |
| Exchequer | 09 | 08 |
| Gould & Curry | 1 55 | 1 35 |
| Hale & Norcross | 2 90 | 2 20 |
| Justice | | |
| Mexican | 1 15 | 1 10 |
| Ophir | 2 10 | 1 90 |
| Overman | 28 | 39 |
| Potosi | 1 50 | 1 60 |
| Savage | 1 70 | 1 60 |
| Sierra Nevada | 1 15 | 1 05 |
| Union | 1 05 | 1 10 |
| Utah | 20 | 17 |
| Yellow Jacket | 58 | 73 |

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alaska-Willoughby G M Co, Alaska | 1 | 20c | Apr 6 | May 25 June 29 | T Pollard, 22 California |
| Alta S M Co, Nev | 52 | 10c | May 4 | June 9 June 30 | J E Jacobus, 309 Montgomery |
| Burlington G M Co, Cal | 2 | 3c | Apr 23 | May 27 June 17 | W C Ralston, 331 Pine |
| Central Eureka M Co, Cal | 1 | 3c | May 16 | June 22 July 18 | W Van Bokkelen, 320 Sansome |
| Chollar M Co, Nev | 42 | 25c | June 9 | July 14 Aug 4 | C E Elliot, 309 Montgomery |
| Horseshoe Bar Con M Co, Cal | 4 | 50c | May 12 | June 22 July 14 | D M Kent, 330 Pine |
| Mexican G & S M Co, Nev | 54 | 20c | Apr 23 | May 28 June 18 | C E Elliot, 309 Montgomery |
| Mono G M Co, Cal | 37 | 10c | June 2 | July 6 July 27 | M E Willis, 309 Montgomery |
| Mt Diablo M & M Co, Nev | 4 | 5c | May 21 | July 2 July 23 | R W Heath, 318 Pine |
| Ninshew G M Co, Cal | 1 | 3c | June 5 | July 13 Aug 3 | C D Cook, Mission St Pier No. 1 |
| Occidental Con M Co, Nev | 23 | 15c | June 2 | July 7 July 28 | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 3 | 2c | May 11 | June 18 July 6 | F L Olmsted, 315 Montgomery |
| Overman S M Co, Nev | 75 | 10c | May 2 | June 5 June 25 | G D Edwards, 414 California |
| Peabody G M Co, Cal | 6 | 10c | Apr 28 | June 3 June 24 | B Naforp, 124 Sansome |
| Reward G M Co, Cal | 13 | 3c | June 1 | July 2 July 20 | S W Backus, Mills Bldg |
| Savage M Co, Nev | 89 | 20c | May 1 | June 3 June 23 | E B Holmes, 309 Montgomery |
| Silver King M Co, Arizona | 14 | 25c | May 7 | June 16 July 14 | J W Pew, 310 Pine |
| Siskiyou Con Q M Co | 11 | 1c | May 5 | June 8 June 29 | E F Stone, 306 Pine |
| Ybarra G M Co, Mexico | 4 | 15c | May 21 | June 21 July 9 | Jas Coffin, 132 Market |

## ANNUAL MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Alaska-Treadwell G M Co, Alaska | A T Corbus, Mills Bldg | June 24 |
| Bodie Con M Co, Cal | M E Willis, 309 Montgomery | June 15 |
| Gold Hill M Co, Cal | C A Grow, Mills Bldg | June 17 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, June 11, 1896

9:30 A. M. SESSION.

| | | | | | |
|---|---|---|---|---|---|
| 300 | Alta | 24 | 100 | H. & N. | 2 05 |
| 200 | | 23 | 300 | Kentuck | 07 |
| 600 | Belcher | 75 | 600 | Mexican | 1 10 |
| 400 | | 76 | 400 | Occidental | 1 55 |
| 550 | Bodie | 65 | 100 | Ophir | 1 85 |
| 100 | Bullion | 34 | 600 | Overman | 39 |
| 100 | | 33 | 200 | | 37 |
| 300 | Bulwer | 33 | 400 | Potosi | 1 50 |
| 400 | | 32 | 500 | | 1 55 |
| 400 | | 31 | 700 | Savage | 1 50 |
| 200 | Challenge | 45 | 100 | | 1 45 |
| 550 | Chollar | 2 80 | 400 | S Belcher | 23 |
| 700 | | 2 75 | 350 | | 22 |
| 100 | Con Cal & Va | 2 70 | 450 | Sierra Nevada | 1 05 |
| 400 | Crown Point | 62 | 850 | | 1 00 |
| 200 | | 63 | 400 | Union Con | 1 05 |
| 400 | Exchequer | 08 | 100 | Utah | 16 |
| 100 | Gould & Curry | 1 30 | 300 | Yellow Jacket | 73 |
| 500 | | 1 25 | 500 | | 72 |

SECOND SESSION—2:30 P. M.

| | | | | | |
|---|---|---|---|---|---|
| 200 | Ophir | 1 90 | 500 | Alpha | 22 |
| 450 | Mexican | 1 10 | 200 | Belcher | 76 |
| 100 | Gould & Curry | 1 30 | 100 | Utah | 17 |
| 100 | | 1 35 | 900 | Overman | 38 |
| 100 | Best & Belcher | 1 30 | 500 | Occidental | 1 50 |
| 100 | C. C. & Va | 2 75 | 100 | Union | 1 05 |
| 100 | | 2 70 | 100 | | 1 10 |
| 100 | Savage | 1 60 | 100 | Alta | 25 |
| 650 | Chollar | 2 85 | 300 | Andes | 44 |
| 200 | Potosi | 1 60 | 450 | Bodie | 65 |
| 400 | H. & N | 2 20 | 400 | Yellow Jacket | 72 |
| 500 | | 2 15 | 50 | | 73 |
| 100 | Crown Point | 64 | | | |


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## Assessment Notice.

OCCIDENTAL CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 2d day of June, 1896, an assessment (No. 24) of fifteen cents (15c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of July, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on TUESDAY the 28th day of July, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURROW, Secretary.

Office, Room No. 69, Nevada block, No 309 Montgomery street, San Francisco, California.

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NIMSHEW GOLD MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, Nimshew, Butte county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 5th day of June, 1896, an assessment (No. 1) of Three cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Mission Pier, No. 1, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of July, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 3d day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

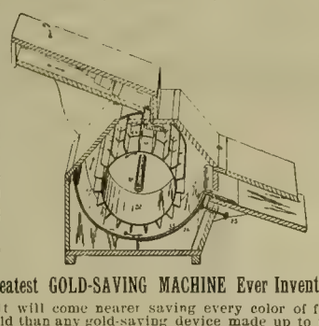
C. D. COOK, Secretary.

Office, Mission St. Pier, No. 1, San Francisco, California.

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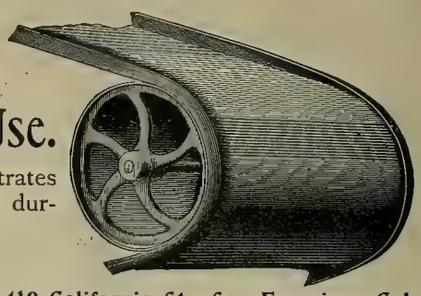
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OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

RISDON IRON WORKS, San Francisco—Gentlemen: Our company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screens 12 tons in 24 hours; through 50-mesh, 15 tons; and through 40 mesh, 18 tons. This proportion has been continuous.

One set of dies will crush from 1500 to 1600 tons.
One set of tires will crush 1500 tons.
One ring plate will crush from 2200 to 2300 tons.
The mills require very little attention. At our mill an ordinary peon," earning one dollar per day, has complete charge.

In regard to sliming, in comparison with stamps, by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success, and of material benefit to the mining world. They can be set up and running in forty-eight hours and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator it is unequaled by any mill now in existence. Yours truly,

D. M. BURNS, Superintendent.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, August 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: Referring to contract made by you with the Bullion-Beck and Champion Mining Company, by which you were to furnish one 5-foot Bryan Roller Quartz Mill on four months' trial, in competition with the Huntington Mill, would say that we have made the test, and the Bryan Mill has proven so greatly superior on all points claimed, viz., capacity and economy, that we have ordered a second Bryan Mill from you and have concluded to discontinue the use of the Huntington Mill.

Yours truly, JOHN BECK. Pres.

SIMON BAMBERGER, Director. [Copy.] W. J. BEATIE, Sec't'y.

BULLION-BECK AND CHAMPION MINING COMPANY.
EUREKA, UTAH, Aug. 24, 1895.

THE RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: In February last, in connection with the five-foot Bryan Roller Mill which we took from you to test in competition with the Huntington Mill, we also took a six-foot Johnston Concentrator to be tested with ten Frues, one end shake with four belts and one side shake Woodbury. We have been working these machines since the mill was completed, at such times when we had sufficient water.

The terms on which the test was made was that the machine doing the most satisfactory work should be accepted and the others taken out. This did not apply to the Frue, as they were purchased with the plant. In compliance with this agreement, we now inform you that the Johnston Concentrator has proved so superior over the other machines that we now order from you four more of the Johnston Concentrators. Yours truly, JOHN BECK. Pres.

SIMON BAMBERGER, Director. W. J. BEATIE, Sec't'y.

GREAT SALT LAKE AND HOT SPRINGS RAILWAY.
S. BAMBERGER, President and Manager.
SALT LAKE CITY, UTAH, October 10, 1895.

B. R. TAWNDRAW, ESQ., care Guyer Hot Springs, Ketchum, Idaho—Dear Sir: In reply to yours of the twenty-eighth of September, we have been using at the Bullion-Beck Concentrating Works, Frue Vanner, Woodbury and Johnston machines, side by side for the last four months; and after a thorough trial of all of them, we concluded that the Johnston Vanner was doing the most accurate work and was the best; hence, we bought four more Johnston machines and shall continue to use them in preference to any other.

You will find it the easiest regulated machine and very much easier set up than either of the other machines. We bought our machines from the Risdon Iron Works, of San Francisco, where Mr. Johnston, the patentee, personally superintends the manufacturing of them.

Hoping you will make a success, I remain, Yours truly,
[Copy.] [Signed] SIMON BAMBERGER.

THE GOLD VALLEY MINING COMPANY OF SAN FRANCISCO.
C. C. McIVER, President; D. CUSHMAN, Secretary.
MISSION SAN JOSE, CAL., Oct. 17th, 1895.

RISDON IRON AND LOCOMOTIVE WORKS, San Francisco—Gentlemen: We take great pleasure in having to inform you that, after a careful investigation extending over a six weeks' steady run alongside of six other concentrators, the Johnston which you put in for us was the only machine from which you could not find a loss in the tailings. It has done all you claim for it and has proved more than satisfactory. We intend replacing all our other concentrators with Johnston's, as we are convinced they will pay for themselves many times over in a year. CHAS. C. McIVER, President.

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No. 1876.—VOLUME LXXII. Number 25. SAN FRANCISCO, SATURDAY, JUNE 20, 1896. THREE DOLLARS PER ANNUM. Single Copies, Ten Cents.

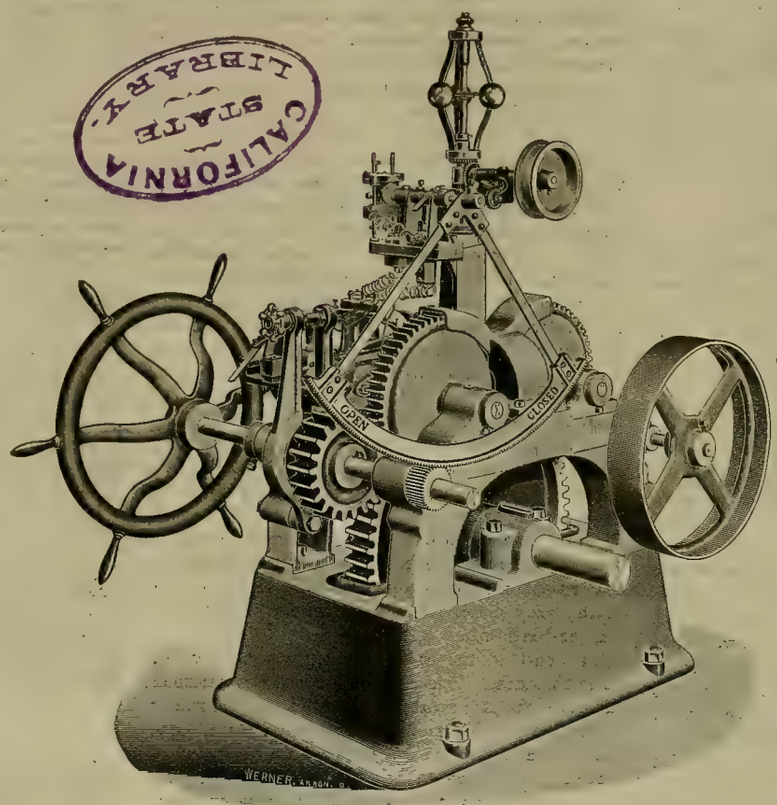

## A New "Relay" Water-Wheel Governor.

Government of water power for electric railway work has always been considered a very difficult problem even under the most favorable conditions. Power plant operators, where the changes in load are great and sudden, frequently find their government so uncertain and so near the danger line that it has been said that railways cannot be run successfully by water power.

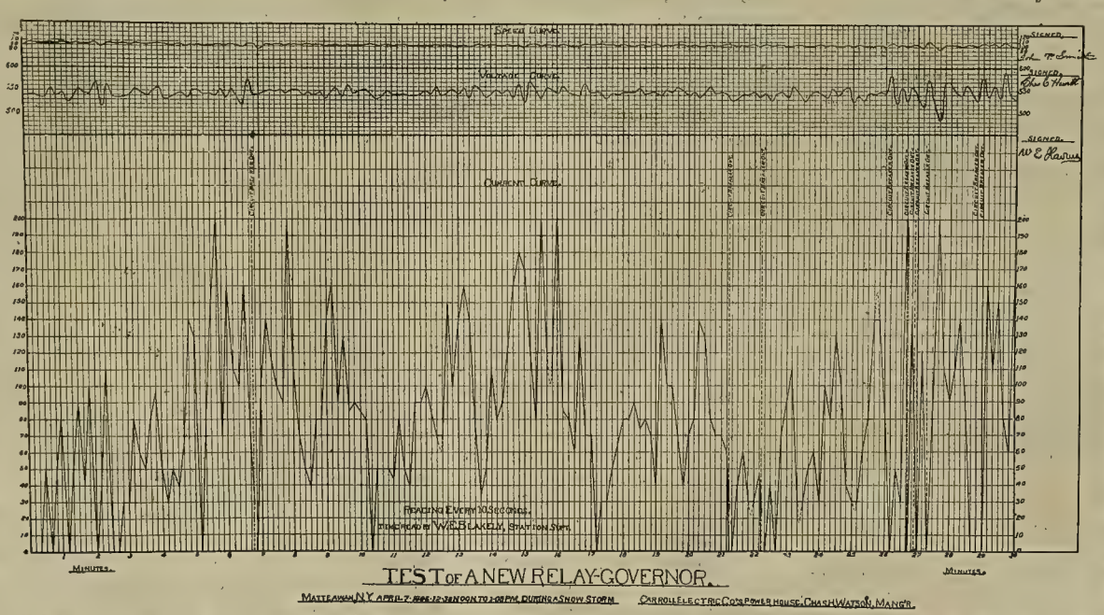
In a recent test it was intended to show what can be done in extreme cases. The electric railway on which the test was made is a seven-mile road at Fishkill, N. Y., with a maximum grade of 8½ per cent. At the time of the test four double motor cars were in operation, using from 30 to 50 H. P. each. One of the cars became short circuited, which is the direct cause of the extreme variations in the speed during the latter part of the test, but goes to show the efficiency of the governor under adverse conditions.

The power is furnished from a pair of 48-inch water-wheels, under about 15 feet head of water, and is conveyed by belts to a counter-shaft, which in turn drives by belt an M. P. 100 generator. The wheel can be supplemented with an engine, which is belted to the same counter-shaft as the water-wheel, but during the test the engine was disconnected, leaving all the power to be furnished by the wheel, making a safe sample of results secured under such conditions.

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NEW "RELAY" WATER-WHEEL GOVERNOR.




TEST OF A NEW RELAY-GOVERNOR.

MATTEAWAN, N.Y. APRIL 7, 1896. 12 TO NOON TO 1:08 P.M. DURING A SNOW STORM. CARROLL ELECTRIC CO'S POWER HOUSE. CHAS. H. WATSON, MANG'R.

J. T. Smith, president of the road, read the speeds from a Schaeffer & Bubenberg tachometer; C. E. Hewitt, electrician, read the voltage from a Weston voltmeter; W. E. Havens, superintendent, read the amperes from a General Electric Co. ammeter; W. E. Blakely, power house superintendent, noted the time by tapping a gong at the end of every tenth second, and the end of every minute was noted by two taps of the gong. The readings began at 12:38 P. M. and continued for thirty minutes, until 1:08 P. M., when the papers were signed by their respective readers and committed to the hands of Mr. Hewitt, who furnishes the tabulation of curves herewith presented.

Referring to this tabulation, it will be noticed that there are three curves. The top one is the speed curve, the middle one the voltage curve, and the bottom one the current curve. It will be noticed that the average or normal speed was 105 revolutions on the wheel shaft, and the average voltage was 550. It will also be noticed that the first reading occurred ten seconds after the first gong, and the numbers that designate the minute occurs at the bottom of the chart, and at the ends of the minutes numbered. That is, the line that is vertical from number one shows that there were 80 amperes of current, 540 volts pressure, and 103 revolutions on water-wheel shaft, at the end of the first minute.

At the end of the second minute the chart shows no current, 546 volts, and a speed of 104 revolutions of water-wheel shaft; and twenty seconds later there are 110 amperes used, and the voltage has dropped to 516. The reading ten seconds later shows no current, 564 volts and 107 revolutions. Over one-half of the load has dropped off in ten seconds, and yet the speed has gone only two revolutions above normal. This is less than 2 per cent increase of speed on a 55 per cent decrease of load. At the end of the first ten seconds in the sixth minute there is no current, the voltage is 552, and the speed 104, and thirty seconds later there is full load, 200 amperes, 540 volts and a speed of 102 revolutions. The following reading ten seconds later is 70 amperes, 556 volts and 105 revolutions, showing that 65 per cent of the load dropped off in ten seconds, and yet the speed did not go above normal. At six minutes and forty-five seconds the circuit breaker went out, dropping the whole load instantly, yet five seconds later the reading is no amperes, 540 volts and 107 revolutions. This is equal to the best engine work. The circuit breaker went out during the twenty-second and twenty-third minutes with practically no increase in the speed. At twenty-six minutes and forty seconds the readings are 200 amperes, 529 volts, and speed 101. During the following ten seconds the circuit breaker went out, and at the end of these ten seconds the readings show 140 amperes, 560 volts, and 105 revolutions, normal speed. This is a remarkable showing. The extreme fluctuations are all recorded accurately and were caused by the short-circuited car and the new fallen snow.

The test, showing that water power government has advanced to such a stage that it is safe and reliable, will be of interest to street railway and electric power operators.

The governor herewith illustrated is built and furnished by the Replogle Governor Works, Akron, O.

# MINING AND SCIENTIFIC PRESS.

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J. F. HALLORAN.....General Manager

San Francisco, June 20, 1896.


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## Heat in the Earth's Crust.

The commonly accepted theory in regard to the earth's internal temperature is that, in going down through the crust, there is an increase of one degree Fahrenheit of heat for each 40 to 50 feet of depth attained; some say 50 to 60 feet and others 60 to 80. Doubtless there has been observed such increase of heat with increase of depth, as has been reported, but it shows nothing more than the temperature in a certain geological zone. The theory is that, as we go below the surface, we reach a depth beyond which the interior of the earth seems to have no sympathy with the external causes of heat and cold, and its heat appears to be its own. The zone of constant temperature is generally placed at 60 or 80 feet. Below this zone there is supposed to be an increase of heat at a regular rate. If this law were universal at a depth of less than thirty miles, the heat would be such as to hold in fusion all known substances.

In the artesian well at Grenelle, near Paris, 1800 feet deep, the increase in heat is one degree for 57 feet and about the same increase is found in the well at Mendarff, near Luxemburg, 2400 feet deep. The mean results of a number of experiments made in the deep mines of Cornwall, France and Germany seem to show an increase of one degree of heat to every fifteen yards of descent. This simply shows that the rocks composing the crust of the earth in that part of the world are of about the same temperature, being of similar age and character. Assuming a rise of one degree Fahr. of heat for each 60 feet of depth, the source of a spring whose temperature is 120° would be 4200 feet below the surface, and water at the boiling point should rise nearly 13,000 feet. The temperature of hot springs depends much on their surroundings. The hottest springs are found in volcanic districts, though there are warm springs away from such districts. A great volcanic eruption or the upheaval of a big range of mountains heats up the rocks underlying a large district for thousands of years. But there are also variations in the increment of downward heat due to the varying conductivity of rocks at or near the surface. The resistance of opaque white quartz is expressed by 114; that of basalt by 273; and that of cannel coal at 1538, or thirteen times more than that of quartz.

Evidently there are in the earth's crust hot and cold zones, dependent upon locality and nature of the rocks, proximity to hot springs and active volcanoes. In some great zones of plain or comparatively level country the crust of the earth is cold to great depths. It is because these zones are composed of very old stratified rocks containing few minerals and showing no chemical action. These cold districts generally underlie the great interior valley regions of the continents. In the mountain regions about the great fractures of upheaval, and ing and generate heat. Districts in which igneous rocks largely prevail are likely to be hot in depth.

It is only when the sun's rays reach our atmosphere that they part with much heat. Swemberg and Fourier calculate the temperature of celestial space at 50 degrees Centigrade below freezing. Waters of the seas and lakes absorb a vast deal of heat from the sun, but principally near the surface. Peron relates that at the depth of 2144 feet in the ocean the thermometer falls to 45 degrees when it is 86 degrees at the surface. Masses of ice resting upon the surface of the earth for ages doubtless decreases the temperature to a very considerable depth. Though the theory is that the temperature of the earth is constant at 60 to 80 feet below the surface, a great depends upon the locality. Near Yakutsh, Siberia, 62 degrees N., the ground is constantly frozen to the depth of 700 feet, while in the island of Java constant temperature is found at a depth of 2 or 3 feet.

While the sinking of deep shafts and bore-holes may show an increase of one degree of heat for each 15 yards of descent in a certain district in Europe, sections of country in America, Australia and South Africa may show different results. Different parts of the earth's crust evidently have a different temperature. The evidences of internal heat disclosed by the sinking of shafts and deep borings are not everywhere alike. The earth evidently has its hot and its cold zones. Subterranean temperature at explorable depths appears to depend much upon the character of the rocks composing the crust of the earth in different sections. Regions underlying sandstones and similar sedimentary rocks that have long remained undisturbed are generally cold, while in districts of country in which intruded igneous rocks abound, evidences of internal heat are found on going below the depth at which the zone of constant temperature is supposed to exist. Where there has been a great upheaval of igneous rock the temperature of the rocks of the earth's crust must be greatly raised throughout a large district and probably holds a certain degree of heat for ages. As a fracture or fissure extending down to the regions of central heat must be formed when there occurs an upheaval of igneous material, it is probable that the heat rising through the opening may serve to heat up the rocks underlying a considerable district for a long period of time.

The crust of the earth is not everywhere of the same thickness. These doubtless cause variations of subterranean temperature. Even at the region of central heat in the earth the temperature is not constant. The molten interior of the earth is gradually cooling. As the heated interior of the earth cools it shrinks and the crust must settle down and conform to the changed conditions. It is this shrinkage of the earth's crust and the crowding and pushing incident to settling down into smaller space that has produced the surface wrinkles which we call mountains and valleys. This action is still going on and is supposed to be the cause of many great disturbances of a seismic character. It is estimated that the diameter of the earth is now less by 189 miles than when the planet was a mass of liquid.

The portion of America least disturbed by the shrinkage of the crust of the earth is that stretching as an immense plain from Lake Superior to the shores of the Arctic ocean—a distance of not less than 1500 miles. This is a region of very ancient crystaline rocks, chiefly trap, gneiss and granite. Through all the convulsions incident to the upheaval of the Rocky mountains and the Appalachians, this region lay quiet. The rocks forming the flooring of this region are free from the superincumbent beds of more recent formations, showing that even in the silurian age they formed dry land, which has ever since held its place with wonderful stability. This ancient belt is about 200 miles wide. That it is older than the silurian rocks is shown by the fact that it dips under the latter on the east and west sides.

This undisturbed region is, as might be expected, one of the cold zones of the crust of the earth. It has long been known that, even at great depths, the copper mines of the Lake Superior region are so cool that clothing is comfortably worn by the miners. As this fact upsets the theory of an increase of one degree of temperature for each 50 feet of depth attained, it was disputed by some of the scientists. In along the borders of the sea, there is almost everywhere sufficient action—chemical, mechanical or volcanic—to keep the rocks warm. Rocks containing ores and minerals are always decomposing or changorder to settle the matter, Professor Agassiz visited the region and placed thermometers in the Calumet and Hecla mines. The point of constant temperature was assumed to be at a depth of 105 feet, and observations were taken to a depth of 4,580 feet. To the surprise of Professor Agassiz, the temperature at the great depth of 4,580 feet was 79 degrees Fahrenheit—only 20 degrees higher than at the 105-foot station. In the Tamarack and other deep shafts in these mines the temperature is about the same. No heat appears to be emanating from the rocks in which work is being done.

On the Comstock the conditions are very different from those prevailing in the Lake Superior region. The Comstock lode is in one of the hot zones of the earth. At the comparatively small depth of 1,500 to 2,000 feet boiling hot water was encountered. The rocks were so hot as to be painful to the hands. In places with the best ventilation attainable there was a temperature of 110 to 120 degrees. In some spots where there was no ventilation the heat rose to 130 and 140 degrees. Men lost their lives by falling into the hot water at the bottom of shafts, and eggs were cooked by being placed in holes drilled in the rock. To enter some drifts was like going into an oven. The miners figured that at no great depth all below must be in a molten state.

However, in sinking the deep shafts—the Combination, Yellow Jacket, and Union Consolidated—it was found that at points below 2000 feet the heat was less than it was above. At the depth of 3300 feet the miners found it much more comfortable than above in places only 1500 feet below the surface. It was found that there were hot places and cool places in the lode. The mineral contents of the rocks seemed to have much to do with the temperature. Where there was much lime in the lode it was always hot. The decomposition of the sulphurets contained in the vein also produced heat.

Although some scientists are still figuring on the increase in temperature in subterranean regions at the rate of one degree for each 50 to 60 feet of depth attained, it is far from being a universal law. It may hold good in certain sections in Europe, but in other places—as at Lake Superior—a new rule is required. Increase of temperature with depth at a certain ratio is probably observable in many places, but each region is liable to have a different ratio. We are obliged to conclude that there are hot zones and cold zones in the crust of the earth. The subterranean temperature of a district of country depends much upon the age and character of the predominating rocks; also volcanic action, recent or remote, must be taken into consideration.

## Silver in Politics.

At St. Louis, last Thursday, the Republican National Convention, before nominating Wm. McKinley of Ohio for President, by a vote of 812½ to 110½ adopted the following as the financial plank in its party platform:

*The Republican party is unreservedly for sound money. It caused the enactment of the law providing for the resumption of specie payments in 1879; since then every dollar has been as good as gold. We are unalterably opposed to every measure calculated to debase our currency or impair the credit of our country. We are, therefore, opposed to the free coinage of silver except by international agreement with the leading commercial nations of the world, which we pledge ourselves to promote, and until such agreement can be obtained the existing gold standard must be preserved. All our silver and paper currency must be maintained at parity with gold, and we favor all measures designed to maintain inviolably the obligations of the United States and all our money, either coin or paper, at the present standard, the standard of the most enlightened nations of the earth.*

On the same day the Democratic State Convention at Sacramento adopted the following financial plank in its party platform:

*The Democratic party of the State of California is unalterably in favor of the free and unlimited coinage of both gold and silver at the ratio of 16 to 1, without waiting for or depending on the action of any other nation, and it demands the use of silver as well as gold as a full legal tender in payment of all debts, both public and private.*

On the 7th prox. the Democratic National Convention will meet at Chicago. Those who claim to know say that that convention will adopt a platform that will declare as flatly for free silver as the Sacramento platform does.

This paper has nothing to do with party politics. The prominence that politicians give the question of silver shows that the people understand well that the question is not an industrial one, but a financial consideration of the deepest import. The ordinary party platform is usually a compromise collection of ambiguous platitudes, the real party utterance being the inaugural address of the successful candidate. It looks now as if on this subject, as on the question of protection, party lines will not be strictly drawn, and that geographical location will have much to do with party majorities.

## Concentrates.

THE deepest mine in Arizona is the Congress mine, 1450 feet.

DEVELOPMENT, not "boom," is best for mines in any locality.

AT the Treadwell mine, Douglas island, Alaska, are employed 325 men.

THE new tailings plant at Utica mine, Calaveras Co., is reported an entire success.

LAST WEEK T. Judge found a 95-ounce nugget in the Union mine at Gibsonville, Cal.

USUALLY 75 per cent of the gold in cleaning up a sluice is caught in the first 200 feet.

ROSSLAND, B. C., is reported full of miners, prospectors, mining experts and investors.

THERE has been no recent change in the U. S. mining laws or the mining laws of this State.

THE third edition of Aaron's Assaying, Part I, rewritten and improved, will be ready July 1st.

THERE is talk of gold going to a "premium." It's been at a premium for the past thirteen years.

THE Burke, Idaho, Miners' Union now graciously permits its members to read the Cœur d'Alene *Miner*.

THE directors of the State fair say they will have a rock-drilling contest and good prizes therefor next September.

THE $15,000 dividend of the Bullion-Beck (Utah) on the 15th makes an aggregate of dividends from that mine of $2,055,000.

THE release of the political prisoners in the Transvaal has caused a general advance in South African gold mining shares.

THE Washington State Mining Bureau, a private enterprise, has organized at Seattle. The members pay 25 cents a month dues.

AMADOR COUNTY has so far found the old chlorination process to give the best results of any with the sulphurets there.

THE locator of a mining claim in 1896 has till Dec. 31, 1897, to do the $100 worth of work or improvements necessary to hold it.

JOS. INGERSOLL, of San Bernardino, Cal., has built a one-stamp mill with three discharges, which he claims will work a ton of ore daily.

A REDUCTION from 12 to 8 hour shifts has gone into effect at the B. & M. smelter, Butte, Montana, with corresponding reduction in the pay.

A UNITED STATES BOND or any other Government obligation is and always has been payable in silver without any violation of direct contract.

SUPT. WILSON is building two 10-stamp mills—one at New Pass and the other at Gold Park, on the western slope of the Toiyabes, Nye Co., Nevada.

THE Bennett amalgamator, weighing 180 tons, and costing $45,000 is reported making paying progress in working placer sands at Green River, Utah.

AT the Mount Morgan mine—the largest gold producer in Australia—the total cost of production, including development work and plant, is stated to be $12 per ton.

IF in sufficient quantity gold ore running as low as $3 per ton can be worked at a profit, where intelligent management and close attention to economical detail is practiced.

THE State Board of Trade is making a fine display at 16 Post street, this city, of California products, many of which are monopolies, so far as this State is concerned.

M. B. KERR is making a success of the South Paloma mine, near Valley Springs, Calaveras county, where he is developing what promises to be a very valuable property.

"THE Mining and Industrial Exchange of New York" is a new concern in New York City that appears to start on a better business basis than its meretricious predecessor.

THE Mountain Mines, Ltd., in Shasta Co., Cal., and the Congress M. Co., Congress, Arizona, do not allow the sale of liquor on their premises, and discourage its use in every way possible.

THE shutdown of the Old Dominion Copper mine at Globe, Arizona, consequent upon friction between the manager and his men, is another illustration of the need of a harmonious understanding in all such cases.

THE present cost of reducing the ore at the furnaces of the Mountain Mines Co., Ltd., Keswick, Shasta Co., is $2.50 per ton. It is expected that further improvements will secure a reduction of $1 per ton from these figures.

BRITISH COLUMBIA mining papers are naturally hostile to the new law to sample and assay imported silver and other ores at different points on the boundary. The new rule is as unpopular in Canada as McKinley is in England.

GOODRICH reservoir, holding water for working the Nelson mine, Baker City, Or., burst last Wednesday night, doing considerable damage to property and drowning seven persons, whose bodies were recovered when the flood had passed.

WHOLESALE jumping of mining claims in the reservation part of Camp Floyd, Utah, district occasions bad blood. The jumpers contend that all locations made prior to the throwing open of that military reservation—April 9, '95—are invalid.

THE Broken Hill Proprietary (Australia), for week ending May 28, treated 7915 tons ore, yielding 304 tons of lead, containing 144,937 ounces silver. The clean-up yielded in addition 363,678 ounces, including 215,237 ounces from matte produced during the preceding six months.

THE Lewiston, Idaho, *Teller*, says a stock company has been organized there with a capital of $250,000 for the purpose of placing a good up-to-date mill at Florence, to save both gold and silver. H. K. Owen, of Seattle, is president of the company, and C. M. Huff is manager.

TO GET the H. P. of a water supply, a simple rule is: Multiply number of gallons per minute by the pressure in pounds per square inch, and divide by 1500. To determine "the pressure in pounds per square inch," multiply number of feet in height—number of feet fall—by decimal .433.

THE tremendous force with which the water leaves the nozzle of a giant was illustrated in British Columbia last week, where, at Granite Creek, H. Cahoe, formerly an official of the C. P. R. R., was flung fifty feet and almost instantly killed by getting in front of a monitor, piping at 250 feet pressure.

TUSCARORA, Nev., reports considerable stir on Bull Run creek, where gold is said to be found. Half the population of Tuscarora has gone there and Elko is contributing considerable of its population to the rush. Bull Run creek lies between Columbia and Cornucopia and empties into the Owyhee river.

GOLD mining in Africa is no new thing: in the days when the pyramids were building it was a leading industry there. Soetbeer estimates that in the four centuries ending 1875 Africa exported £106,857,000 in gold. The aggregate gold yield of that country since the dawn of human history must be a stupendous one.

THE Idaho City *World* attacks the Boise City, Idaho, Mining Exchange, says the $388.10 spent for the last issue of the organ of that association was worse than thrown away, and charges that injury is done to the miners of Boise basin by incorrect and misleading statements as to the extent and value of the mines therein.

THE annual election of the Bodie Con. M. Co., last Monday, put in an entirely new set of men. H. D. Walker had been president of the company at a salary of $200 per month. The accounting showed that he owed the company $6000 which he was unable to pay, saying he had used the money for private purposes. His friends are trying to make good the deficiency.

CALIFORNIA men are putting in an extensive and expensive plant to get gold from the black sand and mud of the upper Fraser river, B. C. It is to be noted incidentally that as a "bye product" it is confidently expected that their dredging will improve the navigation of that stream and that steamers can subsequently go up the Fraser fifty miles farther than at present.

THE industry of organizing new mining companies, with large capitalization, has at present reached its fullest development in the State of Washington. A good many mining organizations of sterling merit have also been incorporated in that State, and considerable development of valuable property, both there and in British Columbia, has been done by these latter concerns.

"THERE is no rhyme for the word silver" is the general statement. Our Australian friends, who have furnished fighters, a voting system, a Torrens land transfer plan, etc., also furnish a provincial rhyme for the word "silver." In some parts of the great woolgrowing regions of Australasia a month old lamb is called a "chilver." The campaign poet can hardly use this, though.

E. J. NORCUTT, of Lewiston, Idaho, in a communication to the Oregon Pioneer Association says that the first mining code in the State of Oregon was enacted on Canyon creek, Josephine county, in April, 1852. The principal provisions were those fixing the limit of channel claims at 50 yards and bank claims at 40 feet, and that all the claims not worked when workable were jumpable after five days.

SAYS the Plumas *National-Bulletin*: "Don't put up the bars against the investment of capital. It requires money to develop our great mineral resources and place them on a paying basis. If you have a mine to sell, don't ask an impossible price for it, thus preventing a sale and injuring yourself and the community. Be wise. Poor men can't afford to take the chances which rich men very properly do."

THE number of "mining companies" now being organized for various purposes in this country averages about ten daily. A large percentage of them start with a "capital stock" of $1,000,000, sometimes more. Mining and undermining, working the claim and working the stockholders are about equally divided therein, and the names and reputation of the incorporators are usually an index to the intent.

SINCE the shutting down of the mills at Aurora, Nevada, several attempts have been made to work the rebellious ore of that district by various processes, but they were all unsatisfactory. Now, however, R. K. Colcord, agent for the company owning the property, reports that twenty tons of the ore taken to Bodie, Cal., to be worked in the cyanide plant there has given satisfactory results, and a big plant is contemplated in the old camp.

THE property of the Juneau M. and M. Company, Alaska, which has been in the hands of Receiver Behrends for a year, comprising two mill sites, saw mill on mouth of Sheep creek, three mining claims on Douglas island, three mill sites in Silver Bow basin, four mining claims in Silver Bow basin, and the 10-stamp mill and appurtenances, destroyed last winter by a snow slide, are sold to J. T. Gilbert, of Milwaukee, Wis., for $32,000.

TO DATE the Con. Cal. & Va. mines on the Comstock, Nevada, have a record of production, in gold, $62,431,000; in silver, $70,324,000; total, $132,755,000. These mines declared dividends as follows: Con. Virginia, $42,930,000; California, $31,200,000; Con. Cal. & Va., $3,899,000; total, $78,029,000. The bullion averaged 46⅔ gold and 54⅓ silver. This record of production and dividends exceeds that of any other gold and silver mine in the United States.

THE Secretary of the Interior has approved the following lists of lands selected by railroads: Northern Pacific Railroad, 66,826 acres in the Bozeman, Mon., district; 2,039 acres, Vancouver, Wash., district; 3360 acres, Fargo, N. D., district; 18,380 acres, St. Cloud, Minn., district; 550 acres, Miles City, Mon., district; 478 acres, Vancouver, Wash., district; 481,748 acres, Bismarck, N. D., district; Central Pacific Railroad, 1,901 acres, Redding, Cal., district.

UPON completion of the annual required work on an unpatented claim, an affidavit of the fact should be filed with the county clerk. The trouble and expense would be trifling compared with the convenience of proof in case of possible litigation. This year, however, no claim owner who can do more will content himself with simply performing just enough to hold possession. The inducements are certainly sufficient to do as much development work as possible.

ALPINE COUNTY has not been heard from for fifteen years and now comes a statement regarding a copper mine there that contains to each ton of ore 800 lbs. copper, $3 gold, and eight ounces of silver, which at present all-round prices would aggregate $154.43. The mine is called the Leviathan and the owners say they are just completing its sale. If all the statements are correct the buyers have a big thing, though ore that yields so much copper, gold and silver to the ton is very unusual.

IN the Republican National Convention at St. Louis last Thursday, a free coinage of silver plank was defeated by a vote of 105½ for and 818½ against. A gold plank was adopted by a vote of 812½ for and 110½ against. McKinley, Morton, Reed, Quay and Allison were placed in nomination for the Presidency. McKinley was nominated on the first ballot by a vote that was practically unanimous, he having more than enough on the rollcall of States before his own State—Ohio—was reached. Hobart of N. J. was nominated for Vice-prest

OF THE development work in the vicinity of Butte, Montana, the *Inter-Mountain* says that at many of the properties of the Anaconda company, within a few years shafts 3,000 and 4,000 feet in depth will be as common as the 1,000-foot shaft of to-day. The new High Ore shaft will probably be the first to reach the greater depth. For the past two years a force of men has been employed exclusively in pushing it to the 4,000-foot level, to which depth it is said the shaft will be developed before the extraction of ore begins.

THE Marysville *Democrat*, which has always evinced a desire to be just and right, thinks the *Appeal* of that city shows poor judgment in its attack on Capt. C. E. Gillette, of the United States Debris Commission. He is a United States officer who has impartially discharged his duties, and who is about as unprejudiced as it is possible for any individual to be. His only interest is to faithfully fill the position he occupies, and it is characteristic of the cause the *Appeal* champions, that it should be the first and only one to attempt any insinuation in that quarter.

IN Witwatersrandt district, South Africa, in April, the Wemmer mine operated fifty stamps, running twenty-eight days, eight hours and thirty-two minutes, crushed 6,614 tons; bullion from mill, 3,695.27 ounces: tailings treated, 4,875 tons; cyanide bullion, 1,198.02 ounces; concentrates caught, 160 tons; average assay value of concentrates, 4 ounces and 8 dwts. Total from all sources, including concentrates, 5,597.28 ounces. In the Eastleigh mine during April fifty stamps ran twenty-six days, twenty-two hours, crushing 3,919 tons, which yielded 554 ounces; tailings treated, 2,200 tons, yielding 933 ounces; slimes treated, 735 tons, yielding 352 ounces; direct treatment, 1,430 tons, yielding 316 ounces. Total output for month, 2,155 ounces.

AS IN other industries, the Chinese long since got a foothold in surface gold mining in this State, and annually take out well on to $2,000,000. No Chinese are ever found in a quartz mine, but they haunt old trails, rework abandoned ground, lease tailings on shares or buy them outright, and, living "on the smell of an oilrag," make considerable in the aggregate. The State would be better off without them, but the question, like all those things, solves itself. As no more Chinese can come here, and these now here are getting too old to buy any more claims, they are gradually dropping out. They are not as numerous in Siskiyou, Trinity and Placer counties as formerly, and, like Chinatown in San Francisco the decrease in their number begins to be noticeable.

SEVEN fugitive Chinese were convicted in the U. S. District Court last Saturday of violation of the Caminetti act. This is the first proceedings of the kind. No better instance could be cited of the law-abiding character of the California miners than this. The Caminetti law has been in force for three years, yet in all that time throughout the whole hydraulic mining area affected by it, despite the efforts of a small army of paid spies and informers, no infraction of its provisions or violation of its requirements by California miners has been brought before a court. The first and only instance is as cited—a gang of irresponsible Chinamen, who, on their own account, started hydraulic operations in Placer Co., in ignorance or defiance of the law. Upon the facts being reported to the U. S. Debris Commission, the Mongolians were promptly punished, being sentenced to six months in the Alameda County jail.

THE State Democratic convention at Sacramento last Thursday, in its platform, congratulated the State that "the mining industry in all its branches has received an impetus which to-day gives it a leading position in the development and progress of the State," and favored "a continuation of the work so auspiciously commenced, and recommended continued aid by the National and State Governments on the lines laid down in the law, to the end that all interests involved be fully and adequately protected and each given the recognition demanded by the important bearing each has upon the general welfare." The convention declared its belief "in fostering the mining industry in all its branches and the rehabilitation of hydraulic mining wherever it can be carried on without material injury to any other industry." The convention also "*Resolved*, That we are in favor of the mineral land bill passed by the last Congress, and we denounce the conduct of those whose action prevented its becoming a law."

COLORADO and Utah railroads are issuing finely illustrated and superbly printed books describing the different mining regions of those States, and are spending thousands of dollars advertising Colorado and Utah. Probably after the California railroads have corraled all the unpatented mineral area of the State, they will do likewise. Some of the statements in some of the pamphlets received are not in exact accordance with the facts and mar the excellence of what are otherwise very creditable productions. For instance, in the handsomest one of the lot, "Under the Crust," issued by the Gulf Road and South Park Line, the statement is made on page 6 and again on page 8 that in '95 Colorado's gold yield exceeded that of California. Official statistics say differently. On page 49 the claim is made that the California mine, Central City, Col., is the "deepest gold mine in the world," which is not so. Colorado has enough to boast of with truth without having assertions made that cannot be backed up.

MANY of the richest mining plums in Colorado, says the *Mining Review*, are being gathered by private owners or close corporations, whose profits, except in unverified estimates on the part of reporters and correspondents, are never published. A very rich mine is apt to fall into this situation. The principal stockholders, having better information in regard to its value, gradually absorb all the stock, and then, having no occasion to sell it so long as it pays large and regular dividends, they salt it down and keep the affairs of the company a profound secret. In such cases the district in which the mine is situated does not enjoy the full prestige which an authentic statement of all the profits earned by all the companies would give it; for the investing public, generally at a distance, are partial to exact figures, and are loth to believe in profits which are not matters of record, capable of being verified. Fortunately the mill and smelter reports, and the statistics of the express companies and the United States mint serve to show, pretty accurately, the total production, from which a fair idea of the actual profits may be derived.

IN number and aggregate magnitude, some incorporated mining companies have made a splendid showing of dividends paid. Taken alphabetically come the names of many who have each paid over a million dollars in dividends since their incorporation up to May 1st, '96. Among them are the Alaska-Treadwell, $2,750,000; Belcher, $15,397,000; Bimetallic, $1,630,000; Bodie Consolidated, $1,677,000; Boston & Montana Consolidated, $4,025,000; Centennial Eureka, $1,970,000; Chrysolite, $1,650,000; Daly, $2,850,000; Deadwood-Terra, $2,490,000; De Lamar, $1,312,000; Elkhorn, $1,212,000; Eureka Consolidated, $5,112,000; Evening Star, $1,437,500; Franklin, $1,240,000; Gould & Curry, $3,826,000; Granite Mountain, $12,120,000; Hale & Norcross, $1,882,000; Hecla Consolidated, $2,130,000; Homestake, $5,837,500; Horn Silver, $5,130,000; Iron Silver, $2,500,000; Kennedy, $1,796,000; Mammoth, $1,040,000; Minnesota Iron, $2,992,500; Mollie Gibson, $4,080,000; Montana Limited, $2,890,000; Morning Star Consolidated, $1,025,000; New Custom, $1,198,120; Ontario, $13,235,000; Osceola, $2,022,500; Parrot, $1,622,215; Quicksilver Preferred, $1,823,911; Quincy, $8,070,000; Savage, $4,460,000; St. Joseph, $2,524,000; Silver King, $1,950,000; Small Hopes, $3,275,000; Standard Consolidated, $3,771,160; Tamarack, $4,270,000; Tombstone, $1,250,000. While this is by no means a full list, it is illustrative of the enormous profits in successful mining enterprises.

THE difficulties that sometimes lie in the way of a bona fide purchaser of mining ground in California, who humbly makes petition to the United States Government for permission to buy a little piece of ground and pay for it is illustrated in the case of Messrs. McCamma and O'Keefe, of Grass Valley, Cal., who, last Saturday were allowed final entry and got a certificate of purchase from the local land office for the South Idaho Con. quartz mining claim. They have been trying to get that for ten years but rival claimants, among whom was the railroad corporation, have been endeavoring to show that the claim was "agricultural land." The miners were too poor to hire a squad of attorneys, but produced some clinching evidence. At one time when their opponents produced sworn testimony that there was no pay ore on the ground, the two men got the officials of the U. S. land office to personally visit the claim, and in their presence they drilled a hole in the quartz ledge, put in a shaft and blasted out quartz with gold in it that the officials could see for themselves. There was no going behind that. Twenty perjurers might swear to lies but there was the very claim, and there was the gold. No great lawyer ever made a more powerful point of proof than did these two miners in thus showing the justice of their claim. This is believed to be the first time that such a mode of procedure has been recorded; it is worthy of repetition in similar cases. Such an experience would be an eye-opener for the Secretary of the Interior and the Commissioner of the General Land Office.

### The "Chispa."

The old-time placer miners talked of "colors," "chispas" and "nuggets." The colors are the fine particles of gold obtained in prospecting with the pan. They range in size from the mere dust of gold that forms a yellow streak in the bottom of the pan to grains worth a fraction of a cent or a cent. As for the nuggets, it is unnecessary to particularly describe those big ugly lumps of gold which all have seen and nobody wants to own. The chispa is a piece of gold worth from ten cents to half a dollar. The Spanish word "chispa" is very expressive when applied to such a little spangle of gold. In Spanish "chispa" means a spark of fire, also a very small diamond is called a chispa, because of its sparkle. A chispa of bright quartz gold, or of any gold that is not rusty, seen among black sand in washing out a pan of gravel, looks much like a spark of fire—seems to be alive. The word chispa used as a mining term to denote a small, bright fragment of gold is very expressive. The bit of gold shines out like a spark of fire. The old-time miners were always glad to find plenty of chispas in their rockers and toms. They were not only pleasing to the eye, but they counted up much faster than did the very fine dust. We do not hear so much said of the chispas these times as in the good old days when the "boys"—then all young and gay—were gathering in the golden harvest of the great placers. Many of the mining terms in use among the Mexicans are very expressive and appropriate, but few of them are now heard among Pacific coast miners. We are no longer dependent on Mexico, Germany or any other country for our knowledge of mining processes. With the development of American mines came American methods.

DAN DE QUILLE.

Virginia City, Nevada, June 15, '96.

### Gold Dredging in New Zealand.

TO THE EDITOR:—In the issue of your valuable paper of May 23d I notice a letter from A. B. Paul, drawing attention to the immense field there is in this State for river dredging for gold. I have recently come from New Zealand, which, although a small country, admittedly does more gold dredging than any other country in the world. For some considerable time I have been engaged in designing and building gold dredges, and, knowing what can be done with them, have no hesitation in expressing my belief that they can be used to build up a great industry in California. One river in New Zealand—the Molyneux—is larger and more dangerous than any in this State, and on a 70-mile stretch of this river there are 57 dredges working, nearly all of which are yielding rich returns. I know one which saved 700 ounces of gold, worth some $14,000, in three weeks. This is, of course, exceptional, but shows the possibilities of the business. The average returns are somewhere in the neighborhood of $400 to $500 per week, and the running expenses, including everything, is between $200 and $250 per week. The barren tailings, or drift, which have to be lifted before the gold-bearing stratum is reached, runs from 10 to 20 feet deep—the longest ladder so far found necessary is 68 feet—which gives a dredging depth of about 50 feet. The dredges lift from 60 to 100 tons per hour and take two men to run them. If the gravel averages all through only 3 cents per ton, it will pay all the running costs, including wear and tear and interest on outlay. We have tried various kinds of dredges and methods of getting on to the wash-dirt and have finally settled down to an improvised bucket-dredge, with tailings elevator, where necessary, to allow lowlying flats along the river banks to be dredged. From what I have seen of the rivers of California, they appear to offer a magnificent opportunity for dredging, which, if carried out on a thoroughly practical and economical basis, will very largely increase the gold production of the State.

In New Zealand we have passed through the initial and experimental stage, and my hope is that those who put their capital into gold dredging in this State may reap as great a return as owners of gold dredges are now doing in New Zealand.

P. H. POSTLETHWAITE,
(Member Inst. Electrical Engineering, England.)

Carrville, Trinity Co., Cal., June 15, '96.

### Decrystallization of Iron and Steel.

TO THE EDITOR:—In the PRESS of June 6th, page 461, is an article credited to *Machinery*, which states a belief existed that iron and steel crystallize under vibration. Further on it says ore stamp stems, piston rods, rock drills, channeling machines, and drop hammers, cam shafts for bolt headers, ore and rock crushers, all break after being in service a short time. My attention was particularly called to the statement that "there is no reason why crystallization should occur." No; because decrystallization is in process and is the only reason of their failure. The coarse, granulated fracture presents the appearance of separate particles. The vibratory and trembling motion has to a certain extent changed the natural shape of the crystals; as a result the grains adhere with less strength. The guy rods of derricks after a time of tension and trembling must be taken down and heated red hot. By this process they regain their strength, because by heat they are reduced to a semi-fluid state and the crystals resume their natural shape. In that shape all organic and inorganic things adhere with greatest strength. Steamer shafts after years of torsion and trembling break square in two, and present no leafy or laminated fracture, as would be the case in twisting sound iron. Many years ago the steamer Golden Age broke her shaft and was brought up to the Pacific Works, then at Benicia. Upon examination I noticed that the fracture was exactly at right angles with the length of the shaft. I did not measure the diameter of the shaft, but guessed it 20 inches. Capt. Lappidge was present and said my explanation was reasonable, and asked what could be done to prevent breaking of steamer shafts. I gave him this answer: "In welding up a shaft twist the faggots all one way, with as much coil as can be without springing the grain; and place more bearings aloug the shaft athwart ship." This is the way to do it now.

WM. WAYNE FITCH.

Fairfield, June 12, '96.

### The State Mining Bureau.

The following are recent additions to the museum of the California State Mining Bureau: Auriferous granite, Overall mine, White river, Tulare Co., Cal.; F. McMillan. Gold quartz, Randsburg, Kern Co., Cal. Raw materials and cement, as manufactured by the California Portland Cement Company, Colton, San Bernardino Co., Cal. Very fine crystallized cinnabar (several specimens) from the Altoona Mining Company, Trinity Co., Cal. Rich gold quartz, showing abundance of coarse gold, Taylor (Idlewild) mine, El Dorado Co., Cal.; E. W. Chapman. Several specimens of gold quartz from various mines in El Dorado and San Diego counties. Gold quartz from Shasta Co.; J. Zachert. Gold quartz from Carson Creek mine, Calaveras Co., from William Howell, superintendent. Gold quartz, with fluorite and telluride of gold, Cripple Creek, Col.; A. R. Cook. Lawsonite; J. Z. Davis. Terical, Saline Valley, Inyo, Cal.; F. Conn. Molybdenite, Fresno Co., Cal.; F. M. Jerney. Chrysoprase, Tulare Co., Cal. Pyrargyrite, Amalie mine, Kern Co., Cal. Turquoise (very fine specimens), from Mineral Park, Arizona; Jas. W. Haas. And numerous other specimens of gold quartz from California, minerals, etc.

H. S. DURDEN, Curator.

## Scientific Progress.

### The Modern Theory of Light.

NUMBER II.

By PROF. OLIVER J. LODGE.

The old and familiar operation of charging a Leyden jar—the storing up of energy in a strained di-electric—any electro-static charging whatever—is quite analogous to the drawing aside of our flexible spring. It is making use of the elasticity of the ether to produce a tendency to recoil. Letting go the spring is analogous to permitting a discharge of the jar—permitting the strained di-electric to recover itself—the electro-static disturbance to subside.

In nearly all the experiments of electro-statics etherial elasticity is manifest.

Next consider inertia. How would one illustrate the fact that water, for instance, possesses inertia—the power of persisting in motion against obstacles—the power of possessing kinetic energy? The most direct way would be to take a stream of water and try suddenly to stop it. Open a water tap freely and then suddenly shut it. The impetus or momentum of the stopped water makes itself manifest by a violent shock to the pipe, with which everybody must be familiar. This momentum of water is utilized by engineers in the "water ram."

A precisely analogous experiment in electricity is what Faraday called "the extra current." Send a current through a coil of wire round a piece of iron, or take any other arrangement for developing powerful magnetism, and then suddenly stop the current by breaking the circuit. A violent flash occurs if the stop is sudden enough, a flash which means the bursting of the insulating air partition by the accumulated electro-magnetic momentum.

Briefly, we may say that nearly all electro-magnetic experiments illustrate the fact of etherial inertia.

Now return to consider what happens when a charged conductor (say a Leyden jar) is discharged. The recoil of the strained di-electric current causes a current, the inertia of this current causes it to overshoot the mark, and for an instant the charge of the jar is reversed; the current now flows backwards and charges the jar up as at first; back again flows the current, and so on, charging and reversing the charge with rapid oscillations until the energy is all dissipated into heat. The operation is precisely analogous to the release of a strained spring, or to the plucking of a stretched string.

But the discharging body thus thrown into strong electrical vibration is embedded in the all-pervading ether, and we have just seen that the ether possesses the two properties requisite for the generation and transmission of waves, viz., elasticity, and inertia or density; hence, just as a tuning fork vibrating in air excites aerial waves or sound, so a discharging Leyden jar in ether excites etherial waves or light.

Etherial waves can, therefore, be actually produced by direct electrical means. I discharge here a jar, and the room is for an instant filled with light. With light, I say, though you can see nothing. You can see and hear the spark indeed (but that is a mere secondary disturbance we can for the present ignore). I do not mean any secondary disturbance. I mean the true etherial waves emitted by the electric oscillation going on in the neighborhood of this recoiling di-electric. You pull aside the prong of a tuning fork and let it go; vibration follows and sound is produced. You charge a Leyden jar and let it discharge; vibration follows and light is excited.

It is light, just as good as any other light. It travels at the same pace, it is reflected and refracted according to the same laws; every experiment known to optics can be performed with this etherial radiation electrically produced, and yet you cannot see it. Why not? For no fault of the light; the fault (if there be a fault) is in the eye. The retina is incompetent to respond to these vibrations—they are too slow. The vibrations set up when this large jar is discharged are from 100,000 to 1,000,000 per second. But that is too slow for the retina. It responds only to vibrations between 400 billion and 800 billion per second. The vibrations are too quick for the ear, which responds only to vibrations between 40 and 40,000 per second. Between the highest audible and the lowest visible vibrations there has been hitherto a great gap which these electric oscillations go far to fill up. There has been a great gap simply because we have no intermediate sense organ to detect rates of vibration between 40,000 and 400,000,000,000 per second. It was, therefore, an unexplored territory. Waves have been there all the time in any quantity, but we have not thought about them nor attended to them.

It happens that I have myself succeeded in getting electric oscillations so slow as to be audible. The lowest I have got are about 125 per second, and for some way above this the sparks emit a musical note; but no one has yet succeeded in directly making electric oscillations that are visible—though indirectly every one does it when he lights a candle.

We have, however, electric oscillators which vibrate 300 million times a second, and emit etherial waves a yard long. The whole range of vibrations between musical tones and some thousand million per second is now filled up.

These electro-magnetic waves have long been known on the side of theory, but interest in them has been immensely quickened by the discovery of a receiver or detector for them. The great though simple discovery by Hertz of an "electric eye," as Lord Kelvin terms it, makes experiments on these waves for the first time easy or even possible. We have now a sort of artificial sense organ for their appreciation—an electric arrangement which can virtually "see" these intermediate rates of vibration.

The Hertz receiver is the simplest thing in the world; nothing but a bit of wire or a pair of bits of wire adjusted so that when immersed in strong electric radiation they give minute sparks across a microscopic air gap. Similarly, gigantic solar waves may produce auroræ; and minute waves from a candle do electrically disturb the retina.

The smaller waves are, however, far the most interesting and the most tractable to ordinary optical experiments. From a small oscillator, which may be a couple of small cylinders kept sparking into each other, end to end by an induction coil, waves are emitted on which all manner of optical experiments can be performed.

They can be reflected by plain sheets of metal, concentrated by parabolic reflectors, refracted by prisms, concentrated by lenses. I have a large lense of pitch, weighing over three hundredweight, for concentrating them to a focus. They can be made to show the phenomenon of interference, and thus have their wave-length accurately measured. They are stopped by all conductors and transmitted by all insulators. Metals are opaque, but even imperfect insulators such as wood and stone are strikingly transparent, and waves may be received in one room from a source in another, the door between the two being shut.

The real nature of metallic opacity and of transparency has long been clear in Maxwell's theory of light and these electrically produced waves only illustrate and bring home the well-known facts. The experiments of Hertz are the apotheosis of that theory.

Thus then in every way Maxwell's 1865 brilliant perception of the real nature of light is abundantly justified; and for the first time we have a true theory of light, no longer based upon analogy with sound, nor upon a hypothetical jelly or elastic solid.

*(To be Continued.)*

# Mechanical Progress.

## Steam Boilers: Their Equipment and Management.

Read before the National Electric Light Association, May 7th, 1896, by ALBERT A. CARY.

One of the first considerations to be taken up in designing a new boiler plant is found in the question, "What style of boiler is best adapted to our work?" And after this is answered the other question following closely at its heels is, "Are our available funds sufficient to equip this plant with the chosen form of boiler?" Unfortunately, we find by no means a small percentage of prospective steam users asking these questions in the reverse order, and it is due largely to this fact that we find so many tankmakers in the boiler business, so many coal companies flourishing and growing rich at the steam user's expense, so many boiler insurance companies springing up in every section of the country, to say nothing of the profits of the owner of the boiler, which unnecessarily go to keeping the boiler plant in repair and the coal pile replenished. All these troubles do not result from the doings of the "penny wise, pound foolish" man, but there is also a large percentage of the plants erected where ignorance has been the partner of the designer, and we find the outsiders again reaping the profits which properly belong to the victim.

After many years of close contact with steam users, I have been led to believe that there is no branch in engineering in which more money is foolishly spent, due to the ignorance of the purchasers, than in steam plants, especially those of small size, say from 300 H. P. down.

I have met many manufacturers who are bright, practical, mechanical men, understanding their business in all its details to a degree that commands your admiration, but when it comes to their steam plant, alas! how little they know, although they think, in their own conceit, that they have mastered this "easy subject" way back in their early days, and there is nothing left for them to bother themselves with, and nine times out of ten you will hear them boast that their steam plant is a model one in every respect.

In these very plants you often will find smoky chimneys painting the whole neighborhood with blackness, and not a single attempt is made to stop this. You will find many of these boilers filling up with scale, and this is calmly accepted as a necessary evil. You will find miserable firemen wasting coal, and so I might continue this list of unnecessary evils to a considerable length.

In many of this class of plants no effort is made to determine the actual amount of power used, unless by a very popular process called guessing, and this extremely delicate operation is often left to the man who opens the throttle or shovels the coal under the boiler. He, naturally, wishing to show up in the best possible light, often decides upon a pretty high figure, which I have on more than one occasion been forced to lower by a large percentage after conducting a careful test. This man, after finally deciding upon the amount of power he thinks the plant is taking, carries these figures to the "boss." Then follows a lot of profound figuring, and finally it is shown that the steam plant is wonderfully efficient, and often the boiler is found to be evaporating something like sixteen pounds of water to a pound of coal, and all of the owners and attendants of the plants in the neighborhood are made envious over these wonderful results.

From such false results as these the excessive amounts of coal used in these plants is considered a remarkably low consumption for the "very large amount of power developed," as has been determined by the guessing process. The owner settles back perfectly contented with his steam plant, and then all progress and improvements stop. His self-satisfied ignorance and boasting finally induces his neighbor (who knows just as much about steam plants as he does) to put a similar plant in some new mill he is building, and so the installation of inferior steam plants continues and becomes almost epidemic.

There is no one who enjoys and profits more by this state of affairs than the coal dealer. He stocks up up with all kinds of coal—good, bad and indifferent. He furnishes the class of steam users we have described with everything in the coal line and gets good prices for what he is selling, but this is not the condition of affairs in up-to-date plants, designed and managed by competent engineers. The coal dealer knows that in these plants the amount of coal used and water evaporated is continuously kept account of, and as an inferior coal will evaporate less water than the good, pound for pound, he knows that a delivery of inferior coal will be detected at once, and it will cost him a customer if he is not very careful.

Now, to return to the equipment of our new boiler plant, and consider the matter of selecting the best boiler adapted to our use. This is a somewhat weighty question, and unless we are thoroughly posted in the practice of to-day we had much better hire a competent engineer to make this decision for us, and the money paid to him will, in the end, be found to be an excellent investment.

There is probably no branch of trade employing abler men to discuss the merits of their output and sell their product than is found in the boiler business, and I am really forced to pity the inexperienced purchaser who is not perfectly capable of forming his own individual opinion of the relative merits of the various boilers offered to him and their adaptation to his use. Such a man is very apt to be influenced by the words of the smoothest talker, or the one who tells him his "story" last, and in the end he is pretty sure to make a serious mistake by selecting a boiler very poorly adapted to the service it is intended for, or one far inferior to the boiler he started out to buy.

I am sure that those present who have passed through this ordeal will bear me out in these statements, and this merely emphasizes what I have said before—that is, that if you were not thoroughly competent to select one of the many boilers, hire a good, able mechanical engineer, one experienced in boiler practice, and let him decide for you. I do not mean by this that you want a man who knows simply one make of boiler and uses it for every plant for which he is retained. There are too many men of this kind, unfortunately, and by the narrowness of their decision they prove that they are incapable of judging the respective merits of the various boilers offered to them. Such men are apt to make you pay exorbitant prices, or else they are apt to give you something you really do not want, and they prove in this way that they are not worth their hire. In selecting the best type of boilers for a certain specific use the conditions under which it is to be run, of course, must be considered.

To cite a few examples: Let us first take up the case of a boiler to be used in a rolling mill, where we find a long line of connected rolls running across the middle of the mill, with a large reversing engine connected at one end, in most cases by gearing. This engine, we generally find, has a cylinder of large diameter and a comparatively short stroke. We find lacking some of those refinements in valve gear which promote economy in the engines used for other purposes, and, in consequence, we find these engines calling for from fifty pounds of steam upward for each H. P. developed. These engines are frequently started up with the full load on, taking steam about the entire length of their stroke, and making the severest kind of a demand on the boiler for a supply of steam, which is required to furnish this large amount in a very short space of time. In such a case as this the boiler must be of such design that it will deliver a very large quantity of steam in a very short space of time, and this may be accomplished in several ways, viz., first, by having a boiler with an abnormally large steam space; second, by having a boiler with a large water capacity and a moderate-sized steam capacity; third, by having large hot-water storage cylinders to supplement the quantity of water held in the boiler; fourth, by running the boiler at a steam pressure several times higher than that used at the engine and delivering the steam through a very large reducing valve, which reduces and delivers the steam from the high pressure to the pressure required at the engine.

# Electrical Progress.

## The Fluorescent Lamp.

Thomas A. Edison says:

"I have succeeded in solving the problem of the new white light. The lamp is finished—that is, the scientific part of the work, and it solves the problem. The remainder is mechanical."

The new light, or fluorescent lamp, as Edison named it, is somewhat similar to the incandescent lamp now used everywhere. There is not so perfect a vacuum as in the incandescent lamp. Unlike the electric lamp, the whole globe glows with a pure white light of marvelous illuminating power. The light comes from a metallic crystal known as "tungstate." Edison says the slightest rubbing of these crystals will make them glow.

He continues: "I have succeeded in fusing these crystals into the inside of a glass globe by heating the glass until it is soft enough to receive the tungstate crystals, which hold it firmly when it cools. Two wires enter the globe at one end, but do not meet. By means of an induction current generated in a Faradic battery, the molecules of the wires are thrown into motion, and the impulse thus given travels along the wires until it reaches the ends inserted into the globe. The molecule impulse is communicated to the molecules of air within the globe. These air molecules are driven with almost inconceivable rapidity against the crystals of tungstate, welded into the inner wall of glass. The impact causes the crystals to glow. The glow, caused by a single blow of these air molecules, is of course but slight, but multiplied thousands of times, and the blows repeated continously at an enormously rapid rate, they produce the new white light.

"The incandescent lamp transforms 95 per cent of the electrical force into heat and only 5 per cent is turned into light. With my new lamp I absolutely can discover no heat. Not satisfied with one test, and concluding that my instruments were at fault, I used other instruments, but with the same result. I am compelled to believe that nearly the whole force used in the new lamp is employed in producing the light. I do not attempt to explain it; I only accept it as a fact.

"The high amount of electricity required in the incandescent lamp to overcome the tremendous loss of electrical energy, and which is turned into heat, is not needed here. This means an astounding cheapness in lighting and a consequent commercial gain. The new lamp will last as long as the globe lasts. There are no expensive films to consider. It is a singular fact that a two-candle new light lamp, according to my photometer, gives out to the eye almost twice the illuminating effect that a two-candle incandescent lamp does. A two-candle tungstate lamp will light a room as well as a sixteen-candle power incandescent light. It is a pure white light—the whitest light known."

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To generate electricity cheaper than by means of an engine and dynamo is still an unsolved problem. To produce it direct from coal, without the ordinary intervention of combustion, is still sought by leaders in electrical research. Recently Dr. Jacques, of Boston, has made some wide claims regarding experiments in that line and has announced his success in economic generation of electric power. He used a rod of carbon immersed in a bath of caustic soda, the latter being contained in a slender iron pot. Heat was applied from below to keep the soda melted, and a jet of air forced in. His theory was that the oxygen of the air united with the carbon, in a sort of cold combustion, and that electrolysis (or dissolution of the material by electric action) occurred. To this process, in fact, was attributed the development of current in the wires connecting the upper end of the carbon rod with the iron pot. Several eminent scientists were quoted as having confidence in the correctness of this idea. Prof. Reed of Philadelphia, before the Franklin Institute, says: (1) If the best quality of carbon rods are selected, they will not dissolve; (2) copper could be substituted for carbon with no change of result, and (3) illuminating gas, containing no oxygen, could be used instead of air, without spoiling the effect. It appears, therefore, that in Dr. Jacques' laboratory experiment the current is developed by heating two dissimilar substances while in contact, and that all the air jet does is merely to keep the upper layer of the melted soda cool. There is no consumption of the carbon.

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THE Lachine rapids of the St. Lawrence river are at last to be utilized. For some time past work has been carried on by the Lachine Rapids Hydraulic Co. upon a large wing dam which runs out for more than a thousand feet into the St. Lawrence river. A fall of water is secured by means of this dam sufficient to develop at the low water season 15,000 horse power. This water power is to be transformed into electricity. Upon the dam a power house will be built, which will run its entire length and show an unbroken interior 1000 feet long. The basement of this will be occupied by water wheels. The main floor will contain the dynamos, of which there will be twelve, each of 1000 horse power, or 12,000 horse power in all. They will be of the General Electric Company's latest multiphase type, and will generate current for transmission to Montreal, for use there in lighting the city, operating the street railroads and in any and all other lighting and power purposes. Apart from the fact that this plant will exceed in interest any yet installed, the contract for this electrical installation is the largest ever placed at one time for electric dynamos. It is also worthy of note that, although it was competed for by every prominent electrical manufacturer in the world, the superiority of the American apparatus kept the order with home manufacturers.

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EDISON received a few days ago at his laboratory at Orange, N. J., the hollow eye-pieces of a pair of opera glasses with the request that he "fit them with the X rays" and return them to the Vermont sender. Evidently this Green Mountain individual had a desire to see things. Another seeker after the unobtainable, writing from Pottstown, Pa., sent the following matter-of-fact epistle: "Thos. A. Edison, Dear Sir: "Will you please send me one pound of X rays and bill as soon as possible." This order was filed away with the opera glasses.—New York Electrical Review, June 10.

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IN foundries and workshops where large castings or forgings are handled by a crane, considerable labor is devoted to fastening chains around the object to be moved and then in detaching them. There is a growing tendency toward the use of powerful electro magnets for this purpose. One of these is carried by the tackle, and it is only necessary to bring its poles into direct contact with a mass of iron or steel and then turn on the current in order to secure adhesion. When deposited in the proper place the current is switched off.

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ALASKA reports a novel proposition in the application of electricity to mining in the shape of drills to be operated by electric motors—a steam tug, having dynamos on board to supply current through an armored and insulated wire.

# Practical Information.

## You Cannot See Fire.

It is a general idea that visible flame is fire in its most notable form. But in fact it is not fire at all. You look into a grate in which soft coal is burning. The flame is leaping in strange fantastic form 15 or 20 inches upward from the coal, and with it a good deal of black, sooty smoke. The sooty smoke and the flame are one and the same, with only a difference of temperature. The soot which forms the flame is red hot. It is soot half burned, or, rather, heated to incandescence, but not yet burned—not yet really burned at all. Every particle of the flame is a red-hot coal or particle of carbon. The real fire we do not see; no eye has ever seen real fire. The instant that the carbon atoms become really burned, eaten up by the oxygen of combustion, they are invisible. A particle of the red-hot soot which forms flame contains very many atoms of carbon, and the oxygen eats at them atom by atom, and this atom-by-atom seizure by the oxygen is the real burning, for which the red-hot state is only the preparation.

A soft-coal fire which has died down and apparently gone out may be found twenty-four hours later with red-hot coals "kept," we say, but in fact still burning. The soft ashes closely wrapping them do not keep them alive or burning; they keep them hot enough to let the oxygen go on nibbling furiously at them. The oxygen works inside of the ashes without any trouble, provided only that the red lumps do not get too cold. It, of course, makes fresh heat all the time, and the close wrap of fine ashes keeps the heat right there. The process of such burning is a slow one, but it answers to keep the coal burning.

In burning three pounds of carbon, the heated state of which gives us flame, the fire work is done by eight pounds of oxygen. The oxygen we do not see. The carbon we see only just before it is burned; and the result of the burning is eleven pounds of the compound of oxygen and carbon, which the eye cannot see. When a monster steamship burns 300 tons of carbon in coal every twenty-four hours, that means that the 300 tons of carbon are made red hot for burning, and are then consumed by 800 tons of oxygen, with the passing off up the chimneys of 1,100 tons of the compound of carbon and oxygen. The heated carbon not yet burned is intensely visible, but as it burns, atom by atom, it ceases to be visible, and the compound of carbon and oxygen is no less invisible, being a gas, each molecule of which consists of a molecule of oxygen (composed of two atoms locked together) into which one atom of cerbon has been swallowed, making a three-atom molecule.

The first belongs wholly to the oxygen. An atom of oxygen is in a state of motion, of spin or whirl like a buzz-saw, only many thousand times faster. These atoms unite in pairs, forming molecules, which have the same spin, only somewhat less swift. It is this lightning spin of the oxygen molecules by which each one devours an atom of carbon, with the effect which we call fire; only the real fire is back of what we see.

The oxygen of the air is a solid cloud of fire; it is essential fire which we breathe; a terrific conflagration only means that this universal fire has found stuff of some kind heated to the degree which prepares it to be consumed. In every case of fire the operation is that of oxygen consuming the atoms of combustibles through that intensity of whirl or spin which all oxygen has, and which is the essence of fire. But the oxygen atom is not a solid atom. It is rather a whirlpool of electric substance or fluid, composed of inconceivably fine atoms in a state of inconceivably rapid whirl. We see a fire start, but in fact there is no start. All the motion that may make to-morrow a conflagration, eating up a thousand square miles of forest, is going on to-day with an intensity very much greater than that of a conflagration. In the conflagration every fiery motion is checked by whatever combustible it may devour. The essential fire of the universal air is greater while it gives no sign than it is when it gets at work on combustible materials. We cannot too carefully reflect that there never anywhere occurs any new start of motion. What seems a start is only motion, which had existed all along, taking effect as the current of Niagara takes effect on anything thrown into it or launched upon it.

## Glossary of Mining Terms.

L. W. Tatum, of Denver, Col., has made a compilation of terms in common use in that State and elsewhere that is of practical value and of interest to many who are not practical miners but who like to understand what is meant when a word is used the meaning of which is not clear to them. Under the head "A," "B" and "C," among others, is furnished the following:

Absolute Temperature—The temperature reckoned from—459° F. or—273° C.
Adverse—To oppose the granting of a patent to a mining claim.
Aerophone—A respirator in the form of a tank receiving the exhalations from the lungs, which contains chemicals designed to revive the air and render it fit for rebreathing. It is used by rescuers after mine accidents.
After-damp—An irrespirable gas remaining after an explosion of fire-damp.
Air-shaft—A shaft for ventilation.
Aliaceous—The odor of garlic; given off by mispickel.
Anemometer—An appliance for measuring the velocity of an air-current.
Anorthite—Lime feldspar.
Anticlinical—A fold of the rock or strata, convex upward. The opposite of synclinical.
Apex—The top or highest part of a vein.
Arch—A part of the gangue left standing for support.
Arenaceous—Sandy; applied to rocks.
Agillaceous—Containing clay. The odor of wet clay.
Artesian Wells—Holes bored through solid strata and often overflowing.
Ascension—The theory that the matter filling fissures was introduced below.
Assay—A test of mineral to determine quality or quantity.
Assay Ton—A weight used by assayers containing 29,166 milligrams. As a ton of 2000 pounds of ore contains 29,166 troy ounces, it follows that each milligram in the assay button equals one ounce of metal to the ton of ore.
Assessment—Percentage levied on the capital stock of a company; annual work required by law on a mining claim.
Attle—Waste rock. (Cornish.)
Azoic—Without life.
Back—The roof of a drift, stope or other working.
Bal—A mine. (Cornish.)
Balance-bob—A heavy, triangular truss, the long, horizontal arm of which supports a weight at one end ballasted to balance the weight of pump-rods at the other.
Barrier Pillars—Pillars larger than the ordinary, left at stated intervals to prevent the crushing of the roof from extending beyond the section enclosed by them.
Bar Timbering—A system of supporting a tunnel roof by long top bars while the whole lower tunnel-core is taken out, leaving an open space for the masons to run up the arching. Under certain conditions the bars are withdrawn after the masonry is completed, otherwise they are bricked in and not drawn.
Base Bullion—Lead combined with other metals after smelting, cast in an ingot.
Base Metals—All metals except gold, silver, mercury and the platinum group, which are termed noble metals.
Battery—Generally applied to a set of five stamps.
Bearing-up Stop—A partition of brattice or plank that serves to conduct air to a face.
Bed—A horizontal seam or deposit of ore.
Bed Rock—Solid rock outcropping at surface or underlying alluvial and other surface formations.
Belt—A range of metal-bearing rocks.
Bench—Used to express the artificial divisions in the process of mining; also a terrace at the outcrop of a seam.
Bitter Spar—Crystal dolomite.
Black-Damp—Carbonic acid gas.
Black Jack—Zinc-blende. Zinc sulphide.
Blankets—Blankets, carpets and other fibrous material used for catching precious mineral in a wet process.
Blast—The operation of forcing air by blowing. Rending rock by explosives.
Blende—An ore of zinc, consisting of zinc and sulphur.
Blind Drift—A horizontal passage in a mine not yet connected with the other workings.
Blind Lode—A vein without an outcrop.
Blossom Rock—Outcrop of a vein indicating the presence of mineral (Gossan,) (Iron Hat).
Blow Out—A spreading outcrop.
Blower—A discharge of gas from coal; also a fan for forcing air into a mine.
Booming—A kind of placer mine where the water is accumulated in a dam and let out at intervals, so as to use its cutting power in the form of a torrent.
Boom Ditch—The ditch from the dam used in booming. (2.) A slight channel cut down a declivity into which is let a sudden head of water intended to cut to bed-rock and prospect for the apex on underlying lode.
Borraska—The reverse of bonanza. Out of pay.
Brace—The collar at the mouth of the shaft.
Brattice—A canvas or plank partition, nailed to posts longitudinally, within a level or shaft to divide the same into two compartments for the purpose of separating two air currents.
Break-Through—A narrow passage cut through a pillar connecting rooms.
Breast—The heading of a drift, tunnel or other horizontal working.
Breasting Ore—The ore taken from the face or end of a tunnel, drift or stope.
Breccia — A conglomerate of angular fragments.
Brittle Silver — Stephanite. A sulphide of antimony and silver containing 68.5 per cent silver, with the antimony variable. Sometimes contains iron, copper and arsenic; variable in color, hardness and specific gravity.
Broaching — Trimming or strengthening a working.
Buddle—The tub or machine used to wash slimes and separate the gangue from the mineral.
Buddling—Separating gangue from mineral by washing.
Bulling bar—An iron bar used to pound clay into the crevices crossing a bore hole, which is thus rendered gas-tight.
Bullion—Ingots of gold or silver ready for the mint.
Bumping-Table—A concentrating table with a jolting motion.
Bunch—A rich pocket of ore.
Buntons—Timbers placed horizontally across a shaft. They serve to brace the wall plates of the shaft lining, and also, by means of plank nailed to them, to form separate compartments for hoisting or ladder-ways.
Button—The globule of metal, the result of an assay.
Cache—A place where a prospector's provision or outfit is buried or hidden. (French)
Cage—A mine elevator. The frame to hold the bucket or car.
Calamine—An ore of zinc. Lapis Calaminaris.
Cam—The curved arm which raises the stamp in a mill.
Canon—A narrow valley; termed box canon when the sides are perpendicular. (Spanish) Pronounced canyon.
Cap—A vein is in the "cap" when it is much contracted, or of no value.
Cap Rock—The rock overlying the ore or vein.
Carbonate—Applied to oxides, when carbonic acid is united.
Carbonates—Ore containing a considerable proportion of carbonate of lead, often rich in silver. Soft carbonates have lead for a base. Hard carbonates have iron for a base—an ore of lead and silver.
Casing—The tubing of a well-hole to prevent caving. The sheathing or parting between the wall and vein.
Cement — Gold-bearing gravel united and hardened into a compact mass.
Chain Pillar—An untouched block of mineral on either side of the gangway.
Cheek—The side wall of a vein.
Chimney—The richer parts in lodes as distinguished from poorer ones, when found pipe shape with general perpendicular position.
Chlorider—One who extracts ore from mines by agreement with the owners, paying royalty for the privilege but has no lease.
Chlorides—A common term applied to ores containing chloride of silver. Compounds of chlorine with other elements.
Choke-Damp—Carbonic acid gas.
Chute (or Shute)—A body of ore, usually of elongated form, extending downward within a vein; a slide for ore or waste rock.
Cinnabar—Sulphide of mercury.
Claim—Space of ground located and worked under the mining laws.
Clastic—Fragmental. When a rock is composed of pieces.
Clean-Up—Collecting the valuable product of a given period of operation in a stamp mill or placer.
Cleat—A joint produced by the natural tendency of coal or rock to cleave or split in a certain direction not parallel to the plane of bedding.
Cleavage—The property of splitting more or less regularly in certain definite directions.
Coaster—One who picks ore from the dump or gleans in abandoned mines for ore.
Cobbing—Breaking ore for sorting.
Collar—Top of shaft or winze.
Color—A particle of metallic gold found in the prospector's pan or horn after washing earth or pulverized rock.
Column-pipe—The line of pipe through which the mine water is pumped.
Concentrates—Mineral from which gangue and dirt have been removed.
Concentration—The removal by mechanical means of ore from the gangue or slime.
Concentrator—A machine for removing waste matter from mineral.
Contact—A junction of two kinds of rock, such as lime and porphyry.
Contact Vein—A vein between two dissimilar rock masses, separating the two formations.
Copper-plates—Plates of copper, coated with quicksilver, upon which the gold is caught as the ore is washed from the stamps.
Cord—A cord of ore weighs about 8 tons.
Counter—A cross-vein.
Counter Balance — Counterpoise — A weight used to balance another weight or the vibrating parts of machinery.
Country—The ground traversed by a vein.
Country Rock—The rock beyond the sides of a lode. The strata between or across which the lode is found.
Course of Vein—Its strike. The horizontal line on which it cuts the country rock.
Coyoting—Spasmodic irregular surface mining.
Crab—An iron windlass for moving heavy weights.
Creep—The crushing in of the top or side rock, resulting in the floor rising and gradual closing of an opening.
Crevice—Fissure, split or crack; a vein is called a crevice.
Crib—A framework built like a log cabin. It may be a mere pillar afterwards filled with rock, or it may be the lining of a mill-hole or shaft.
Cribbing—The timbers used to confine wall-rock. The lining of a shaft.
Cropping-Out—Mineral or rock rising to the surface.
Cross Course—An intersecting vein.
Cross Cut—A level driven across the course of a vein.
Cross Vein—An intersecting vein.
Cupriferous—Copper-bearing.
Curb—A timber frame intended as a support or foundation for the lining of a shaft.
Cut—Where a vein is intersected, crossed or divided.
Cyanide—A compound of cyanogen with a metal.

## Commercial Paragraphs.

THE Sacramento city trustees have awarded the Risdon Iron Works a $6400 contract for boilers for the water works.

THE J. H. Montgomery Machinery Co., of Denver, Col., recently shipped two of their largest whims to the mines near Monterey, Mexico.

THE Midas Gold Saving Co., have sent two of their Gold King amalgamators to Wilcox, Arizona, two to San Andreas, Cal., and two to Burson, Cal.

THE stockholders of the Westinghouse Electric and Manufacturing Company, at a special meeting held the 5th inst., formally voted to increase the capital stock of the company from $10,000,000 to $15,000,000.

MESSRS. COBB & HESSELMEYER, mechanical and hydraulic engineers have moved into new quarters at 421 Market St., rooms 70 and 71. They are busily engaged upon the details of several large power plants in different parts of the State.

THE Truax Manufacturing Co., of Denver, Col., report recent shipments of their patent ore cars as follows: Five cars to Montana, six to British Columbia, four to Mexico, five to Idaho, three to Utah, two to New Mexico and a large number to Colorado points. These cars were patented in 1892 and 1895.

FRANK BARRERE, representing the McGlew ore concentrator reports recently sending one to Australia, one to Wadsworth, Nev., one to Bakersfield, Cal, three to Tucson, Arizona, and one to Scott Creek, Cal. The office and works have been removed to 129-135 Frst St., this city. W. H. Birch & Co., will in future manufacture the machines.

THE Colorado Iron Works Company of Denver are remodeling the W. J. Chamberlain & Company's sampling mill, and are putting in a set of their 54x8 inch high speed crushing rolls, with Cazin's patent end adjustment and self adjusting main boxes. They have also put in a set of the same size rolls in the Nellie Bly mill, near Boulder, Colorado.

THE recent sale of Wallace & Sons' plant at Ansonia, Conn., to the Coe Brass Manufacturing Company, of Torrington, Conn., makes the latter company the largest brass manufacturer in the United States, and therefore the largest American consumer of copper. It is said that the sale was made privately by the Calumet & Hecla people, who were the largest creditors of Wallace & Sons.

## Recently Declared Mining Dividends.

THE Union mine, Colorado, pays a dividend of 1 cent per share next Thursday.

THE Tamarack, Mich., will pay a dividend of $3 per share on the 30th.

THE South Idaho Mining Company of Nevada county has declared a stock dividend of 10 per cent.

THE Golden Gate Development Co., of Tuolumne Co., Cal., has declared a dividend, its fifth, of 15 cents per share.

THE Tamarack, Mich., Copper Mining Company has declared a $3 dividend, aggregating $150,000, payable on the 30th inst.

THE Homestake, S. D., Company has declared its regular monthly dividend of 25 cents per share, payable on the 25th.

## Recent California Mining Incorporations.

Larch Mining Company, San Francisco; S. L. Lent, J. F. Hinrichs, E. N. Atwood, G. T. Ruddock, W. D. Chambers; capital stock, $1,000,000; $1000 subscribed.

Hancock Mining Company, San Francisco; W. S. Chapman, V. E. Matthews, L. H. Smith, J. S. Minear, A. P. Minear; capital stock, $400,000, all subscribed.

Oro Vista Mining and Milling Company, Los Angeles; capital stock, $100,000, all subscribed; J. F. Walker, H. Todd, J. H. Webb, M. Walker, C. E. Todd, Los Angeles.

Sierra Azul Mining Company, San Francisco; capital stock, $500,000, all subscribed; W. J. Sutherland, E. S. Spring, W. G. Holmes, San Francisco; W. G. Greenen, Tombstone, Ariz.; B. Rogers, Seattle, Wash.

# CALIFORNIA MINES AND MINERS.*

## Name, Character and Location of Mines in This State—Name and Postoffice Address of Owner, Superintendent or Agent.

Continued from last issue.

### PLACER COUNTY—Continued.

| Name of Mine. | Character of Mine. | No. of Men Employed. | Location. | Name of Superintendent or Agent. | Address. |
|---|---|---|---|---|---|
| Jacobson | Quarry | 5 | Rocklin | Jacobson & Co, Owner | Rocklin |
| Kittler | Quartz | 10 | Ophir | B. Berry, Supt | Auburn |
| Laird | Drift. | 8 | 2 m S of Loomis | Jas. Laird, Supt | Loomis |
| Lightfoot | " | | 2 m SW of Michigan Bluff | D. L. Gorman, Own | Michigan Bluff |
| Live Oak Con | " | | 3 m NW of Forest Hill | F. Chappelet Jr | Forest Hill |
| Lone Star | " | | Alta | E.K Smart & Co, Own | Dutch Flat |
| Lucky | Quartz | | ½ m N of Ophir | C. Henny, Own | Ophir |
| Loomis | Quarry | 5 | ½ m S of Loomis | M. J. Haley, Own | Loomis |
| Lost Camp | Hyd'l'c | 6 | 1 m S of Blue Canyon | Iveson & Co., Own | Blue Canyon |
| Mammoth Bar | River bed. | 125 | 6 m E of Auburn | Howard Davis, Supt | Auburn |
| Maguerite | Quartz | 14 | Auburn | W. Deetken, Supt | Auburn |
| Mayflower | Drift. | | 2 m N of Forest Hill | F. Chappelet Jr, Supt. | Forest Hill |
| McDaniel | " | 4 | Auburn | S. Myres, Supt | Auburn |
| Mike Cochran | " | 6 | 10 m SE of Michigan Bluff | Mike Cochran, Supt | Michigan Bluff |
| Moore | Quartz | | 1¼ m SW of Auburn | White Bros., Own | Auburn |
| Mormon | Drift. | | 2 m E of Michigan Bluff | Edw. Polifka, Own | Michigan Bluff |
| Morning Star | " | 50 | 1 m S E of Iowa Hill | J. H. Neff, Supt | Iowa Hill |
| Muir | " | | 2 m N of Michigan Bluff | Wm. Muir, Supt | Michigan Bluff |
| Muir Tunnel | Drift & quartz. | | Michigan Bluff | Wm Muir, Supt | Michigan Bluff |
| Mountain | Drift. | | 4 m S W of Forest Hill | H. Schermier, Supt | Todds Valley |
| Mantyla | Quarry | 10 | Rocklin | John Mantyla, Own | Rocklin |
| McDonald, The | " | 6 | 2¼ m S of Lincoln | C. J. McDonald, Own | Lincoln |
| Nevada Hill | Quartz | | 4 m N W of Auburn | B. Berry, Supt | Auburn |
| Neversweat | Drift. | 4 | 3 m S E of Michigan Bluff | J. W. Sutcliff, Supt | Michigan Bluff |
| North Star | Quartz | | 1 m N of Butcher Ranch | E. E. McKinstry, Own | Butcher Ranch |
| New Basel Con | Drift. | | 3 m E of Westville | | Westville |
| Olsen | " | 3 | 1¼ m S of Auburn | — Olsen, Supt | Auburn |
| Oro Con | " | | 2 m N of Iowa Hill | E. M. Armstrong, Own | Woodland, Yolo Co |
| Page & Buckman | Quartz | 6 | 3 m S of Westville | Page & Buckman, Own | Westville |
| Paragon | Drift. | 20 | Bath | Wm. Grenell, Supt | Bath |
| Pioneer | Quartz | 50 | 6 m S E of Towles | D. J. Sullivan, Supt | Towles |
| Polar Star & S'n Cross | Hyd'l'c | | Dutch Flat | John Spaulding, Own | Auburn |
| Portuguese | Quartz | | 5 m S E of Iowa Hill | J. Brun, Own | Iowa Hill |
| Poverty Bar | River bed. | | 2 m S of Butcher Ranch | J. Whitefield, Own | Butcher Ranch |
| Quinn | Quarry | 8 | Rocklin | Mrs. Mary Quinn, Own | Rocklin |
| Rainbow | Drift. | 7 | 8 m NE of Michigan Bluff | Edw. Polifka, Own | Michigan Bluff |
| Ralston Divide | " | | 10 m E of Michigan Bluff | Wm. Ralston, Own | Pine St., S. F. |
| Red Point | " | 75 | 2 m E of Damascus | C. F. Hoffman, Supt | Damascus |
| Reed | " | | Deadwood | A. G. Reed, Own | Forest Hill |
| Rising Sun | Quartz | 10 | 1 m N of Colfax | | Colfax |
| Rocklin Granite Co | Quarry | 21 | ¼ m E of Rocklin | J. L. Delano, Supt | Rocklin |
| Richey, The | " | | 2 m E of Sheridan | John Richey, Own | Sheridan |
| Roberts, The | " | 9 | 1 m S E of Penryn | D. A. Roberts, Supt | Penryn |
| Redstone | Quartz | 20 | 1 m S of Blue Canyon | | Blue Canyon |
| Sandy Slide | Drift. | 4 | 4 m S E of Michigan Bluff | J. W. Sutcliffe, Supt | Michigan Bluff |
| Savage | Quartz | | Ophir | C. W. Kellogg, Own | Ophir |
| Sellier | Drift. | 6 | 4 m N of Michigan Bluff | J. B. Sellier, Supt | Bath |
| Spring Garden | " | | 5 m S W of Forest Hill | Bradley & Nash, Own | Butcher Ranch |
| Stewart & McGillivray | River bed. | | 3 m S E of Michigan Bluff | Wm. McGillivray, Sup | Michigan Bluff |
| St. Lawrence | Quartz | 12 | Ophir | Charles Reed, Own | Ophir |
| St. Patrick | " | | Ophir | B. Berry, Supt | Auburn |
| Strawberry Flat | Drift. | 6 | 2 m N E of Iowa Hill | — Watts, Own | Iowa Hill |
| Van Wormer | Quartz | 3 | ½ m S of Blue Canyon | M. T. Barnett, Supt | Blue Canyon |
| Washington Con | Drift. | | Deadwood | A. Dixon, Own | Michigan Bluff |
| Westchester | " | 7 | 4 m N W of Forest Hill | John Greenwood, Supt | Forest Hill |
| Yorktown | Drift & quartz. | | 3 m N E of Last Chance | A. Dixon, Own | Michigan Bluff |

### PLUMAS COUNTY.

| | | | | | |
|---|---|---|---|---|---|
| Butterfly M. Co | Gold. | 18 | 6 m from Quincy | Thompson & Kellogg and A. Smith | Spanish Ranch Quincy |
| Black Oak | " | 2 | 6 m W of Quincy | H. P. Wormley, Owner | Quincy |
| Cameron | " | 3 | 3 m S E of Butte Valley | Angus Cameron, Own | Butte Valley |
| Calliope | Placer. | 7 | 4 m S E of Butte Valley | H. L. White & Son, Own | Butte Valley |
| Chico Star | Gold quartz. | 2 | 6 m S E of Butte Valley | Dunn Bros., Own | Butte Valley |
| Cleveland | " | 5 | 1 m S W of Greenville | G. P Cazzalia, Own | Greenville |
| California Nos. 1, 2, 3, 4. | " | 1 | 1¼ m S E of Taylorville | A. C. Light, Own | Taylorville |
| Cal. G. M. Invest. Co. | " | 11 | 3 m NW of Genessee P.O. | J. T. Clapp, Supt | Genessee |
| Cascade | " | 8 | 10 m S of Genessee P. O. | P. R. Walsh, Own | Vallejo |
| Centennial (Brandt) | " | | 1 m S of Genessee Mine | Deane & Fletcher, Own | Reno, Nev. |
| Cayota | " | 1 | 9 m W of La Porte | F. Cayot, Own | La Porte |
| Coquette | " | 3 | 8 m S of Buck's Ranch | J. J. Lawrence & Snell, Own. | Merrimac |
| Chips Creek Claim | " | 2 | 20 m W of Spanish Ranch | Geyrand & Son, Own. | Spanish Ranch |
| Dutch Hill M. Co | " | 6 | 10 m S E of Prattville | Savereol Bros., Own | Butte Valley |
| Diadem | " | 2 | 4 m SW of Meadow Valley | J. A. Edman, Own | Meadow Valley |
| Ding Dong | " | 2 | 4 m N of Quincy | J. Lowery & Co., Own. | Quincy |
| Docile | " | 2 | 3½ m E of Alleghany | F. Smith, Own | S F. |
| Emerson & McMullin | " | 3 | 6 m S of Genessee P. O | A. Joseph, Own | Genessee P.O. |
| Elizabethtown | " | 8 | 1½ m N E of Quincy | W. W. Kellogg, Own | Quincy |
| Ella | " | 4 | 6 m N E of Merrimac | | |
| Fall River Con. G. M. Co | " | 2 | 9 m W of La Porte | J. C. Walters, Own | Gibsonville |
| Four Hills M. Co | " | 12 | 6 m S W of Johnsville | Ogden & Hoffman, Own | Johnsville |
| Feather Fork | Drift. | 70 | 1½ m S W of Gibsonville | W. C. Wingate, Supt. | Gibsonville |
| Florence Con | Gold. | 2 | 3½ m E of Merrimac | E.C. Robinson et al, O'n | Merrimac |
| Frazier | " | 14 | 6 m N E of Merrimac | F. W. Finchley | Merrimac |
| Glazier | Gold quartz. | 6 | 4 m S E of Rutte Valley | Dr. J. P. Welsh, Own | Butte Valley |
| Garfield Flat Mine | " | 3 | 4 m N of Johnsville | P. Lorenzi, Own | Johnsville |
| Grizzly Bear | " | 6 | 4 m N of Johnsville | N. Rossi & Co., Own | Johnsville |
| Gallagher | " | 2 | 5 m E of Johnsville | Gallagher Bros., Own | Johnsville |
| Gold Log | " | 2 | 6 m S of Genessee P. O | C. Marian & W. H. Adams, Own. | Genessee P. O. |
| Golden Stair | " | 3 | 10 m S of Genessee P. O | R. W. White, Supt | Genessee P. O. |
| Green Ledge | " | | 4 m S of Genessee P. O | J. Young and G. F. Burn | Taylorville Genessee P. O. |
| Genessee Valley | " | 10 | 3 m S of Genessee P. O | J. Geuss, Own | Genessee P. O. |
| Gladiator | " | 12 | 9 m W of Johnsville | Wm. Doolittle, Supt | Dutch Flat |
| Graves | " | | 5 m N E of Merrimac | W. C. Graves, Own | Merrimac |
| Grant & Davis | " | 2 | 14 m NW Spanish Ranch | J. Grant & T. Davis, O'n | Spanish Ranch |
| Hibernia | " | 14 | 2 m S E of Greenville | E. C. Robertson, Supt | Greenville |
| Homestake | " | 4 | 6 m N E of Merrimac | John Garner, Own | Chico |
| Hungarian Hill | " | 4 | 3 m S W of Quincy | J. H. Whitlock, Own | Quincy |
| Indian Hill | " | 3 | 12½ m NW Spanish Ranch | Eyraud & Lasires, Own | Spanish Ranch |
| John Bull | " | 2 | 2½ m S E of Greenville | J. Firinstone & J. Richards, Own. | Greenville |
| Jamison M. Co | " | | 2 m S E of Greenville | — Cheney, Supt | Johnsville |
| Kirkham Claim | " | 4 | 4 m E of Butte Valley | F. Ackels et al, Own | Butte Valley |
| King Solomon | " | 2 | 9 m N E of Taylorville | D. Carte & G. Compton, Own. | Quincy |
| Last Chance | " | 1 | 3 m S E of Butte Valley | S. Deane, Own | Butte Valley |
| Leetel's | " | 7 | 2½ m W of Crescent Mills | B. F. Leete, Own | Greenville |
| Lucky Star Mine | " | 11 | 11 m W of Taylorville | H. C. Langrehr, Supt | S F. |
| Last Chance | " | 3 | 7 m S of Genessee P. O | F. Duchains, Own | Genessee Val. P.O. |
| Lone Pine | " | 16 | 6 m W of Susanville | Judge J. Goodwin et al, Own. | Quincy |
| Malvern Hill | " | 2 | 2 m E of Butte Valley | E. Davis & C. Bressler, Own. | Butte Valley |
| Musick & Schaefer | " | 2 | 5½ m N of Quincy | Musick & Schaefer, O'n | Quincy |
| Michigan Hill | " | 2 | 5 m N E of Quincy | J. B. Higgins, Own | Quincy |
| Mtn. King (Butte Bar) | " | | 10 m S W of Quincy | Frank B. Thomas, O'n | Quincy |
| Mountain Chief | " | 2 | 4 m S E of Quincy | Judg. J.G. Clough, Own | Quincy |
| McGill-Standart Con. | " | 18 | 2 m S of Greenville | G. Standart & R. McGill, Own. | Greenville |
| Northern Placer M. Co. | " | | 16 m S E of Quincy | Pitner Trayner, Own. | Quincy |
| Oliver Quick | Gold. | 2 | 5 m N E of Merrimac | J. Poppin, Own | Merrimac |
| Pipe | Placer. | | 2 m S E of Greenville | B. F. Gullic & C. S. Clard, Own. | Greenville |
| Plumas Eureka | Gold. | 50 | Johnsville | — Johns, Supt | Johnsville |
| Plumas Imperial | " | 18 | 4½ m S W of Quincy | C. D. Hazzard, Own | Quincy |
| Round Valley Con | Gold quartz. | | 2 m S E of Greenville | Duncan McIntyre, Sup | Greenville |
| Robinson (Mor'g Star) | | 7 | 8 m N E of Merrimac | E. C. Robinson, Own | Merrimac |

—* Begun in issue of April 25, '96. (To Be Continued.)


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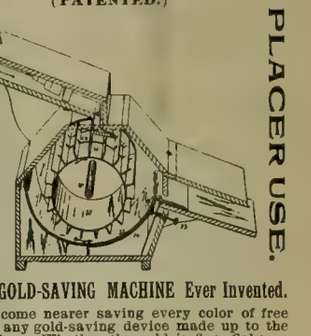
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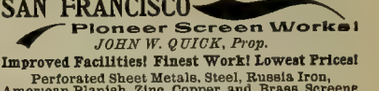
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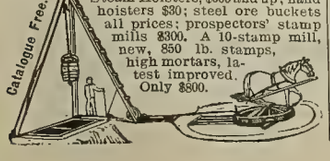
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FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN legal size, 12x36 inches, the Mine Bell Signals and Rules provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We furnish these Signals and Rules, printed on cloth so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.

## Coast Industrial Notes.

—The Sacramento Drying and Packing Co. will build a large fruit cannery at Visalia.

—The Fresno Chamber of Commerce wants the Yosemite Railroad Co to start their road from that city.

Coalinga, Fresno Co., reports a new gusher from which flows 1000 gallons of oil per hour.

—A new wooden $125,000 dry dock 425x80x21 feet is to be built by J. E Higgins at west Tacoma, Wash

—Washington expects this year's wheat crop to be 15,000,000 bushels—the biggest in the history of the State.

The Valley Railway directors have decided to issue $6,000,000 of fifty-year bonds, bearing 5% interest, to complete the road to Bakersfield.

—The inspection board in their official report give high praise to the battleship Oregon and pronounce the California-built vessel in every respect satisfactory.

—The California Wine Association is about to build the largest winery in the world near Fresno, with a daily capacity of 900 tons of grapes. Elevators, a distillery, etc., will be built in connection with the winery.

—The Atlas Lumber Company and Stetson & Post of Seattle, Wash., are filling two orders, amounting in the aggregate to 3,600,000 feet, of wood paving blocks for Indianapolis, Indiana, street pavements.

—The Mechanics' Institute and the Manufacturers' and Producers' Association have every assurance of a successful exposition in the Pavilion. Nearly three-fourths of the available space is already applied for.

—The steamer Washtenaw is being overhauled at the Fulton Engineering and Shipbuilding Works, preparatory to being placed in competition with the Pacific Mail Co., to carry freight between here and New York, via the Straits of Magellan.

The annual fishing troubles at the mouth of the Columbia river are unusually prolonged and fatal this year. So far no agreement has been reached by the canners or gill-net fishermen. The river is full of salmon and men who can make $150 per day are risking their lives in their capture.

Fires during the week destroyed two blocks in Merced, Cal., causing a loss of $100,000, a $50,000 hotel at La Jolla, San Diego Co., another $50,000 hotel at Oceanside; the works of the Standard Asphalt Co., Asphalto, Kern Co., $30,000; the Northwestern Lumber Co.'s mill at Hoquiam, Wash., $75,000.

—During May coal shipments from the Vancouver Island, B. C., collieries aggregated over 60,000 tons. The Premier says there is a tax of 2½ per cent on the value of coal at the mine. If so on the coal product of May the Dominion Government would collect a tax of $3500. There is not a mine on Vancouver Island which pays that tax.

—H. Glen of The Dalles, Or., has a contract for forty-seven miles of clearing, grading, riprapping, tunneling and rock work on the Astoria and Columbia River Railroad between Goble and a point within ten miles east of Astoria. The work must be finished within a year, and will require a force of 200 men, besides a large amount of machinery.

—Few persons, says the Seattle, Wash., *Post-Intelligencer*, realize the magnitude of such orders as those now being filled by the Atlas Lumber Company and Stetson & Post in supplying 3,600,000 feet of cedar paving blocks for the city of Indianapolis. Perhaps a better idea of their extent may be gained from the fact that 300 cars will be required to move the blocks East.

—The special report of the condition of the Oregon Improvement Company estimates the assets of the company in actual use at $8,463,234 and these with a contingent value at $2,123,725. The approximate income from operations in 1895 was $440,000. The compiler says that the Port Townsend Southern Railroad never paid operating expenses and that it was a wild scheme without business foundations. He does not think that it will be self-supporting for several years. He says that the Seattle and Northern returns to the Oregon Improvement Company some revenue, but there is no likelihood of its becoming valuable. These two roads cost the company $2,500,000 in consolidated bonds at a heavy discount, "upon which, as a whole, no income has been received."

—Mr. Louis Mead, of the Manufacturers' and Producers' Association has sent to the California prison directors the following letter: "*Gentlemen*: We have been informed that your honorable board has deferred consideration of the bids for coal and hardware for the prison at San Quentin until next Saturday. Among the bids for coal there will be found one from a California company, namely, the Pittsburg Coal Mining Company. The coal put on the market by this company, besides being a California product, is, we are informed, of as good if not better quality than any coal used in this market, and if your tests have proven such to be the case, as we have no doubt they have, we would most respectfully urge that you award this contract, if the bid is as low or lower than other bids for an equal quality of coal, to the California coal company."

## Books Received.

"*Artesian Wells as a Means of Water Supply*," by W. G. Cox, published in Brisbane, for sale by D. Van Nostrand Co., 23 Murray St., New York City, price $3.00, an interesting treatise on the subject as concerning Australia, but of little practical benefit to California or the United States, local publications on the same subject making its circulation here entirely unnecessary.

## Personal.

JAS. D. HAGUE has returned from the Black Hills and New York City

P. GEO GOW, San Francisco manager of the Gold and Silver Extraction Co. of America, is in Denver, Col.

W. S. WILLIAMS succeeds C. M. Spangler as superintendent of the Standard Mine at Henry, Butte county.

CHAS. SMITH, amalgamator at the Kennedy mine, Amador county, is building a new style amalgamator and concentrator.

GENERAL MANAGER W. C. BUTLER, of the Everett smelter and the Monte Cristo mining companies, will spend the summer at Monte Cristo, Wash.

U. S. SENATOR GEO. C. PERKINS, who with his colleague, U. S. Senator S. M. White, did such good work for the miners of the State, has returned from Washington, D. C.

J. E. MCMANUS, of Everett, Wash., has been appointed mineral land inspector at a salary of $10 per day and expenses, and assigned to service in Montana and Idaho.

J. J. HILL, president of the Great Northern Railway, is in Portland, Or. He still proposes a combination under one management of his road and the Northern Pacific.

"CLEVELAND, REED & CARLISLE" is announced as the name of a new legal firm, to commence business in New York City next year. The announcement, though based on possibility, is premature.

G. F. ALLARDT, Lyman Bridges, Howard C. Holmes, E. J. Molera, Hermann Kower and Luther Wagoner, civil engineers of this city, have been appointed a committee to take charge of the entertainment of the American Society of Civil Engineers during their meeting in this city next week.

## Obituary.

H. L. VAN NOSTRAND, formerly superintendent of the Arnold mine near Albuquerque, N, M., died at San Deigo, Cal., last week.

HENRY JACKSON, shift boss at the Bunker Hill and Sullivan mine at Wardner, Idaho, was killed there last week by being struck on the head with a falling rock.

JESSE THORPE and Robert English were drowned last Wednesday while on a prospecting trip by the upsetting of their boat in the Pitt river, sixty miles northeast of Redding, Cal.

JOHN D. WILSON, a pioneer mining man, died in Oakland, Cal., on the 15th inst. Mr. Wilson was a charter member of the San Francisco stock board and a member of the Vigilance Committee of '56.

GEO. RILEY, a miner was recently killed at Mercur, Utah, in a singular manner. He was working in a 300-foot tunnel, and after putting in a shot and lighting the fuse came out of the tunnel and stood on the dump until after the blast should go off. When the explosion occurred, a piece of rock flew straight out of the tunnel—a distance of 300 feet—and struck him between the shoulders, inflicting injuries from which he died soon after.


**"HISTORY OF CRIPPLE CREEK."**

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention THE PRESS and address. *Illustrated Weekly*, Denver, Colo.

UNITARIAN LITERATURE sent free on application. Address Postoffice Mission Committee, First Unitarian Church, corner Geary and Franklin streets, San Francisco. Mention this paper. *

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**GOLD MINING PROPERTIES.**

Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

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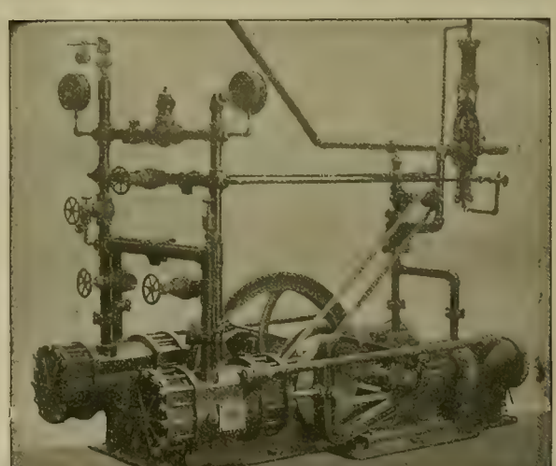
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This is a cut of the Double Pipe AirCompressor, the Compressor that is guaranteed to save 30% in power over any other make. It is cheapest to buy, cheapest to carry about and cheapest to run. If your fuel or water costs you anything, you want this Compressor. If you can get railroad freights free, and can carry machinery to your mine without cost, and your power costs you nothing, any make of Compressor will do you. You will be under no necessity to write to PNEUMATIC POWER CO., at 306 Pine St., San Francisco, Cal. We could save you money, though, in cost of foundations, as our Compressors are half the size of other makes.

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THAT OUR ANNUAL PRODUCT OF . . . . . .

**INSULATED WIRE**



EXCEEDS that of any other manufacturer in the United States, and Includes Everything in the Electrical Line. . . . . .

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Dr. J. C. Anthony, of 86 and 87 Chronicle Building, who for the past four years has met with universal success in the cure of Ruptures, now guarantees a cure in from 10 to 16 days. There is no pain, no blood drawn and absoutely without danger. Usually but a single treatment required.

# Mining Summary.

## CALIFORNIA.

### Amador.

At the Wildman-Mahoney mine, at Sutter Creek, seventy stamps are dropping. General Manager Ross estimates that when the 1200-foot level of the Mahoney is reached, the ore-shoot in that mine will connect with the Wildman ore body at the 1300-foot level of the latter mine, making a known ore body 1600 feet in length and from 8 to 40 feet in width.

### Butte.

Clark Bros. are running an arrastra at their mine near Yankee Hill. C. Waldeyer works five stamps on ore from another part of the same ledge. He calls his mine the Morning Star, the Clarks call their's the Evening Star.

John Wagner of Merrimac will soon resume operations on his mine, a mile west of the Golden Butterfly in Morris ravine. W. Treat & Son have twenty-five men at work at their mine. On bedrock they are handling about 200 inches of water. The water pumped is used to wash the gravel.

A new supply ditch has been built into the Fahey mine from the Palermo ditch, giving 30 feet fall, a hydraulic elevator is talked of.

One hundred and forty Chinamen are reported working on the bar at the mouth of Berry creek. Mooney and Herrin have opened their river mine, near Enterprise. Brooks & Co. will start up their mine near Enterprise about July 1st.

*Mercury*: A. P. Frary and H. J. Langdon have bought a one-third interest in the Blue Jay mine at Oregon Gulch, one mile east of the Banner mine. They also have a working bond on the other two-thirds of the property. They will begin operations in a few days and will run night and day until the ledge is reached. They hope to open a vein from 2½ to 4 feet wide.

The shaft in the Magalia mine struck the old Pershbacker works on Saturday and emptied it of its immense body of water without an accident. The work of taking out some of the coarse gold from the ancient channel will soon begin. This opens up business on the Magalia ridge and other developments will soon follow.

### Calaveras.

*Prospect*: The ranch of Allen Clorac, Happy Valley, a mile east of Mokelumne Hill, was bonded last Wednesday to Prince Andre Poniatowski for two years for $10,000. During the life of the bond and until its final settlement, monthly installments of $30 per month are to be paid to Clorac.

### El Dorado.

(Special Correspondence).—W. E. Jones has bought four claims adjoining the Larkin on the east. He finds three ledges on the property and will run a tunnel to tap them at good depth.

On the Salisbury they are sinking a shaft to a depth of 500 feet; meanwhile they are milling the surface from different parts of the property to a depth of 15 feet.

On the Larkin a station and tank have been completed on the 200 level. Sinking will be resumed for an additional 100 feet.

A shaft has been started on the Lone Star, and is down 50 feet. This property is one mile south of the Larkin.

On the Live Oak, adjoining the Larkin on northeast, the tunnel has reached 145 feet on two feet of quartz.

Chas. Edner, twenty-six miles east of here, is developing a 2-foot ledge of ribbon rock, of which he milled 15 tons and realized $331.

Otis Graves, of Cripple Creek, has bought the Ed. Hummel mine near Greenwood and is continuing the work by sinking to a greater depth. The property has a fair-sized ledge of free milling ore that runs $5 and upward.

San Francisco people have bonded the Welsh property near Greenwood. They have sunk 100 feet, drifted and crosscut 150 feet, and erected a substantial hoist run by water power. The ledge is said to be 3 to 8 feet, and mills $5 per ton.

Mr. John Smith, the storekeeper at Greenwood, is recognized as the miners' friend in that section. His readiness to grubstake and accommodate an honest man in the prospecting field has given him and his section an enviable reputation in those parts. Mr. Smith takes much interest in mining, and also intelligently advocates the prudent investment of money in mining grounds.

Placerville, June 16th, '96.

### Inyo.

*Register*, June 11: P. W. Palmer, who returned from San Francisco yesterday, informs us that he has purchased the Mammoth mine, millsite, and everything connected with the property except the mill itself, which belongs to J. S. Cain. The terms of the sale are private between himself and the Bank of California, which has owned the property since the boom days of the camp. Work will be vigorously pushed in the mines and mill this summer, we hope with rich returns.

### Kern.

At the new mines recently noticed, there is now a postoffice known as Garlock. There is also one at Randsburg.

Water was struck at 207 feet sufficient to insure the running of the mill.

The ores milled since May 20th show:—May 20th, 11¼ tons, 14¾ ounces, $18 per ton. May 21, 19 tons, 18½ ounces, $2,888. May 20th, 5¼ tons, 190 ounces, $2,809.

The 5 stamp mill erected at Kane Springs, twenty miles away, is completed.

Robert Taylor of Mojave, contemplates putting up a stamp mill.

Willard and Harrison in the Rand district are putting in a five-stamp mill and 10-horse power engine and pushing the work on two of their claims—the Rawhide and Ophir. They have a 4½-foot shaft down 100 feet and about 100 tons of ore on the dump which they will go to work on as soon as the mill is in running order. They report about 1000 people at and near Randsburg and Cow Wells, with three stages daily from Mojave.

### Mariposa.

(Special Correspondence).—Coulterville, although dull to the single-handed miner, is still quite active with the larger corporations. The country at large has been treated of late to considerable of the sensational from this section, so we will treat upon the statistical only.

The Merced Gold Mining Co., located south of and adjoining the town of Coulterville, is a corporation with a capital stock of $1,500,000; head office, Boston; J. R. Gilbert, resident superintendent. This corporation's property here consists of several groups of mines, the principal of which are the Margarette, Louisa and Mary Harrison. On the Louisa they have a shaft down 350 feet in three compartments. The Mary Harrison has a two-compartment shaft down 160 feet. The principal works of this company, however, in this section, are located one and one-half miles southwest of Coulterville, and consist of the Potosi, Malvina, Malvina No. 2 and several other mines of lesser note. The Potosi has been pierced by a tunnel 2600 feet in length, at the mouth of which is located their 40-stamp mill, with sixteen concentrators. Their assay office, blacksmith shop, machine shop and Rand air compressor are also located at this point. This compressor has a capacity to run six drills, which are constantly in use. On the Malvina a double-compartment shaft is down 600 feet. The ore of this group of mines is a silicate white quartz, tinged with slate, about four per cent sulphurets. It is a medium-grade ore, and the vein runs from 10 to 25 feet wide. This company at present employs 130 men in all departments, and mines and mills about 100 tons of rock daily. The Sunny Ridge mine, located sixteen miles northeast of Coulterville, on the Yosemite road, is owned by Levi Keys of Coulterville. It runs northwest and southeast on the East belt. The development consists of three shafts down severally 30, 30 and 45 feet, uncovering a ledge 140 feet in width. It is a low-grade ore, but in the principal shaft prospects $5.40 per ton, about seventy-five per cent of which is free milling. The base portion consists of magnetic iron tinged with manganese. At present this mine is idle, but will soon start up. L. P. Mc.

Coulterville, June 15th, '96.

### Nevada.

*Union*: Although North Bloomfield is not the lively little mining camp it was six or seven years ago, the prospects are that inside of a year or two it will be a better town than ever. The prospects for one of the greatest drift mines in the State are here and capitalists are beginning to realize it.

Since the famous Derbec mine ceased work, on account of running to the end of their line, practically nothing has been done to work the Bloomfield channel. Of late, though, capitalists have been inquiring into the merits of working the channel further up the ridge.

It is a well known fact that where the Derbec Company suspended work the gravel was very rich, and they could not make satisfactory arrangements to purchase the adjoining ground from Mrs. DeNoon. General A. M. Dobbie recently made a trip to San Francisco, and through his efforts the old Watt ground, the Blue Coat, the Backbone and several other properties were bonded to an English syndicate represented by M. Simianson. All the papers have been signed, and it is understood that in about a month's time the Englishmen will commence the work of running a tunnel to tap the channel.

It is known that the Derbec is a continuation of the famous North Bloomfield channel and that it turns up the ridge for a distance of six miles. Another advantage is the fact that it is known at just what depth the channel can be tapped and then the whole ridge can be worked.

The English syndicate consider this is the largest gravel mining scheme in the State and that, after the tunnel is once in, millions of dollars will be taken out, the Derbec alone having produced over $2,000,000.

The tunnel would have to be run a distance of about 800 feet, and there is plenty of water power for running air compressors or for installing an electric plant. The people of North Bloomfield have bright hopes for the future, and it is to be hoped that they will be realized.

### Placer.

*Sentinel*: The tunnel at the Eureka mine was in 1023-foo tmark June 1st—198 feet during May. The "I Will Try It" Drift Gravel Mining Company will work their property this summer. The mine is at Fall Creek, Nevada county, and the nearest postoffice is Emigrant Gap. The Zuver Bros., of Auburn, are owners of the mine. Augustus Buchanan will superintend the work this season. They expect to work about fifty men.

### Plumas.

*National-Bulletin*: At the Taylor diggings, between Genesee valley and the north arm of Indian valley, a bank 75 feet high is being washed by the company and the yield of gold, though bedrock has not been reached yet, is satisfactcry.

G. M. Compton has resumed work on the King Solomon mine.

After a seven days run of the Kittle mill, Standart & McGill cleaned up amalgam valued at about $2,700. During the month before closing down last fall, it yielded nearly $15,000, only a fifteen-stamp mill being used for crushing.

### San Bernardino.

(Special Correspondence).—On April 15th I discovered gold on Porphyry mountain, a reef of conglomerate or sedimentary porphyry carrying gold, 800 feet north of the Waterloo silver mine. This reef is several hundred feet in width, about 2,000 feet in length, which carries gold all through it. This deposit is soft porphyry, small particles of broken quartz and carrying red oxide of iron. It seems to be perfectly free—no sulphurets or other base material that would interfere with its working.

H. B. STEVENS.

Calico Mining District, June 12th, '96.

The San Jacinto *Register* says the gold mines in San Jacinto mountain, near Strawberry valley, are attracting a great deal of attention, many have taken up claims.

According to R. G. Dun & Co.'s circular, the Vanderbilt Mining Company has levied an assessment.

### Shasta.

*Free Press*: The large dredging boat was successfully launched Wednesday afternoon by the Shasta Dredging Company. It is 35 feet long and 20 feet wide. When the necessary machinery is put on it will probably draw 1½ feet. J. M. Gleaves, the president of the company, thinks the boat will be in full operation by the 25th. The pump is so arranged that nothing larger than an 8-inch boulder can be hoisted. The capacity of the pump is between 900 and 3000 yards of sand per day, and as the sand prospects $2 per yard, the gross returns per day on 900 yards is estimated to be about $1800. Col. Button will have charge of the work.

### Siskiyou.

*Journal*: The small placer mines in the vicinity of Hawkinsville are closing down for the want of water. The larger hydraulic mines which get their supply of water from the high mountains will be able to keep at work until after the 4th of July.

The new road which the owners of the Columbia mine are building from their mine to the mill on Mill creek, will be completed some time in July. Forty men are employed. A concentrator arrived in Yreka the latter part of last week for this company, and it has also been said that they intend to increase the capacity of their mill after a little, by adding more stamps. It is said that the quartz in the Columbia mine continues to grow richer, and at the next crushing the cleanup will be better than ever.

The Distlehorst Dredging Company, on Klamath river, will be ready for operation in another month.

The Culver & Co. mine on Klamath river will not be opened up again for some time. They have done considerable development work since putting in their new pump, which is said to be one of the best ever brought to the county. This mine is worked very much on the same plan as the Blue Gravel at Greenhorn, near Yreka.

Nothing has been done yet toward opening up the Spencer mine on Humbug. This mine will require quite an outlay of money to get where the last work was left off. The mine will have to be retimbered and the water pumped out, or a tunnel dug to let the water run out, either method being quite expensive. A great deal of money has been taken from this mine, and it will probably continue to pay when some one has sufficient courage to sink several thousand dollars in it.

### Tuolumne.

(Special Correspondence).—Some of the mines, mills and reduction works recently visited in this famous old county go to show that more activity exists now than at any time since the early sixties.

The White Lead, a gravel deposit, running nearly north and south and extending from Mariposa county on the south through this county into Calaveras and on through the several counties to the north, has almost been forgotten by name, but it is still worked all along the line under various names and titles. All classes are engaged, from the Spaniard with his batea and the Chinaman with his rocker to the sluice and flume with undercurrent catching the gold sent down by the monitors, where privileges have been granted to mine by such methods. This channel shows a width of from 100 feet to one-fourth of a mile, made visible by the white-capped rocks of decayed marble and limestone that have been the obstacle to successfully mining this channel in the past. In a few places this lead crops out but in other places it runs at great depth. It is said on reputable authority that this lead has never been bottomed. When you think of the millions of dollars that have been extracted from it in the past, and never reaching bedrock, what must there be in waiting for the miner of the future who will succeed in reaching bedrock. This lead has been practically abandoned by white men for many years; the well-to-do Chinese companies along the line have led the white men to investigate. White men are now engaged in attempting to enter this lead on the line of the bedrock, at a point where the Stanislaus river cuts the channel on the northern boundary of this county near Columbia. If sufficient capital is found among those who have abiding faith in this enterprise, it may again show the output of the early fifties.

The Sunset quartz mine, located on the south fork of the Stanislaus river three miles north of Columbia, owned by Vassalo & Co., is soon to start up.

The Green Tibbitts mine, twelve miles northeast of Columbia, on the south side of the south fork of the Stanislaus river, and about one mile northeast of old Riverside mill, is owned by Green, Tibbitts, Clark and French. This mine was located in February of this year. They are sinking a chute on the trend of the vein. Steps will be taken in the near future to work it on an extensive scale. Supt. L. C. Tibbitts says that they have recently milled a small lot of rock from this mine that averaged nearly $150 per ton.

The Black Oak quartz mine, one-half mile southeast of Soulsbyville, is owned by Scott, Dowe & Co. W. P. Scott is superintendent. The character of this mine is a quartz granite formation between walls of slate. It runs north and south and pitches to the west. The ore body is about five feet thick, of a rebellious character; worked by mill and concentrator process. They have a twenty-stamp mill, crushing about twenty tons daily; working thirty men in mill and mine. Just now they are preparing to put in a cyanide plant that is to have a capacity of thirty tons daily.

Summersville mining district, Carter's P. O., the center of which is situated about three miles southeast of Soulsbyville and ten miles east of Sonora, has within its limits a number of working mines, and many notable mines, at present idle, soon to resume activity. The principal working mines are the Con. Eureka Gold Mining Co., a corporation of $100,000 capital stock. C. H. Thomas is the resident superintendent. This company's property is located three-quarters of a mile south of Carter's P. O. and consists of all the usual outbuildings surrounding a successful mine, including a 20 stamp mill. The ore body of this mine runs from northeast and southwest with an easterly pitch; it is composed of quartz and black metallic slate, between a hanging wall of slate, and a foot-wall of quartzite. The general formation of this and most other quartz lodes in this section is a gray dorite and talcose slate; running in places 1½ miles in width. The width of the Con. Eureka varies from 10 inches to 20 feet and averages 12 feet between the walls. This mine is worked through a double compartment shaft now down 1450 feet, the present workings are from the 1400-foot level. The shaft and mill are operated by water power, using a wheel, with an effective pressure of 636 feet. They use two skips of 1½ tons capacity each; their air compressor runs a giant ram and a double power drill. Twenty-eight men are employed in mine and mill, extracting and crushing from forty-five to fifty tons of ore daily. The rock in the past has averaged $3.00 per ton in free gold, and about $1.00 per ton in sulphurets.

The Sunny South and Wallace Gold Mining Co., is situated about 1½ miles north of the Con. Eureka (at Carters). W. H. Hawkins is the superintendent. Their improvements consist of a steam hoist, shops, etc. A shaft through which the mine is worked, is now down 85 feet, eight men working on double shift; are making upraises, and extracting ore. The ore is free milling, and twenty tons now on their dump I am informed will mill $10.00 per ton. At a depth of 85 feet in their shaft tunnels have been extended 80 feet in opposite directions on the vein, which averages 3 feet in width, and the formation between walls averages fully 20 feet. A 20-stamp mill is talked of to be erected in the near future.

The Consuelo quartz mine located about three miles southeast of Carters, on the north fork of the Tuolumne river, is owned by D. B. Warfield, Oakdale. This location is said to be the extension of the Con. Eureka, and although but limited development has been reached, it is favorably spoken of by mine owners in that vicinity. It is at present idle.

The Providence mine, south extension of the Consuelo, of which A. Ogden is superintendent, is being developed by a shaft and two tunnels. They have several men at work; the ore thus far extracted is said to be of a high grade.

Little Blue Mountain mine, located on the same vein as the Providence, and just south is a recent location, owned by Risley and Stewart, of Alameda, is now being developed in a small way, with very encouraging prospects.

The old Spring Gulch mine, located still farther south on the same lode with the above-mentioned, is owned by R. Marshall, of Sonora. It is at present under bond of $20,000 to a Utah company, who are prospecting.

The Con. Golden Gate & Sulphuret Mining & Development Co., located 1½ miles SW. of Sonora, has a capital stock of $6,000,000. J. A. Fischer is president and general manager and Samuel Smitherum is superintendent. This property consists of three claims—the Golden Gate, Golden Sulphuret and South Extension of the Golden Sulphuret. The whole is covered by U. S. patent. Their improvements consist of some fifteen buildings, arranged with such harmony that the whole group looks more like a small village than one mining claim, consisting in part of first-class hoisting works over a double-compartment shaft down 700 feet, the first 450 feet of which is on an angle of 80°, then runs off at an angle of 60°; a 20-stamp mill, with twelve concentrators; air compressor, run by steam, with a capacity of 125 H. P.—claimed to be the finest in this county; chlorination works complete. Seventy men are employed in the different departments of the mine. They are crushing 400 tons weekly. The ore of this mine is rich in sulphurets and the gold output is among the first of the mines of this county. This company has just declared its fifth dividend—one of 15 cents per share.

Rappahanock Gold Mining Co., located 6½ miles northwest of Sonora, adjoining the Rawhide mine on the north, R. Chute superintendent, has a steam hoist over an incline shaft, now down 350 feet; working 11 men.

The Rawhide mine, situated six miles northwest of Sonora and two miles nearly north of Jamestown, is somewhat celebrated from the fact of its having formerly been possessed by the great magnate of mining industries, Alvinza Hayward, who is seldom known to let a good thing go. That he missed it in this instance goes without saying. This is a corporation with 100,000 shares, of $1,000,000 capital stock. W. A. Nevills is the principal owner and general manager. The ledges and ore body of this mine are contained within an area of 220 acres of land, covered by U. S. patent. The improvements of this mine consist of forty-five buildings, three sets of hoisting works over shafts down severally 300, 400 and 1,000 feet; a 40-stamp mill, with sixteen concentrators; very extensive chlorination works, with a daily capacity of three tons. The power used for the mammoth engine is electricity, brought to the mine some six miles from near Columbia; 110 men are employed, and with this force they mine and mill

about 100 tons of ore daily, about 4 per cent of which is sulphurets.

The App Gold Mining Co., consisting of the App, Heslep and and Hitchcock mines, is located at Quartz Mountain, about 6½ miles south of Sonora, and about 1½ miles southeast of Rawhide mine. W. A. Nevills is the principal owner and general manager of this mine, Charles Jacobs is superintendent. The grounds of this company are also patented. Their improvements are two sets of hoisting works, a 20-stamp mill, with eight concentrators, and about twenty other buildings, being proportionately equipped to that of the Rawhide. This mine is being developed through two shafts, one down 600 feet and the other 800 feet. At this mine water power is used; fifty men are employed, and with this force fifty tons of ore is mined and milled daily. The character of the rock is similar to that of the Rawhide mine.

The Whisky Hill group of mines, consisting of the Trio, Mooney and McCann, located one-quarter of a mile southwest of Jamestown, have just been sold to a Boston syndicate for $150,000. Formerly owned by H. A. Preston and Alvinza Hayward. Under the management of B. M. Newcomb, the present purchasers will immediately start up work. A shaft is to be sunk 1000 feet, and other developments will follow.

The Sweeney mine, situated 1½ miles south of Jamestown, is personally owned by H. A. Preston. This claim, at present idle, has been previously developed by a shaft sunk to a depth of 300 feet, revealing a ledge from eight feet to fifteen feet thick, which like all other mines located on the mother lode, runs northwest and southeast, with an easterly pitch (in this mine) at an angle of about 45°. Mr. Preston informs me that the rock prospects from $5 to $7 per ton, and that a Salt Lake company will take charge of this claim, erect hoisting works and thoroughly prospect the mine.

Bella Union mine, five miles south of Jamestown, owned by H. A. Preston, has been bonded to A. Halsey and L. Rosenfeld, who are now engaged in developing it. Through a tunnel they have crosscut the ledge at a depth of 150 feet from the surface, revealing a ledge twenty five feet thick of low-grade ore.

The Golden Rule mine, located at Stent, 2½ miles east of south of Jamestown, has just completed an extensive steam hoisting works, and begun sinking a shaft. Heretofore this mine has been worked through a tunnel, at the mouth of which they have a complete 10-stamp mill, which is kept constantly running on ore from this mine. E. A. Stent is superintendent, and he keeps twenty-five men employed.

Shawmut and Eagle mines (adjoining) are located 1½ miles north of west of Jacksonville, and 1¼ miles east of Chinese Camp, or two miles southeast of Stent, on Woods creek. Owned by Rosenfeld & Halsey; A. Halsey superintendent. These mines are being developed from opposite directions by tunnels. That of the Shawmut is now in 1125 feet, and the Eagle has a tunnel in 780 feet running toward the Shawmut leaving about 1000 feet to connect the two mines, which when connected will be worked through the Shawmut. An incline shaft 463 feet in depth, sunk on the trend of the vein and previously used in developing the mine is now used only for an air shaft. The tunnel of the Shawmut taps the lode at the bottom of this incline; at which point they have crosscut the vein north 170 feet, and still going, and south 475 feet and still pushing ahead. At a point 200 feet in the south drift they are sinking a shaft 6 by 14 feet on the incline of the vein which runs from 4½ feet to 7 feet thick as far as penetrated. They have their rock crushed as a test at the Mammoth mill, 1½ miles distant, having no mill at present. They have a 100-horse power compressor that runs four drills, in piercing the two tunnels, the compressed air to reach two of the drills is carried over 4000 feet. Water is the power used under 440 feet pressure, to run the air compressor. They have about 800 tons of low-grade ore, at this writing, on the dumps of their millsite. Forty men are employed and the management seems satisfied with the outlook.

The Mammoth mine is located on Woods creek, half mile above the junction of that creek with the Tuolumne river, at Jacksonville, and about four miles east of Chinese Camp. It is owned by the Sierra Buttes Gold Mining Co., J. F. Bluett is superintendent. This corporation has 3400 feet, their improvements consist of a hoist, 5-stamp prospecting mill, air compressor, office, boarding house and blacksmith shop. The mine is being developed through a tunnel 670 feet in length, and taps the vein at 350 feet from the surface, which at this point is 33 feet wide. An upraise of 107 feet has been made connecting with an upper tunnel 200 feet in length; the vein at this point is 23 feet thick. A shaft is being sunk in the lower tunnel to thoroughly test the mine, which is now down 155 feet. A ditch 3½ miles long with water taken from Wood creek, furnishes the power to their air compressor which runs the hoist and mill. Their mill has a capacity to crush about ten tons of ore daily, now running on Shawmut rock. The ore of this mine is of a low grade, but they seem to have plenty of it. As soon as they demonstrate to themselves that they have a sufficient ore body to warrant it, a complete plant will be put up. At present they employ twenty-two men in mill and mine.

To any one visiting the southern mines at intervals of a year apart, they will be surprised to see the activity in prospecting. Clerks and students from your city taking their summer outing have donned the miners' garb, erected brush tents, and in hundreds of places new prospect holes are visible. This is very marked, from Jacksonville, on the Tuolumne river, through Big Oak Flat to Groveland, on the road to Yosemite Valley.

My next letters will follow from the counties of Yuba, Butte, Plumas, Shasta, Trinity and Siskiyou. L. P. Mc.

June 15th, '96.

## NEVADA

Geo H. Sanford, who is developing a group of mines at El Dorado canyon, 200 miles south of Pioche, left this city yesterday with a complete outfit for that locality. He says the ore averages $31 per ton. The El Dorado canyon mill is now running on ore from the mine dumps and is paying well. The mill has been converted into a wet crusher and its capacity doubled. Mr. Mills is the superintendent.

*The Silver State* says that the new electric process at Kennedy is a pronounced success and will save 95 to 98 per cent. It is a sure thing for Kennedy this time. On a trial with less than a ton of ore, there was saved from the tailings $4 in gold and an ounce in silver.

*Enterprise*: The C. & C. dump is presenting a scene of great activity these days. Twenty men are now engaged in and about the Kinkead mill. The success of Mr Kinkead's enterprise of working the waste rock of the Comstock mines has already proved a boon.

### LINCOLN COUNTY.

The first shipment of gold bullion from the April Fool at De Lamar, reached Salt Lake last Thursday, worth $2,000.

## OREGON.

### BAKER COUNTY.

The Perry mine, six miles east of Baker City, an extension of the Rachel mine, is reported sold to C. C. Stratton, of Chicago, for $11,500 cash.

### UNION COUNTY.

At La Grande, J. Palmer from the Basin mines has twenty pounds of gold, of the value of $4,400, the product of twenty days' run.

At East Eagle the company has in its employ a Mexican packer, with a pack train of forty-four mules. The train packs 14,000 pounds of ore each trip from the mines to the mill, a distance of one and one-half miles, making two trips daily.

*Mining Journal*: The Griffin ledge is near the south side of Rogue river. On February last ten tons of the ore from this ledge treated at the Schiefflin mill on Footes creek, yielded the owners over $100 a ton. The ore travels somewhat in kidneys and varies in quality. It is so far all free milling.

## BRITISH COLUMBIA.

(Special Correspondence).—J. Wendle, formerly of Marysville, Cal., J. Mockler, Wm. Taggart, formerly of Seattle, and R. N. Campbell have struck $12 diggings on Little Valley creek. S. J. Marsh will be ready to treat ores by the cyanide process at the reduction works next month. Cariboo Gold Fields, Ltd., are not doing much work at present. The drain tunnel is at a standstill on account of soft ground. Work will be resumed with three shifts after the freshet. All the hydraulic claims are working. The season promises to be a very good one for them as the snow is going very slowly. The Slough Creek company are clearing out the old drain and drifting for the partially worked bench near the mouth of Nelson creek. Fred T. Laird, of Laird & Lee, Chicago, is sinking a bedrock shaft on Willow river, where Mosquito creek empties. He is well prepared to bottom the deep ground on Willow river which has hitherto baffled all attempts. The first loaded wagon since last December came into camp yesterday.

Barkerville, B. C., June 5th, '96.

Work at the Blue Bell mine in Tribune closed down. It is reported that the smelter will be closed down during the week. It has been running constantly for some three months and is in need of repairs. So far as can be learned the shutdown at the mine will continue for a month or six weeks, and there is a probability that work may not be resumed until the company's refinery is in working order. A number of men are new employed burning brick for the refinery.

Kaslo *Kootenaian*: Seven thousand or more $3 and $3.50 miners will be surprised to learn that the Wellington, one of the best shippers in the Slocan, is now manned with a crew of men just brought from Eastern Canada under a compact to work for $1 per day and board, above ground, and $2 per day and board below ground.

Edward Watt, the late successful manager of the Wellington, has just returned from Ottawa, where he arranged to step out, being dissatisfied, it is said, with the policy of the company. Hector McRea, the secretary-treasurer and new manager, followed Mr. Watt, arriving this week with nineteen men and a carload of provisions from Ottawa. These men were taken at once to the mine, where they are now at work.

With the exception of an unsuccessful attempt by this company, made several years ago, this is the first time an effort has been made to introduce cheap labor into this part of Kootenay.

The North Star mine at Fort Steele, has contracted to deliver 7000 tons of ore this season to the Great Falls smelters.

British Columbia has its Uitlanders, a large and constantly increasing body of gold hunters who for the past two years have been thronging into the heart of the Kootenai district from the United States. The provincial government has not made the mistake committed by the volksrad of the Transvaal, however; it has not loaded down the newcomers with heavy taxes. The Dominion *Mail and Express* points out that it has enacted a new mining law, not unlike that in force in Ontario, and though received with some murmurs of dissatisfaction by the mining interests, it seems to be easy enough on those interests.

From the time the first prospectors and diggers struck the trails of the Kootenai the work of development has gone steadily on. Perhaps not many of them have turned up a fortune with their picks, but by their united labor they have added greatly to the wealth of British Columbia, and materially to that of the whole country. They have made great changes in the solitude they found there. In a little over six months Rossland, starting from nothing, sprang into a town of 3000 people. On August 1st it became a port of entry, and in the following four months its imports amounted to $294,021 and its exports to $619,023. These figures as to population and trade are a considerable advance for a few short months, starting from nothing. Most of the exports consisted of the ore of the War Eagle and Le Roi mines.

But though this town of Trail Creek region has made great progress it is not the only part of the Kootenai that has moved. From Slocan, by way of Kaslo, and by way of Nakusp, great quantities of silver lead ores have been shipped, while the smelters of Nelson, Pilot Bay and Trail Creek are producing large quantities of matte and bullion. These smelters add enormously to the benefit the province derives from its mining industry. It is only a few months since they were erected.

*The Mail and Express* explains how the action of the Dominion government in granting a bounty on all ore smelted in the country, has prevented the export of ore to the reduction works on this side of the line. Had it not been for this the Everett reduction works would have received enormous business from this source alone.

Since the beginning of the year there have been 23,000 tons of silver lead ore treated in Kootenai, and 7,000 tons exported for treatment. To this is to be added 3,000 tons of gold ore shipped from Trail Creek. Camps are scattered all over the Kootenai country, some of them already promising to be the nuclei of considerable towns. Capital has freely assisted labor, and like it, comes from the most part from the United States. But British investors are now taking a keen interest in the mines. Since last midsummer several have visited the country in person, syndicates have sent over mining experts to report on the prospects, and London financial houses are handling some of the best properties. If Old Country investors put their hands to this mining enterprise there will be a rapid transformation in that corner of British Columbia.

There are already above 100 mining companies registered in the new province, many of them American, a few Canadian, and some British. Their stocks are listed on the exchanges of the chief cities of the province. The making of British Columbia is undoubtedly going on at a very rapid rate. Its new and industrious population contributes very greatly to the demand for food stuffs produced by farmers, and for the manufactured goods produced by skilled workmen. The Seattle *Post-Intelligencer* declares that a hundred times as many men could find employment upon the ore of that region, and immigrants will swarm into it. The *Mail and Express* asks, with evident alarm, Is the trade of these developers of our mineral wealth in British Columbia to be switched off from our own agricultural and manufacturing industries, and connected with those of the United States?

## IDAHO.

At Burke, work on the Poorman-Tiger concentrator is being pushed.

Harvey & Co., who have part of the Poorman leased, will resume work as soon as the water is lowered sufficiently, putting their ore through the Granite mill at Gem.

At Murray, the Arizona and the Consolidated Vestal hydraulic mining companies are working full crews on Alder gulch. The spring has been cold and backward. Plenty of snow towards the head of the gulch insures water for a good long run.

Placer miners all over the north fork region are busy, water being plenty and the weather generally favorable for work. Little new ground is being opened up, but nearly all the old claims are being worked more or less. A few claims will be worked out this year.

At Thiard, the Jenkins mill is dropping ten stamps, crushing twenty-five to forty tons of rock each twenty-four hours. The slime tables are successful, the amount of gold saved by them paying the cost of operating several times over.

There are mines in the northwest, says the Spokane *Review*, which pay dividends and nothing is ever heard from them. They go on quietly producing wealth and the owners make no talk of it. The Standard Mine Company, in the Cœur d'Alenes, paid $600,000 in dividends last year. They go on paying $50,000 a month just as regularly as clockwork. These facts do not always come out, because it is a close corporation. There is no excitement about this dividend and there is no need of one. It is entirely a matter of private interest.

During April the DeLamar Mining Co. reports: Number of tons crushed (wet), 4,057.66; number of tons crushed (dry), 3,651.90. Assay value of the pulp: Gold, $14.75; silver, $5.87; total, $20.62. Assay value of the tailings: Gold, $4.26; silver, $5.09; total, $5.35. Percentage saved, total, 74.05; number of Dore bars produced, 15; number of ounces pure gold produced, 1,814,525; number of ounces fine silver produced, 27,413.30; value of gold produced, $36,290.50; value of silver produced, $17,818 64; surplus on bars to date, $3,677.17; ore sales, $4,300; miscellaneous revenue, $645; total, $62,731.31; expenses, $37,553.39; profit for the month, $25,177.92.

## UTAH.

*Tribune*, 16th: The English-American syndicate, having failed to make the final payment on the Lammersdorf interest in the property of the Sevier Gold Mining Company, the holder pockets $41,000 and continues in the saddle as its president, its treasurer and general manager. Negotiations for the interest of Mr. Lammersdorf, which consisted of 140,000 of the total of 250,000 shares, began about eleven months ago, at which time the syndicate, after an examination of the property, deposited $,1000 on an option and for the privilege of making an examination. This resulted so favorably that on September 14th the syndicate followed it up with a payment of $40,000, which placed to Mr. Lammerdorf's credit $41,000 on the deal. There was a balance of nearly $51,000, which became due yesterday.

## MONTANA.

The annual report of the Iron Mountain Mining Company of Missoula shows the mine and mill paid in dividends $85,000. There were mined during the year 66,856 tons of crude ore, which produced 5,767 tons of concentrates. These concentrates were loaded into 265 cars for shipment and produced net returns of $326,578 44, or an average of $1,231 62 per car. From these shipments there were 497,888 ozs. ; silver value, $333,586.23; 4,466,103 pounds lead, value $138,422 14 a total of $472,008.67. The freight and treatment cost $145,630 24; net returns, $326,378 43. The current expenses for the year were $203,318.57, leaving a profit of $123,059 86.

The *Miner* says that another big strike has been made in the Broadwater mine at Neihart, on the lower level, 3,000 feet from the mouth of the tunnel.

P. A. Fusz has resumed at Phillipsburg work on the drain tunnel on which work was abandoned two years ago. When completed it will be one mile in length, and will drain the Bimetallic and Granite mines at considerable depth. There are 450 feet of the tunnel to be built.

## WYOMING.

Boston capitalists have purchased the Clark placer grounds near the head of Big Wind river on Warm Spring creek, and have landed at the mines six loads of machinery for working gravel.

A stream of prospectors in wagons and horseback, with packs, are daily passing through Lander bound for the upper Wind river and Black Fork country.

## COLORADO.

Frank H. Pettingell writes from Colorado Springs: "The indifference displayed by the mine owners of Cripple is driving away an unlimited amount of Eastern and foreign capital which invariably seeks refuge in other camps, and all too frequently goes to other States. All one has to do is to price some fair prospect in Cripple and the figures asked are generally ten times the amount of ore in sight. This may speak well for the confidence of those who are most familiar with the camp, but Colorado wants the capital and we want our properties developed as the ordinary miner will not or is unable to do."

In the Ward district the Montgomery property in California gulch is reported sold for $40,000, $10,000 in cash and a bond running for two years for the remaining $30,000. The new owners are said to be connected with the Schlitz Brewing Company of Milwaukee. A contract to drive 50 feet farther in the east drift of the Gray Eagle mine, on Left Hand, has been let by the company, of which ex-Congressman McShane of Omaha is at the head. The company also has men working on the Little Alice, another one of their properties: they are overhauling the mill and fixing it up for a new cyanide-electric process. The Kobbri mine at Sunset, operated by the Gulf Gold Mining Company, reports a strike. The ore body is 2 feet in width and was struck at a depth of 20 feet while drifting. Assays of $81 have been received.

*Republican*: One of the most important projected mining enterprises in the State is the great tunnel that is to be run through the mountain from Ouray to Telluride. It is to connect with the Revenue tunnel on the Ouray side. On the Telluride side it starts from the Hector mine, owned by A. E. Reynolds and his associates, who are also the owners of the Virginius and the Revenue tunnel. The latter is now in the mountain about 8,000 feet and work is to be prosecuted from both ends until the connection is made. A 10x16x16 compound steam and air compressor has recently been put in position on the Hector and another is soon to be put in operation on the Ouray end.

*News*: All the shares in the Cripple Creek Reduction Company, Limited, have been subscribed for and steps will at once be taken to commence building the first plant of the company at Florence, this State. The Cripple Creek Reduction Company is formed for the purpose of treating Cripple Creek ores by a process owned by Prof. Page of this State. This is a process wherein cyanide is used in conjunction with another preparation and the claim is made for it that the process will save ninety-five per cent of the gold in ore treatment.

The reduction company has acquired ten acres of ground in close proximity to the reduction works at present in operation at Florence. The guaranteed $100,000 is to be at once expended in the erection of a plant and operations pursued without delay.

## ARIZONA.

T. G. Massicks has been appointed receiver for the Little Jessie mine near Prescott: W. J. Martin is superintendent.

Yuma *Sentinel*: The Desert Mining Company recently sunk a well in Cullen valley, this county, between Harrisburg and Mesquite Wells, and at a depth of 67 feet got an excellent supply of water. The water will be pumped three miles over a divide and from there it will run by gravitation to the company's mine, five miles farther. The company has a ten-stamp mill on their property, which will now be increased to forty stamps.

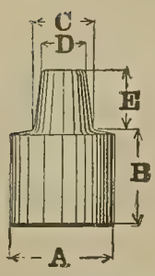
Globe *Silver Belt*: At the Kasser Gold Mining Company's camp, Lost Gulch, the pipe line, about a mile in length, has been completed and the mill is now running. Water was struck in the shaft last week at a depth of 80 feet below the fourth level. The character of the ore changes at the water level to sulphurets and pyrites and shows an increased percentage of gold. Machinery for hoisting water will be put in at an early date. Development work in the mine will be pushed and the mill will be kept running.

Tucson *Citizen*: There are no mining camps in the southwest where more men are employed,

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## MINERS, ATTENTION!



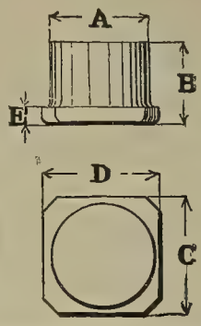

A=.....inches.
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Our prices are as low as any, and the article we offer should commend it to all mine owners and mill men.




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better wages paid, more copper produced and better times existing generally than at the copper camps of Clifton and Morenci.

### LOWER CALIFORNIA.

Davis, Hartzell and Munson have sold one-fourth interest in their Viznagar mine for $25,000 cash, to J. B. Bliss, of New York. The Viznagar mine is located in the Alamo mining district. The property has been worked the past year. A ten-stamp mill has been running for the last eight months and has produced considerable gold.

### SOUTH AFRICA.

Following is the report of the Robinson Gold Mining Co. for April. The directors' monthly report is as follows: Quartz mined, 13,505 tons. Development: Drives, 785 feet; raises, 166 feet; crosscuts, 135 feet; total, 1086 feet. Main incline shaft (west), sixth level: Driving west on south reef, 20 feet; driving east on south reef, 46 feet. Seventh level: Driving east on south reef, 35 feet; raise, 32 feet; crosscut, 27 feet. Eighth level: Driving west on main reef, 57 feet; driving east and west on south reef, 82 feet. Ninth level: Driving east and west on main reef, 83 feet; driving west on south reef, 74 feet; raise, 14 feet; crosscut, 9 feet. Tenth level: Driving east on south reef, 32 feet; raises, 56 feet. Main incline shaft (east), fifth level: Driving east on main reef leader, 28 feet; crosscut, 8 feet. Sixth level: Driving east and west on main reef, 64 feet; raise, 50 feet. Seventh level: Driving west on main reef and main reef leader, 38 feet; driving west on south reef, 31 feet; crosscut, 19 feet. Eighth level: Driving east and west on south reef, 9 feet; crosscut, 16 feet. Ninth level: Driving east and west on main reef and main reef leader, 49 feet; raise, 25 feet. Tenth level: Driving west on main reef leader, 48 feet; raise, 45 feet; total, 1086 feet. Mill: Stamps at work, 120; net running time, 24¾ days; tons crushed, 13,505; tons per stamp per diem, 4.6; gold won from above, 10,117 ounces 16 dwts. Chlorination and cyanide works: Gold won from own concentrates (by chlorination), 750 ounces; bullion from tailings (cyanide process), 2216 ounces 5 dwts.; bullion from slimes, Rand Central Ore Reduction Company, Limited, 783 ounces 14 dwts.; from own ore, 13,867 ounces 15 dwts.; gold from concentrates purchased (by chlorination), 2059 ounces; total, 15,926 ounces 15 dwts.

EXPENDITURE AND REVENUE.

Crushed 13,505 tons.

Working expenditure.

| | | | | Cost per ton. | |
|---|---|---|---|---|---|
| Mining account (including mine maintenance) | 8,475l. | 16 | 3 | 0l. 12 | 6.59 |
| Milling account (including mill maintenance) | 2,503 | 3 | 2 | 0 | 3 10.27 |
| General maintenance account | 214 | 11 | 11 | 0 | 0 3.81 |
| General charges | 1,615 | 7 | 2 | 0 | 2 4.70 |
| | 12,906l. | 18 | 6 | 0l. 19 | 1.37 |
| Expenditure on mine development (including main shafts) | 3,247 | 0 | 8 | 0l. 4 | 9.70 |
| Ditto on machinery, plant and buildings | 2,323 | 14 | 2 | 0 | 3 5.29 |
| | 18,477l. | 13 | 4 | 1l. 7 | 4.36 |
| Retreatment account: | | | | | |
| Working expenses at cyanide and chlorination works | 2,623 | 10 | 7 | | |
| Cost of concentrates purchased (including r'c'v'g) | 7,656 | 19 | 4 | | |
| | | | | 28,758l. | 3 3 |
| Profit for month | | | | 27,456 | 12 3 |
| | | | | 56,214l. | 15 6 |

REVENUE.

| | | | |
|---|---|---|---|
| Gold account (mill), 10,117 ounces 16 dwts. | 36,044l. | 13 | 0 |
| Sundry revenue | 200 | 0 | 0 |
| | 36,244l. | 13 | 0 |
| Slimes plant account: | | | |
| 5140 tons delivered | 628 | 18 | 0 |
| Company's share of profits to March 30, 1896 | 293 | 2 | 10 |
| | 922 | 0 | 10 |
| Retreatment account: | | | |
| Gold account (tailings) 22 6 ounces 5 dwts. | 7,350 | 0 | 0 |
| Gold account (own and purchased concentrates), 2809 ounces 0 dwts. | 11,517 | 0 | 0 |
| | 18,867 | 0 | 0 |
| Plus amount received in excess of book-entry for February gold | 181 | 1 | 8 |
| | 56,214l. | 15 | 6 |

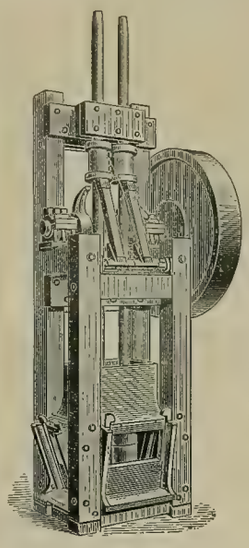
The falling off in the bullion from the slimes plant is accounted for by changing the order of cleaning up. The difference will be recovered at later stages. During the month a break-down occurred to the mill engine, whereby 60 out of the 120 stamps had to be hung up for two weeks.


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## Two Stamp Mills.

**Superior to all other Mills of the same form for the following reasons:**

**First.** Because **Two Stamps** will do **More and Better Work** in a mortar than any other number, as the motion of the stamps causes a discharge at the ends of the mortar, in addition to the front discharge, thereby increasing the stamping capacity, and leaving the pulp of uniform fineness.

**Second.** They are the cheapest mills to the stamp that were ever offered to miners.

**Third** They do not slime the ores or flour the quicksilver, as the lateral motion of the pulp prevents such effect.

**Fourth.** They crush all kinds of ore, rock, cement or conglomerate perfectly.

**Fifth.** They are more durable, as the framework is secured to the mortar and thoroughly bolted together.

**Sixth.** The several parts are interchangeable and can be readily set up or taken down and duplicated.

**Seventh.** No skilled labor is required to assemble the parts.

**Eighth.** The discharge is larger in quantity to the stamp, and the number of drops per minute, (110) of the stamp is greater than any other mill.

Weight of Stamps (each).....850 pounds.
Weight of Mill complete.....7500 "
Power required to drive.....5 H. P.

CAPACITY, SIX TO TEN TONS PER DAY.

PRICE, $450.00

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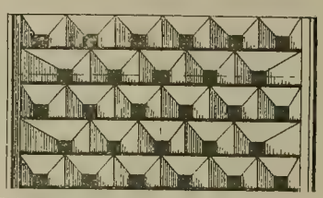
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## GOLD SAVING RIFFLE.



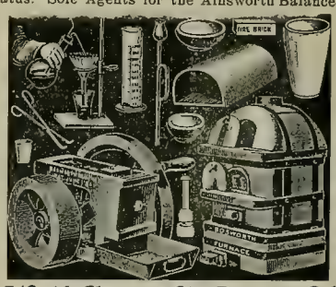
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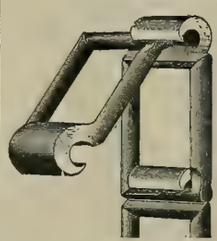


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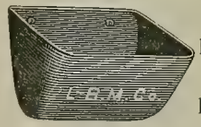
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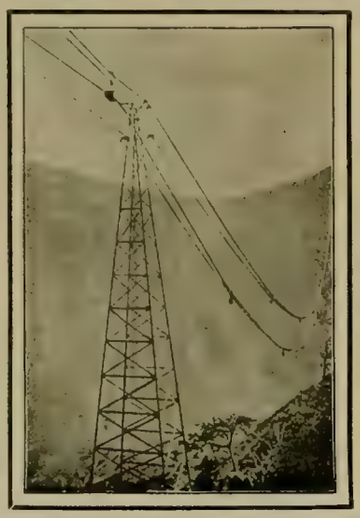
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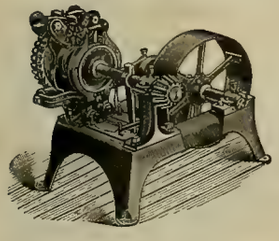
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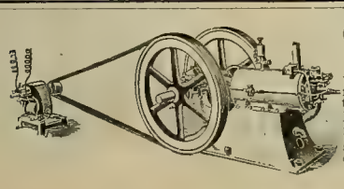


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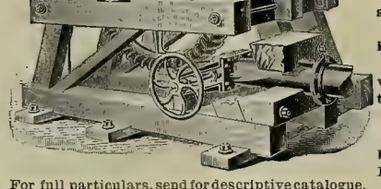
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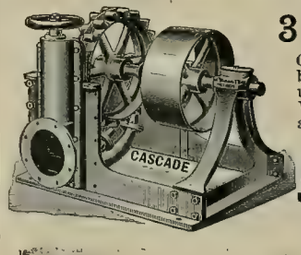
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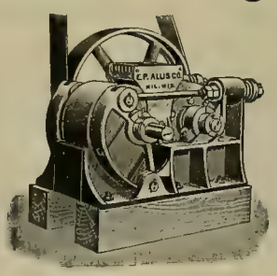
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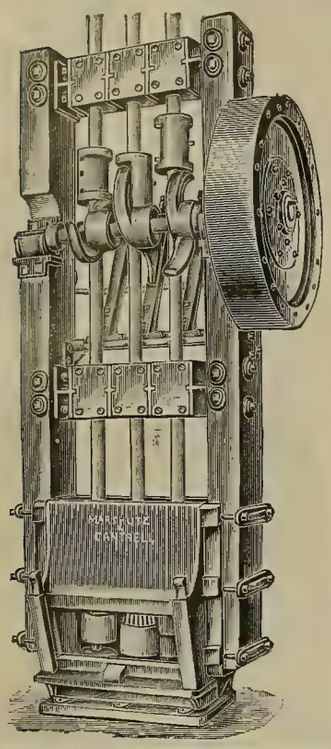
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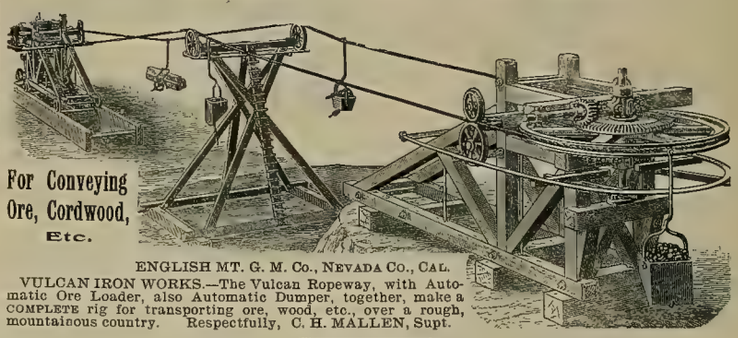
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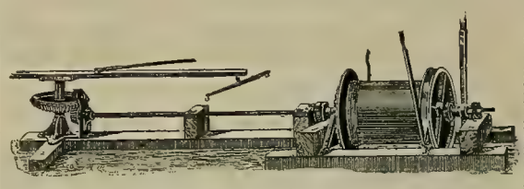
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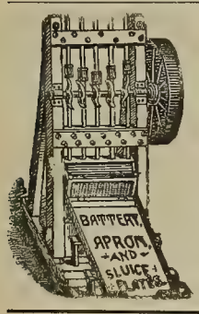


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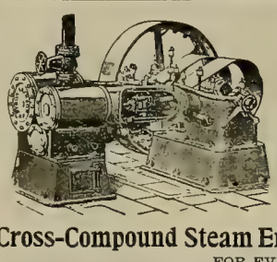
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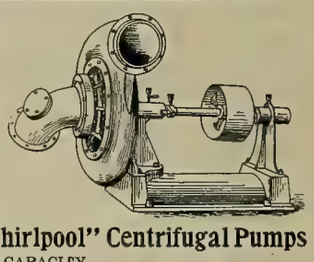
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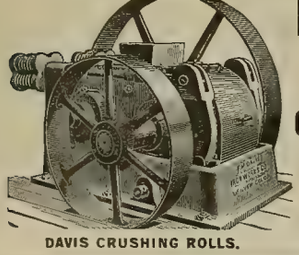


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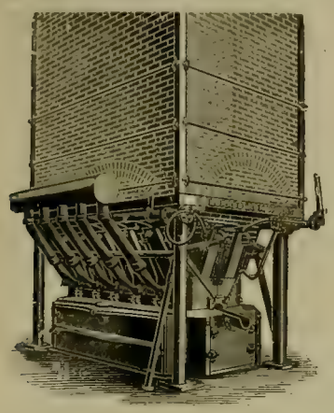
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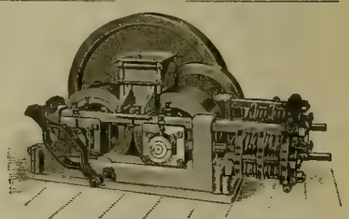
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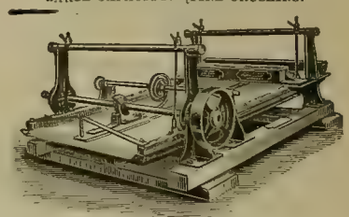
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PATENTED SEPTEMBER 19, 1893. CHEAPEST, SIMPLEST, MOST DURABLE AND CLOSEST SAVING CONCENTRATOR IN USE. FRANK BARRERE, Secretary and Manager.

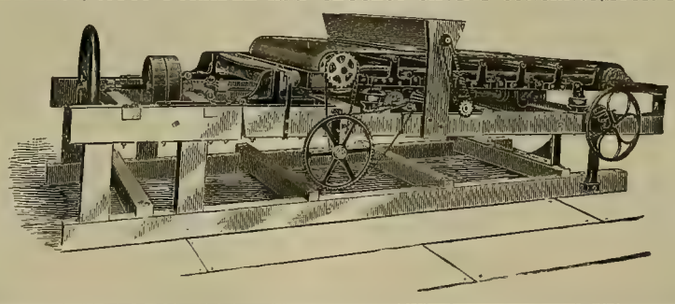
Can be seen in operation at the Company's works, 132 Main Street, San Francisco.

Office, 116 Davis Street.

NINETY-FOUR AND ONE-HALF PER CENT
—SAVED—
ON ORES DIFFICULT TO CONCENTRATE.

A MARVEL of Simplicity, Durability and Effectiveness combining both Side and End Motion with a Bumping Belt.
SPEED AND INCLINE of belt and amount of PERCUSSION easily and quickly regulated, WHILST IN OPERATION
CAPACITY about ten tons. Only one-tenth horse power required. Adapted for either canvas or rubber belts.

PRICE.....$350 EACH
Including prepared canvas belt 4 ft. 6 ins. wide.



FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.
THE MCGLEW CONCENTRATOR COMPANY:—I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years' experience with different concentrators, I believed them to be the best.
Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.
Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent. The concentrator runs very easy and requires but slight attention. One man attends to rock breaker, crusher and concentrator.
You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,
E. L. BALLOU, Propr. Ballou Reduction Works.

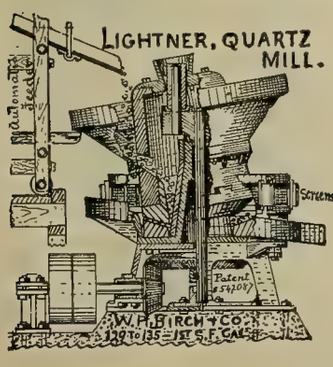
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MANUFACTURERS OF

## AIR COMPRESSORS AND ROCK DRILLS,

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CALIFORNIA MACHINE WORKS.

2-Stamp Batteries, Self-Contained.
3- " " " "
4- " " " "
5- " " " "

BRODIE'S ROCK CRUSHERS, SAFETY CAGES, MINING HOISTS, ORE CARS and BUCKETS.

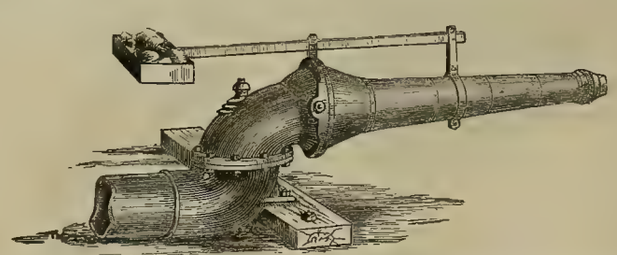
All kinds of Mining Machinery.

Agents Sioux City Corliss Engines. { HIGH GRADE. LOW PRICE.

Office and Works:

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# IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture, and which are pronounced far superior to the SINGLE-JOINTED style. The latter, however, we furnish when requested. Prices, Discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent upon application.

JOSHUA HENDY MACHINE WORKS, 42 Fremont St., San Francisco.

# Market Reports.

## The Markets.

SAN FRANCISCO, June 18, 1896.

Jobbers report business more active than at this time last year. Continued failures of retail merchants in the interior are against a pronounced restoration of confidence in the agricultural districts, where about all have taken place. As a rule they are pushing for business in the mining districts owing to a continued growing boom in gold mines. Eastern and foreign capital continues to arrive for investment. According to Joseph Rosenthal, a well known business man of this city who has returned from an extended trip through Europe, our mines would receive greater attention abroad were they differently handled. His judgment, derived from personal experience abroad, is that if some of the best dividend payers, like Utica, were capitalized in London they could be successfully floated for many million dollars. He says the Utica could be floated at fully $20,000,000 on its present dividend-paying proposition. He believes that the dividends from such a mine would create a great furore for investment in this State that would lead up to a boom similar to that which raged in South African mining shares.

The local money market is in favor of borrowers, but the latter have to be blessed with gilt-edge security to get ready accommodation from banks. It is stated that there is a growing feeling of confidence that business will steadily improve. It is also thought that fair prices will be received for farm products, which will help producers to pay up their indebtedness. There is some inquiry for funds for crop moving purposes. The East reports an excess of funds, but as the crops promise a fair average, there will be soon an increasing demand for moving them. Speculation at the East is tame, but this is always the case there around the mid-summer holidays.

**New York Silver Prices.**

NEW YORK, June 18.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. |
|---|---|---|
| Friday | 31 5-16 | 68¼ |
| Saturday | 31⅜ | 68⅝ |
| Monday | 31 7-16 | 68¾ |
| Tuesday | 31⅜ | 68⅝ |
| Wednesday | 31⅜ | 68⅝ |
| Thursday | 31 7-16 | 68¾ |

| | Copper. | Lead. | Iron. | Tin. |
|---|---|---|---|---|
| Friday | 11 62½ | 2 90 | 10 75@13 00 | 13 40 |
| Saturday | 11 62½ | 2 90 | 10 75@13 00 | 13 40 |
| Monday | 11 75 | 2 90 | 10 75@13 00 | 13 45 |
| Tuesday | 11 65 | 2 90 | 10 70@13 00 | 13 50 |
| Wednesday | 11 65 | 2 92½ | 10 70@13 00 | 13 40 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 6@7 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | 12½ |
| New York Telegraphic Transfer | 15 |
| London Bankers' 60 days | $4.88¼ |
| London Merchants | $4.86¼ |
| London Sight Bankers | $4.89½ |
| Refined Silver, per oz., 1000 fine | 68⅜ |
| Mexican Dollars | 54@55c |

SILVER. — The market has held fairly steady throughout the week. An Eastern correspondent writes that to prevent a corner in silver five of the principal exporting houses at New York have combined to control the visible supply. The plan is to permit each house, in turn, to make shipments for all orders during one week. This will prevent competitive buying and is on a similar line to that which exists in this city. Referring to the shipment of 1,025,000 ounces of silver on one steamer from New York to London, the New York *Journal of Commerce* says: "It is the largest single day's shipment in recent years, so far as the records of leading bullion houses show. Agents of the London buyers scoured the market yesterday and bought about all the silver in sight at the going prices, so that it would have been most difficult to secure any round amount after the London buying was completed. The large outward movement of the white metal was due to the speculative advance in the price here this week, which has made London houses with contracts for future delivery of bars very nervous about their coming deliveries on the same. London does a large business in silver in this way for future delivery, and the market has developed so much strength that many have thought it best to secure stock now against their contracts, rather than risk a setback in the market at the time when they will have to make deliveries. Another consideration which has caused London to buy silver is the belief that Japan will buy the metal with a considerable portion of its Chinese war indemnity money now on deposit with the Bank of England. Japan's paper currency is stated to have been increased during the war from 50,000,000 to 225,000,000 yen; so that, as there has been no increase in the amount of silver held against it, the nation's currency lacks a sufficient metallic basis."

MEXICAN DOLLARS. — The market is firm with a fair export inquiry at from 54 to 55 cents.

COPPER. — In our market no change in quotations is reported. The demand is of the usual character. At the East the markets have made another advance, closing strong. The demand there, while chiefly for export, shows considerable of an inquiry for home consumption. It is stated that American consumers did not stock up much owing to the belief that lower prices would rule under an increased output of the mines, but the very heavy foreign consumption has more than absorbed the latter, thus bringing about higher prices.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

QUICKSILVER. — The market is steady at the decline.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 37 00 |
| Distant points up north | 36 25@37 00 |
| West coast of Mexico, for export | 32 50 |

ANTIMONY.—The demand is fair, with the market easy at 8@9c in a jobbing way. New York mail advices quote 7⅞@7¾c for Cookson's, 6⅝@6¾c for Hallett's and 6½@6⅝c for Japanese, from store.

TIN.—In our market there is nothing new to report. At the East the markets have been barely steady, with a fair consumption demand ruling.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

BORAX.—The market is quoted as follows

| | |
|---|---|
| Refined, in car lots | 6½ |
| Refined, in sacks | 5⅞ |
| Powdered, in car lots | 6¼ |
| Concentrated, " | 5⅝ |

IRON.—The local market is essentially unchanged. Large buyers do not find any difficulty in having their wants met at slight concessions on asking prices. At the East the output of the furnaces is being reduced owing to the production being in excess of the consumption. While those belonging to the combine do not openly make concessions in prices, furnacemen outside of it are cutting which unsettles values.

Our market is quoted as follows:

| | To Arrive. | Spot. |
|---|---|---|
| **AMERICAN.** | | |
| Sloso | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |
| **ENGLISH.** | | |
| Barrow | $21 00 | $23 50 |
| Gartsherrie | 21 50 | 23 50 |

LEAD.—The large supplies at the East are telling against the markets there. In our market buyers can secure concessions.

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " " | 1 65 |
| Buck, Balls and Chilled, do, " " " | 1 65 |

POWDER.—The demand continues large, considerable in excess of that ruling at the corresponding time for several years past.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " " | 8½c |

COAL.—There is practically nothing new to report. The consumption of steam is increasing while that of household is decreasing. The liberal supplies of coast are against any advance in the market, notwithstanding the lessening supply of Australia.

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — — | @ | 11 00 |
| " in sacks | — — | @ | 12 00 |
| Cumberland | — — | @ | — — |

LUMBER.—There is a continued good home and export demand.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 14 00 | @ | 19 00 |
| Spruce | 26 00 | @ | 31 00 |

## Mining Share Market.

SAN FRANCISCO, June 18, 1896.

The market the past week was of a decidedly mixed character, but not more so than the average trader, particularly those who figure the moves on what has been. It cannot longer be denied that the market is under strong manipulation, and that it has been placed in position for easy handling, which makes it equally dangerous for magin traders and short sellers. The depression in the market the past few days has the unmistakable earmarks of a freeze-out. That it has been successful to a large extent goes without saying. The line of shares carried by brokers for outsiders has been greatly narrowed, while the cash shares carried have also been greatly reduced. Who has taken them in is an open question, but it can be affirmed that whoever has done so feels warranted in doing so by the work going on in the mines and the general condition of the country pointing to more prosperous times, and when the latter obtains it is fairly easy to promote a mining share deal without showing up a large quantity of ore. The feature of the market the past week was a setback in the shares of Con. Virginia, which sold at a decline of 20 per cent. In this downmove the other north end shares sympathized, as did the Gold Hill shares (the latter always decline on the flimsiest excuse), but those of the middle group of mines held strong, Savage and Chollar even advancing. The downmove in Con. Virginia was due to a leakage in the bulkhead which confines the foul, gaseous air in a part of the old workings. The escape of the latter was enlarged and made an excuse for a raid on the shares. The leakage was soon stopped and the bulkheads further strengthened as a precautionary measure. This interfered with ore extraction. At this writing, work of extracting has been resumed. The company is milling about 1100 tons of ore, which will give a net bullion return of over $30,000, so the company is not so bad off as the bears would have the many to believe. The impression, at this writing, with outside dealers is that there will not be an upmove until after the national holiday, and in the meantime the market might weaken off. Whether this belief is correct or not we are unable to say, but the present situation at the mines does not warrant or justify it.

At the annual election of the Bodie Mining Co. the old management lost control. There is a contest on for the control of the Savage mine by Herman Zadig and associates. Mr. Zadig has done no little to promote active times in the share market; and, believing this, many operators are said to be working in his interest. The wide range between car-sample assays and battery assays of the ore extracted and milled will give Mr. Zadig quite an advantage in his fight for control. One assessment was levied the past week—5 cents on Kentuck—but others are expected to follow in regular order.

The news from the mines on the Comstock lode, while essentially unchanged, is of an interesting character so far as it concerns several of them. In the Alta group work is still continued in Alta on the levels heretofore reported. In the Gold Hill group official advices report a general resumption of work in Overman and that a few tons of fair-grade ore are being raised. In Caledonia and Kentuck no work is being done. Seg. Belcher and Belcher continue to report the raising of ore going around $20 a ton. The latter company is milling about 350 tons. In Crown Point the dead work is about finished and more active exploiting can be looked for soon, as also the extracting and milling of the gold ore around and below the 600-foot level. No news comes from Yellow Jacket. The upraise for ventilation in Confidence is the chief work in that mine. In Con. Virginia another west crossdrift has been started from the surface tunnel. The joint west crossdrift of Confidence, Challenge and Con. Imperial is nearing the west lode. The work in Alpha, Bullion and Gould & Curry is the same as heretofore reported. In Potosi and Chollar work is being prosecuted on several levels. While pushing work in Hale & Norcross a few tons of ore are raised each day. The work being done is closely watched by mining men. In Savage ventilation connection has been made so as to expedite the extraction of ore. About 200 tons were raised the past week which assayed as per car sample over $58.50 per ton, and 200 tons were milled which gave a battery assay of over $46 per ton. More men have been added so as to increase the output of ore. Work in Best & Belcher is on the same levels heretofore reported. The work in Con. Virginia on the 1050-foot level grows in interest. The gaseous leakage in the mine interrupted the extraction of ore for a few days. The work in Ophir and Mexican is in the same levels as heretofore made public. It is in the right direction for striking ore. In Union, Sierra Nevada, Utah and Andes the work is essentially unchanged.

The news from the Brunswick lode is of a decidedly interesting character. Work is being pushed with vigor in the grounds owned by Gould & Curry, Savage, Chollar and Hale & Norcross. Any day may bring about quite a change for the better as the work is pushed ahead. Attention is centered on the work that is being done on the 300-foot level. Miners are confident that there will be quite an improvement in the ore on this level from that found on the 200-foot level. If this is realized then a most decided movement in shares can be looked for. Strong parties have been steady buyers of these shares at the recent decline and they are still in the market as buyers notwithstanding they make the market look "rotten" as if it was going all to pieces.

From the Bodie district no news of importance comes to hand, although more interest begins to be taken in that district than for several months past.

The market was dull and heavy throughout to-day. It had the appearance of going to pieces, still it did not. Although the Gold Hill shares and some of the north end shares sold lower, those of the middle group were well maintained with Savage sold slightly higher. The public sold more than they bought. This afternoon the market was dull but fairly firm. After Call it was firmer with more disposition to buy. Occidental sold up to $1.40. Advices from Virginia are quite bullish on the situation on the Brunswick lode. The better informed look for a decided improvement soon. The development in Savage on the Comstock lode is said to be larger than generally believed. They have not commenced extracting ore in Con. Virginia yet although the mine is all right.

The following illustrates the changes of the week:

| Mines. | June 11. | June 18. |
|---|---|---|
| Alpha | $ 22 | $ 15 |
| Alta Consolidated | 25 | 19 |
| Andes | 44 | 34 |
| Belcher | 76 | 56 |
| Best & Belcher | 1 30 | 1 05 |
| Bodie | 65 | 43 |
| Bullion | 34 | 28 |
| Challenge | 45 | 40 |
| Chollar | 2 85 | 2 80 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 2 75 | 2 20 |
| Consolidated New York | ..... | ..... |
| Crown Point | 64 | 58 |
| Exchequer | 08 | ..... |
| Gould & Curry | 1 35 | 1 25 |
| Hale & Norcross | 2 20 | 2 10 |
| Justice | ..... | ..... |
| Mexican | 1 10 | 92 |
| Ophir | 1 90 | 1 55 |
| Overman | 30 | 26 |
| Potosi | 1 60 | 1 45 |
| Savage | 1 60 | 1 95 |
| Sierra Nevada | 1 05 | 85 |
| Union | 1 10 | ..... |
| Utah | 17 | ..... |
| Yellow Jacket | 73 | 57 |

## San Francisco Stock Board Sales.

SAN FRANCISCO, June 18, 1896

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 400 Alpha | 15 | 200 | 56 |
| 200 Alta | 19 | 200 Gould & Curry | 1 25 |
| 100 Andes | 34 | 200 | 1 20 |
| 100 Belcher | 56 | 200 H. & N | 2 10 |
| 250 Bodie | 37 | 100 Mexican | 92 |
| 100 Bullion | 27 | 250 Occidental | 1 25 |
| 100 | 28 | 200 Overman | 26 |
| 500 Challenge | 40 | 100 Potosi | 1 45 |
| 600 Con Imperial | 03 | 250 Savage | 1 85 |
| 150 Chollar | 2 80 | 100 | 1 80 |
| 50 | 2 75 | 100 Sierra Nevada | 85 |
| 150 Con Cal & Va | 2 20 | 550 Yellow Jacket | 57 |
| 200 Crown Point | 58 | 100 | 56 |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 100 Ophir | 1 55 | 200 Alpha | 15 |
| 150 Mexican | 90 | 300 Belcher | 55 |
| 400 Gould & Curry | 1 25 | 200 Sierra Nevada | 82 |
| 100 Best & Belcher | 1 05 | 400 Bullion | 24 |
| 500 Savage | 1 90 | 200 Overman | 26 |
| 200 | 1 95 | 300 Alta | 61 |
| 300 Chollar | 2 80 | 300 Occidental | 1 35 |
| 150 Potosi | 1 40 | 100 Andes | 33 |
| 50 H. & N | 2 05 | 100 Bodie | 41 |
| 100 | 2 10 | 200 | 43 |
| 200 Crown Point | 54 | 200 Bulwer | 28 |
| 200 Yellow Jacket | 57 | | |

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied | Delinq't and Sale. | Secretary. |
|---|---|---|---|---|---|
| Alaska-Willoughby G M Co, Alaska | 1 | 20c | Apr 6 | May 25..June 29 | T Pollard, 22 California |
| Alta S M Co, Nev | 52 | 10c | May 4 | June 9..June 30 | J E Jacobus, 309 Montgomery |
| Bullion Con G M Co, Cal | 8 | 15c | June 16 | July 20..Aug 11 | C A Grow, Mills Building |
| Central Eureka M Co, Cal | 1 | 3c | May 16 | June 22..July 18 | W Van Bokkelen, 320 Sansome |
| Chollar M Co, Nev | 42 | 25c | June 9 | July 14..Aug 4 | C E Elliot, 309 Montgomery |
| Horseshoe Bar Con M Co, Cal | 4 | 50c | May 12 | June 22..July 14 | D M Kent, 330 Pine |
| Mono G M Co, Cal | 37 | 10c | June 2 | July 6..July 27 | M E Willis, 309 Montgomery |
| Mt Diablo M & M Co, Nev | 4 | 5c | May 21 | July 2..July 23 | R W Heath, 318 Pine |
| Nimshew G M Co, Cal | 1 | 3c | June 5 | July 13..Aug 3 | C D Cook, Mission St Pier No. 1 |
| Occidental Con M Co, Nev | 23 | 15c | June 2 | July 7..July 28 | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 3 | 2c | May 11 | June 18..July 6 | F L Olmsted, 315 Montgomery |
| Overman S M Co, Nev | 75 | 10c | May 2 | June 5..June 25 | G D Edwards, 414 California |
| Peabody G M Co, Cal | 6 | 10c | Apr 28 | June 3..June 24 | B Natorp, 124 Sansome |
| Reward G M Co, Cal | 13 | 3c | June 1 | July 2..July 20 | S W Backus, Mills Bldg |
| Savage M Co, Nev | 89 | 20c | May 1 | June 3..June 23 | E B Holmes, 309 Montgomery |
| Silver King M Co, Arizona | 14 | 25c | May 7 | June 16..July 14 | J W Pew, 310 Pine |
| Siskiyou Con Q M Co | 11 | 1c | May 5 | June 8..June 29 | E F Stone, 306 Pine |
| Ybarra G M Co, Mexico | 4 | 15c | May 21 | June 21..July 9 | Jas Coffin, 132 Market |

## ANNUAL MEETINGS.

| Company and Location. | Secretary and Office in S. F. | Date. |
|---|---|---|
| Alaska-Treadwell G M Co, Alaska | A T Corbus, Mills Bldg | June 24 |


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## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR THE WEEK ENDING JUNE 9, 1896.

561,754—POWDER MEASURE—T. R. Barney, S. F.
561,658—VALVE—W. Curlett, S. F.
561,659—CHALK HOLDER—J. W. Currier, Los Angeles, Cal.
561,978—GALVANIC BATTERY—T. E. Fogalsang, Sac'to, Cal.
561,800—GAS IGNITER—G. E. Hoyt, S. F.
561,667—BICYCLE ALARM—R. E. Kelly, Alameda, Cal.
561,670—BOOK BINDING—L. Kosby, S. F.
561,675—FILTER—C. K. Lamb, S. F.
561,594—BICYCLE BRAKE—L. A. Larsen, S. F.
561,679—ELEVATOR—T. M. Martin, Los Angeles, Cal.
561,806—TROUSERS STRETCHER—W. J. McCoy, Santa Barbara, Cal.
561,601—TELEPHONE REGISTER—E. L. Morey, Portland, Or.
561,823—WRENCH—J. Shafer, San Bernardino, Cal.
561,021—TEA INFUSER—J. H. Sutthoff, Seattle, Wash.
561,629—CONCENTRATOR, L. R. Tulloch, Angels, Cal.
561,630—CONCENTRATOR FEEDER—L. F. Tulloch, Angels, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FILTER—Christopher K. Lamb, San Francisco, Cal. No. 561,675. Dated June 9, 1896. The object of this invention is to provide a filter apparatus which may be used either in double or single form, a mechanism for supplying water to be passed through the filter or to cleanse it and discharge sediment by means of a single cock, and a means for separating and securing the parts together. It consists of an exterior cylindrical case having a receiving chamber for the water to be filtered, a conical perforated plate or plates fitted to form ground joints with the interior periphery of the case, a plate of filtering material similarly shaped and fixed to the receiving side of the perforated plate, a filling of charcoal within the case and exterior to the filter plates, a second perforated conical disk with a lining of asbestos cloth fitted against its interior surface, a water receiving chamber with discharge pipe exterior to the filtering plates, a water-tight cover fitting the outer end of the case, and means for holding the disks and filter plates in position and allowing the escape of air from the various chambers.

HOISTING AND PUMPING APPARATUS—Frederick H. Nease, Bellevue, Idaho, assignor of one-half to Frank Brown same place. No. 561,723. Dated June 9, 1896. This invention relates to the class of power mechanism adapted for either hoisting or pumping, or both. It consists in a hoisting apparatus of a frame-work, a vertically rotatable shaft mounted therein, a horizontally disposed winding drum loosely mounted on the shaft, with teeth upon its upper surface, a slidable clutch on said shaft adapted to engage and operate the drum, a clutch shifting mechanism and connections for operating the same.

## Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 2d day of June, 1896, an assessment (No. 23) of fifteen cents (15c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of July, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on TUESDAY, the 28th day of July, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. DURBROW, Secretary.

Office—Room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

NIMSHEW GOLD MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Nimshew, Butte county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 5th day of June, 1896, an assessment (No. 1) of Three cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Mission Pier, No. 1, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of July, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 3d day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

C. D. COOK, Secretary.

Office, Mission St. Pier, No. 1, San Francisco, California.

## DIVIDEND NOTICE.

**SAN FRANCISCO SAVINGS UNION,**

532 California Street, Cor. Webb.

For the half year ending with the 30th of June, 1896, a dividend has been declared at the rate per annum of Four and thirty-two one hundredths (4.32) per cent on Term Deposits and Three and sixty one-hundredths (3.60) per cent on Ordinary Deposits, free of taxes, payable on and after Wednesday, the 1st of July, 1896. LOVELL WHITE, Cashier.


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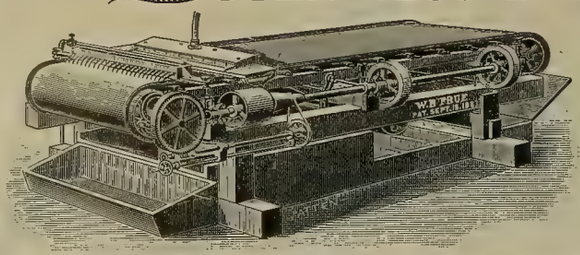
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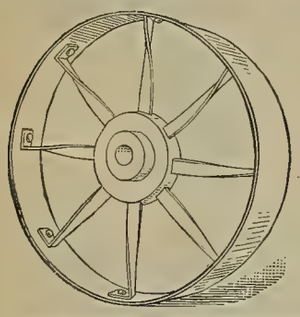
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AND PACIFIC ELECTRICAL REVIEW.

No. 1877.— VOLUME LXXII. Number 26. SAN FRANCISCO, SATURDAY, JUNE 27, 1896. THREE DOLLARS PER ANNUM Single Copies, Ten Cents.



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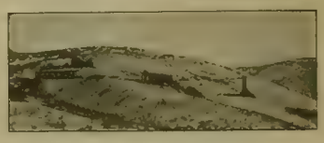
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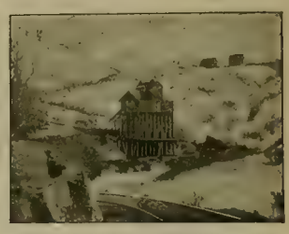
GOLDEN GATE SHAFT HOUSES.



GENERAL VIEW OF MERCUR, UTAH.



MERCUR SHAFT HOUSES.



MATTIE NO. 4, MERCUR MINE.



EAST GOLDEN GATE AND WONDER SHAFT HOUSES.



GEYSER MINE AND MILL.

MINES AND MILLS OF CAMP FLOYD DISTRICT, UTAH. (*See page 528.*)

# MINING AND SCIENTIFIC PRESS.

ESTABLISHED 1860.

Oldest Mining Journal on the American Continent.

*Office, No. 220 Market Street, Northeast Corner Front, San Francisco*
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J. F. HALLORAN.....General Manager

San Francisco, June 27, 1896.


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## The Increased Demand for Silver.

The shipment of silver to the Old World goes on, and has been going on for years. One might view these weekly shipments and the aggregates for months and years with complacency were each ounce of silver bullion paying $1.29 of debt across the water, as previous to demonetization, but the white metal turned over to Lombard street at a little more than half this price is a throwing away of our national wealth. The loss by the outlawing of silver was great, but a trifle in comparison with the losses sustained by the people at large by the destruction of property values and the reduction of the price of all products one-half, the result of throwing away half the volume of primary money and making gold alone the standard of values. Since the demonetization of silver there has been in use among the nations hundreds of millions of paper money which could and should have been replaced by solid metallic money.

The fact that all the silver we mine is readily sold shows there is no overproduction. There is a demand for all we can produce. This shows the senselessness of the talk about this country being flooded with silver from Europe. Instead of diminishing, the demand for silver from the Old World has been increasing. Recently a shipment of no less than thirty-two tons of silver bullion was made in one day. It is supposed that most of this silver goes to Japan and other countries of the Orient. The rapid increase of manufacturing industries in those countries has called for an addition to the stock of money among all the silver-using nations of the Orient. These nations were rather slow in availing themselves of the advantages accruing to them through the demonetization of silver by the Western nations, but since the great and constant appreciation of gold they soon became active in the promotion of manufacturing enterprises. The Japanese were the first to awaken to the necessity of establishing home manufactories of various kinds, particularly in the line of cotton goods. The profits resulting from the use of modern machinery and the utilization of cheap labor in the cotton-spinning industry proved so great that many have engaged in the manufacture of cotton goods. From a small beginning a few years ago there are now in Japan sixty-one cotton mills with 1,500,000 spindles. Recently silk factories with half a million spindles have been established. In other lines manufactories are being set up and profitably operated. As fast as they secure the up-to-date machinery of the Western nations the Japanese set to work to duplicate it in their home shops; thus they are now able to manufacture any kind of machinery required in the cotton and silk mills and other industrial works. The Japanese are fast becoming independent of the Western nations. With the development of its long dormant resources after modern methods, the Orient will find it necessary to increase its stock of money. This will cause a steady demand for silver, and this demand will increase with the increase of manufacturing industries and the employment in them of more and more operatives. The greater the progress and prosperity of a country the greater the demand for money with which to develop idle resources and set on foot new enterprises.

Although our silver is now in brisk demand in the Orient and in France, Germany, Russia, and other European countries, we are shipping it across the sea and turning it over to the Lombard street money sharpers at their own price. There is no reason why we should not be receiving the old price for every ounce of silver we produce. We have only to return to our old monetary system and the money of the Constitution and at once silver will command its former figure—the price previous to demonetization. There is no swifter cure for the stagnation and retrogression now upon the country. It is idle to talk of prosperity under a single standard, that necessitates for its maintenance the borrowing of hundreds of millions of dollars. It is ruinous, and on a par with the spider's production of web by spinning out its own bowels. The hundreds of millions have been borrowed and brought to our shores, but so far as the people at large are concerned the gold might as well have been sent to South Africa; nobody outside of the financial centers has seen a dollar of it, and instead of the promised prosperity we have but a deepening of the gloom of adversity and stagnation.

With our 70,000,000 people, almost boundless extent of territory, and thousands of undeveloped resources, we can find use for every dollar in silver that our mines produce, for with the starting up of new enterprises and renewed activity in the industries the demand for money would increase. Our Eastern friends say that the remonetization of silver would result in silver monometallism. Such a result seems impossible. But is it not better to make a profit under the silver standard than to lose money under the gold standard? The worst that could happen under the silver standard would be no worse than what we now have under the present monetary system. Under the gold standard farm lands and all other kinds of outside property show a steady decrease in price from year to year. This being the case, there is nothing to induce either home people or foreigners to invest their money in such property—in anything, indeed, except our gold mines. With a return to remonetization of silver there would be bimetallism—the full use of both gold and silver instead of either money alone.

## McKinley's Record on Silver.

The following is Wm. McKinley's official record in relation to silver:

On November 5, 1877, in the House of Representatives, he voted for Bland's free coinage bill.

On January 28, 1878, he voted for a resolution declaring that all the Government bonds issued under the resumption act were payable, principal and interest, at the option of the Government, in silver dollars.

When the Bland bill came back from the Senate with amendments providing for the coinage of not less than $2,000,000 nor more than $4,000,000 of silver per month, Hewitt, of New York, moved to lay it on the table. On February 21, 1878, McKinley voted "No."

President Hayes vetoed the bill. On February 28, 1878, McKinley voted for its passage over the veto.

April 8, 1886, on a proposition to suspend the purchase and coinage of silver bullion on July 1, 1889, McKinley voted "No."

August 28, 1893, when the repeal of the silver purchase act was carried, McKinley was not a member of Congress, but he made a public address in which he urged that "the silver product of the country should not be discriminated against."

On September 27, 1894, in another public address he denounced those who voted for the repeal of that law.

## Nevada as a Gold Producer.

Nevada astonished the mining world as a silver producer and is now likely to create a sensation as a gold producer. Something is being heard of from her gold mines notwithstanding Nevada has so long been known as the Silver State that no one outside of the State, except a few mining men, thinks of it as an area producing gold. The Comstock, of world-wide fame, was always spoken of as a great silver lode, but in reality it was and always has been as much a gold as a silver producer. More than one-third of all the hundreds of millions taken from the mines of the Comstock was in gold. In all the big lode has yielded not less than $150,000,000 in gold. Even the silver-lead ores of central Nevada carry a large per cent of gold. At Silver City, five miles south of the bonanza mines of the Comstock, are gold mines that have been worked nearly forty years. These mines are now paying better than at first and new finds in them are frequent. At Pine Grove and in one or two other places are gold veins that have been worked for thirty years. This permanence and persistence in depth is characteristic of all the gold-bearing veins of the State. No paying vein has ever given out.

Though some rich gold-bearing veins are found in western Nevada, the great gold belts and the big mines of the State lie well out to the east toward the west line of Utah. The De Lamar mine, at the town of De Lamar, has been yielding about $100,000 a month, to be increased with augmented capacity of the mill to 300 tons a day. They regularly run a special bullion coach, accompanied by armed guards, from the mine to the railroad at Milford. For special reasons they do not report the amount of their shipments, nor do they tell just what they are doing. The lode is opened up by ten tunnels, in all of which ore is in sight.

In opening up the mine, bringing in water and the construction of reduction works Captain DeLamar has expended nearly half a million dollars. A British syndicate is negotiating for the purchase of the mine. It is said it will not be sold for less than $2,750,000.

The April Fool mine is little behind the DeLamar as a gold bonanza. This mining property paid big from the start, though it was necessary to ship the ore to Salt Lake and a long part of the way by wagons. The owners of the mine have taken out and sold sufficient ore to enable them to bring in water at a cost of $40,000 and to erect mills worth $30,000.

The gold belt of the DeLamar covers many square miles of territory. Few locators in the district had the capital or the capacity to push ahead in development as was done by the DeLamar and April Fool people. The town of DeLamar is growing. The mining world is only beginning to hear a whisper from DeLamar—before snow flies it may be a shout.

Another mineral belt which is making some noise is the State Line mining district. The mines of this belt lie partly in Utah and partly in Nevada. The district is a new one—just discovered last winter—but good prospects are being shown. Some of the mines are rich in silver, besides carrying a paying amount in gold. In the district there are really two mineral belts—one gold and the other silver-bearing. The gold veins are in a formation of granite and quartzite and the silver in porphyry. The two belts lie parallel and only about a mile apart. Of course, the metals in the veins are more or less mixed in places, but in addition to whatever silver they carry, all the mines show well in gold.

Already a town is founded at this point and miners are going in. The owners of the mines first opened are shipping ores to Salt Lake, and the camp, like DeLamar, will soon be more than self-sustaining. In this district veins showing well in ore are found to cover a belt of country twelve miles long by four miles wide. All the mining men who have visited the new State Line district pronounce it a promising region.

In Eastern Nevada, along near the Utah line, are several big gold belts. At Osceola there is an auriferous belt containing both quartz veins and placers. A little back from this border section, in Nye county, lies Montgomery district, and near it several other districts, all containing prospects, and justly promise to be rich mines. Just now, as matters stand, Nevada is a happy hunting ground for all who wish to secure valuable mining properties without being obliged to pay boom prices for their purchases.

## Concentrates.

ABOUT 500 stamps are now in constant operation in Alaska.

THE Young America mine, Sierra county, is to be operated this summer.

AT the Gwin mine, Calaveras Co, the shaft is now down 1275 feet and is in slate.

THE Cripple Creek *Mail* is the best paying and the poorest printed paper in Colorado.

A CHICAGO man wants to buy "some dividend-paying mining shares." He's not a bit lonesome.

ON Miners' Union Day, the 18th inst., a holiday in Montana, 4000 union miners paraded in Butte.

IN southern California, including Kern county, there are now 135 quartz mills, aggregating 980 stamps.

THE Rothschilds have had renewed the lease of the Alamaden quicksilver mines with the Spanish Government.

OVER 1800 miners are now at work in the vicinity of Deadwood, S. D., an increase in a year of nearly 50 per cent.

TO date, the Homestake, S. D., mine has paid its owners in San Francisco and elsewhere dividends aggregating $5,868,750.

THE pumps in the Tiger mine at Burke, Idaho, have been stopped, and there is now 800 feet of water reported in the shaft.

THE old silver camp of Pioche, Nev., is in line with changing conditions and gold properties are being developed thereabouts.

THE 1012-lb. stamps at the App mine, Tuolumne Co., have been hung up to have a concrete foundation put under the battery.

COW WELLS, Kern Co., is eight miles from Randsburg and twenty miles from Goler. A postoffice—Garlock—has just been established.

AT the Utica mine, Calaveras Co., miners' wages are $3.00; shovelers and other laborers, $2.50. The supply of proffered labor exceeds the demand.

ABOUT eighty men have been employed during the past season at the borax mine of the Pacific Coast Borax Co., near Calico, San Bernardino Co.

ACTIVITY in oil in California is now only second to that displayed in the pursuit of gold. At present the mining industry of the State leads all others.

THE Golden Eagle mine at Winnemucca, Nev., has become a producer and is yielding smelting ore that, besides a fair value in silver and lead, averages $20 gold.

THE abundance of last year's snow in the mountains has enabled hydraulic miners in Siskiyou, Shasta and Trinity counties to continue work till the present time.

FROM Gold Basin it is reported that the Scotch syndicate which owns the Cycloptic mine has a force of men at work developing it and now will put in a 60-stamp mill.

AT the Rawhide mine, Tuolumne county, last Saturday, James Colter and Ernest Diepzel were tamping powder in the 900 drift when it exploded, blowing both men to pieces.

THE Butte, Mont., *Inter-Mountain* says work will shortly be resumed on the new silver mill at Anaconda for the Anaconda Company, upon which work was suspended 60 days ago.

THOS. A. EDISON has spent nearly $3,000,000 on his Sussex, N. J., iron mine plant and expects to shortly produce a large daily output of iron at the cost of seventy-five cents per ton.

DIFFERENCE of opinion among the managing directors has occasioned a temporary cessation of active operations at Keswick, Cal., of the extensive works of the Mountain Mines Company.

THERE are 500 stamps in present operation in Alaska, with about 175 more contracted for. There is a notable absence of speculation, the work being confined to legitimate mining development.

ASSESSMENT work sufficient to hold four adjoining claims, held in common, can be put on any one of the four by the coowners, but must aggregate $400, to comply with legal requirements.

A THIRTY-THREE-OUNCE nugget picked up near Randsburg, Kern Co., by Thos. Gaggers last Tuesday has greatly excited Mojave residents, most of the residents having gone to look for another like it.

WERE California to do as Utah—charge fifty cents per $1000 as a fee for filing the incorporation papers—some of the organizers of the ten-million-dollar mining companies might capitalize at lower figures.

AFTER next Saturday the field or union of the national flag will consist of forty-five stars, in six rows, the first, third and fifth rows to have eight stars and the second, fourth and sixth rows seven stars each.

THE handsomest production received this week is from Leo Von Rosenberg, 35 Broadway, N. Y., a superbly illustrated description of the property of the Gold Coin Mines Co. at Central City, Colorado.

THIS issue closes volume seventy-two of this paper. Ordinarily a volume of the MINING AND SCIENTIFIC PRESS contains 416 pages. The volume of which this is the 26th and last number contains 540 pages.

CONSIDERABLE is at present being said and sung as to whether shares in a mining company should be assessable or not. The strength of the argument appears to lie with the affirmative side of the proposition.

THE prospect of the next four months of political turmoil and unrest does not disturb the gold mining industry—probably the only industry in the country that is unaffected by the party dust of the presidental campaign.

THE case of the Government vs. the North Bloomfield Hydraulic M. Co. is still before the U. S. District Court in this city; no conclusion has been reached. It is, practically, a test of the constitutionality of the Caminetti law.

THE Golden Scepter Mining Co., at Quigley, Montana, already has a pay-roll of $50,000: it is such enterprises as that that are the backbone of the nation's life in these days of dullness in all other industries but that of mining.

AT Leadville, Colorado, last Saturday, 800 miners struck because the mine owners would not pay $3 per day. They have been paying $2.50 per day, and claim that at the present price of silver, which is a Leadville product, they can pay no more.

THE Fellowcraft, once known as the Bode mine, near Angels, Cal., is sold to P. L. Hobb and A. J. Weatherhead of Cleveland, O., who will sink a shaft 1000 feet. They have already bought a 10-stamp mill, air compressor and electric-light plant.

NEVADA COUNTY men say that the recent purchase of the old Caillot sulphuret works by the Selby Smelting Co. for $5000 will net the purchasers a large profit when everything on the place is made to yield up the gold with which it is impregnated.

THE creditors of the Lady Emma Mine Co., El Dorado county, have assigned their claims to H. S. Morey, who has attached the plant. The company had the mine bonded, and the owners disclaim any responsibility for debt as to the property itself.

RAINY LAKE, Minnesota, papers claim that there will be 200 stamps in that country by August 1st. The Mines Contracting Company of London has prospectors in that section and has in a measure abandoned the system of bonding locations, now buying outright.

J. J. L. VALENTINE, foreman of the Leland Stanford group of mines, Groom creek, Arizona, on the 17th inst. descended a shaft in which two shots had just been fired. As he did not reappear, the men went down, where they found him dead, having been overcome by powder smoke.

THE index to the contents of the latest volume of this paper, published on the last pages of this issue, gives a good idea of the varied values of its issues for the past six months. Thousands keep this paper for permanent reference, and it is for their use and convenience that the index is semi-annually prepared.

THE burden of proof is on the claim jumper; he must show that the $100 work or improvements was not done, and the absence of any absolute rule of determination in those matters makes it frequently difficult for the individual who tries to wrest a claim from its original owner to substantiate his assertion.

MOST assuredly the California Miners' Association will hold its annual convention in this city next fall. It is neither dead nor sleeping. Its work is just begun, there is considerable for it to do, and it is none too soon to begin contemplation of how best to secure further success and wisely administer its affairs.

SOME of the more promising copper properties at Copperopolis, Cal., owned by the Fisher Ames estate, Boston, Mass., are to be given renewed attention. Next to gold, copper is in greatest present favor, and the wonder is that that productive property in Calaveras Co. has been so long allowed to remain idle.

COL. J. W. DONNELLAN, President Salt Lake, Utah, Mining Exchange, has returned from a visit to this State, and in the *Tribune* expresses his surprise that the immense gold wealth of California has not received greater attention and development, and thinks that the State's output of gold in '96 will largely exceed last year's aggregate.

THE United States mint at Philadelphia is experimenting on the adaptability of pure nickel, aluminum, and other metals for use in the minor coinage of the United Sates. It is possible that in the event of pure nickel being found superior to the alloy now used for the 5-cent piece an effort may be made to have its exclusive use authorized for the minor coinage of the country.

"CONCENTRATES" is asked why or how is the "½" vote used in the national conventions. Sometimes, when there are two contesting delegations from a State, a compromise is effected by the committee admitting both delegations, each member to have half a vote. Should that State delegation fail to vote solid on any proposition, a "½" would appear in the total.

The deepest vertical mining shaft in the world is the 6-compartment 14x22½ Red Jacket shaft of the Calumet-Hecla, Mich.—4914 feet. The shaft at the Kennedy mine, Amador Co., this State, is about 2200 feet deep. Several Nevada Co. mines are deeper than the Kennedy shaft. The Geyser mine at Silver Cliff, Col., has probably the deepest shaft of any in that State—2100 feet.

AN employe of the Golden Cross M. & M. Co., Hedges, San Diego Co., reports a temperature of 126 degrees last week. That sounds terribly torrid, and would be fatal to many in a humid climate. But in that locality 126 degrees implies about the same relative discomfort as 75 degrees in San Francisco. He adds that the company pays $525 per month for water, which seems reasonably dear.

THE first report of gold output from the Witwatersrandt, South Africa, district was in '87, when there was a total yield of gold reported for that year of 23,155 ounces. A steady annual increase was noted, the highest yield being in '95—2,277,685 ounces. The largest monthly yield was in August, '94—203,573 ounces. The yield for the first four months of '96 aggregates 663,566 ounces.

BUTTE, MONTANA, thinks it possible the Rothschilds may now close down the big copper mines there, in which they have so large an interest. Such action is very unlikely, as they do not yet own a controlling interest of the stock; the present demand for copper is fully up to the supply; great as is the output of the big Montana copper property, there are other producers that prevent its action from being a controlling feature in the world's price for copper.

MUCH reflection thereon causes the Clancy, Montana, *Miner* to believe that: "The mining business is unlike any other business on earth. A prospect ambles along through its different stages of development, and during these stages it generally changes hands two or three times. Some men could not make a mine pay if its footwall was the Philadelphia mint and its hanging-wall the United States Treasury, while other men would squeeze bullion out of grindstones."

NOTHING was done definitely at the recent session of Congress toward arranging for the classification of mineral lands in Oregon. Congressman Hermann and Senator McBride, with honest intent, introduced bills creating a mineral land commission. Senator Mitchell succeeded in having an amendment injected into the California mineral land bill including Oregon in its provisions, which defeated the California bill, so far as the first session of the 54th Congress was concerned.

AT the Golden Cross mine, at Hedges, Cal., which has the largest number of stamps under one roof in the State, W. W. Stewart, of San Diego, is receiver at a salary of $8,000 per annum. About 175 men are employed. The present debt of the company is reported to be $150,000, and it is thought that sufficient can be taken out of the mine this year to pay that in full. The property is considered an excellent one, and the cost of mining and milling the ore is stated to be but $1.50 per ton.

SEATTLE men claim to have discovered a 60-ft. ledge of graphite on the British Columbia coast, and talk of organizing a company to make pencils thereof. 'Twill also make stove polish, paint, crucibles and lubricant, but is not worth $1200 per ton as they claim. About 30,000,000 lbs. are annually imported, chiefly from Ceylon and Austria, the best quality being worth about five cents per lb. It is found in two or three localities in this State, but not in sufficient quantity to be of commercial value.

IN the case of Castle vs. Womble, Stockton district, the Secretary of the Interior decides: "That a mineral discovery, sufficient to warrant the location of a mining claim, may be regarded as proven, where mineral is found, and the evidence shows that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success in developing a valuable mine." In Smuggler Mining Company et al. vs. Trueworthy Lode Claim et al. he decided that: "A protestant, who alleges no surface conflict, is not entitled to be heard on appeal before the department. An adverse relocation, made during the pendency of an order holding the original claim for cancellation, gives the relocator no standing to be heard as against the right of the claimant."

THE Tenares mine, Durango, Mexico, has been worked for nearly 300 years. The official records show that it has produced over $20,000,000. It has been worked to a depth of about 700 feet and a mile in length, in the most primitive way. Today the Mexican miners carry on their mining, where permitted, by underhand stoping, and carry rock and ore to the surface on their backs, using a ladder made of a single-notched pole. They can carry about 200 pounds. The mines are perfectly dry and the rock hard.

THE U. S. Debris Commission last Monday issued their last hydraulic permit for this fiscal year, granting permission to the Lone Star Mining Company to resume hydraulic mining in Plumas county, work having been suspended on account of a break in the company's restraining dam. Since the organization of the Commission there have been 223 applications made, and 166 granted. For some months the Commission has been straitened for funds, but after next Wednesday the appropriation of $15,000 will be available.

WHETHER one wants to hold his claim or sell it, it is best, whenever practicable, to get a United States patent for it. Once that is secured, it is unnecessary to do any further annual assessment work on it. In case it is desired to sell it, the possession of a United States patent is second only, in the eyes of the purchaser, to the value of the claim itself. In any event it stops probability of litigation, and every miner knows that where not so protected the discovery of unusual value in a claim is nearly always the signal for vexatious lawsuits.

SECTION 11 of Arizona's new mining law says: "The relocation of forfeited or abandoned lode claims shall only be made by sinking a new discovery shaft and fixing new boundaries, in the same manner and to same extent as is required in making a new location; or the relocator may sink the original discovery shaft 10 feet deeper than it was at date of commencement of such relocation, and shall erect new or make the old monuments the same as originally required. In either case a new location monument shall be erected, and the location certificate shall state if the whole or any part of the new location is located as abandoned property."

UNLIKE silver properties, copper mines are not directly affected by the continued effort of England to dictate and control the financial policy of the United States. English and French capitalists recognize the consequent value of American copper properties, which with them constitute a favorite form of investment. Close upon the announcement of the sale by the Hearst estate of a big block of Butte, Montana, copper stock to the Rothschilds, comes a statement that the United States copper mines at Jerome, Arizona, owned by W. A. Clark, of Montana, have been sold to a French syndicate for $5,000,000. It is reported that the purchasers propose closing down to reduce the country's output.

DREDGING is a form of river mining now receiving considerable attention. On the Colorado river, about fifteen miles above Yuma, Arizona, dredging machinery has been anchored on two large flatboats and a system of sluices is placed on others. The debris from the bottom of the river is scooped up and run through the sluices, which are placed a little below the surface of the stream. The Distlehorst Bros. have been operating dredgers on the upper Sacramento river, this State, for two years with very satisfactory result, and the same plan is to be tried this season on an extensive scale on the Klamath. A California company is also putting in a big plant to dredge on the upper Frazer, B. C.

THE Merced Gold Mining Company furnishes a statement of its Mariposa county operations during May. There were treated 2,280 tons of ore, yielding in gold $5,100, and 20 tons of sulphurets, assaying $79.55 per ton—a value of $2.93 net per ton to the ore. The March returns showed a value of $3 per ton; April, $4.59—an average of $3.50 per ton for the three months. The Homestake mine makes big profit on $2.75 ore; the Treadwell mine declares regular dividends on ore running from $2.50 to $3.50 per ton; another mine at San Andreas, Calaveras county, pays on an ore value of $3 per ton. The Spanish mine, Nevada county, paid on an ore value of 91 cents per ton.

THERE are several "Pioneer" Gold Mining Companies in California. One of them has created considerable recent comment in Boston, where its stock has been the subject of speculation. In the early part of the year a Boston brokerage firm agreed to buy the property for $150,000, a commission of 20,000 shares of stock to be allowed certain mining experts, one of whom is said to have parted with 10,000 shares. The purchasers subsequently decided to attempt abrogation of that part of the agreement, and secure title from the owners direct. The stock fluctuated from 10⅞ to 5¾; suits were begun, and some mutual dissatisfaction displayed, the latest result being that a compromise is effected, whereby T. M. Brazell and Hugh McDonald of this city get $8,500 each. The price paid for the mine is reported to be $150,000; it was capitalized at $1,000,000.

JUDGE LAMOUREUX, Commissioner of the General Land Office, was here this week. He came from Washington via Montana. It would be unjust to assume that he came to California to get instructions from his owners at short range, for a Federal official is supposed to be superior to such influence. His indecent haste in complying with corporate wishes, and refusal to recognize the plainest dictates of justice in the matter of the claims of the mineral land committee of the California Miners' Association, would, however, go far to justify the assumption that his case is an exception to the ordinary honorable rule. He, his superior, Secretary of the Interior Smith, and Speaker of the House Reed constituted a triumvirate that, officially intrenched, successfully thwarted all efforts to prevent corporate absorption of the mineral area of the State. The official has forfeited any claim to the respect of self-respecting men.

RECENT reports that the usual "English syndicate" had bought the Mariposa grant for $10,000,000 have now given place to a statement that the owners of that great property are about to develop it themselves. Senator Jones of Nevada, Alvinza Hayward, the Hobart Estate and Jno. W. Mackay own the grant, are all experienced mine operators with unlimited capital, and if they go in with the vim and vigor displayed in other great mining enterprises in which they are interested will wake up that long-neglected county. Mariposa county has long suffered from that grant. It has been erroneously supposed that the grant was all there is of the county; there are good mines inside and outside the limits of the grant, but that vast idle property has been an obstacle in the way of proper development of Mariposa's gold resources for the last forty years. It comprises about 49,000 acres, considerable of which is considered good mining ground. It will be a great day for Mariposa's mining industry when the work of development of that ground begins.

# Scientific Progress.

## The Modern Theory of Light.

NUMBER III.

By PROF. OLIVER J. LODGE.

Light is an electro-magnetic disturbance of the ether. Optics is a branch of electricity. Outstanding problems in optics are being rapidly solved, now that we have the means of definitely exciting light with a full perception of what we are doing and of the precise mode of its vibration.

It remains to find out how to shorten down the waves—to hurry up the vibration until the light becoms visible. Nothing is wanted but quicker modes of vibration. Smaller oscillators must be used—very much smaller oscillators not much bigger than molecules. In all probability (one may almost say certainly) ordinary light is the result of electric oscillation in the molecules of hot bodies, or sometimes of bodies not hot, as in the phenomenon of phosphorescence.

The direct generation of visible light by electric means, so soon as we have learnt how to attain the necessary frequency of vibration, will have most important practical consequences.

Our present methods of making artificial light are both wasteful and ineffective. We want a certain range of oscillation, between 800 and 400 billion vibrations per second; no other is useful to us, because no other has any effect on our retina; but we do not know how to produce vibrations of this rate. We can produce a definite vibration of one or two hundred or thousand per second; in other words, we can excite a pure tone of definite pitch, and we can command any desired range of such tones continuously by means of bellows and a keyboard. We can also (though the fact is less well known) excite momentarily definite etherial vibrations of some million per second, as I have explained at length; but we do not at present seem to know how to maintain this rate quite continuously. To get much faster rates of vibration than this we have to fall back upon atoms. We know how to make atoms vibrate; it is by what we call "heating" the substance, and if we could deal with individual atoms unhampered by others, it is possible that we might get a pure and simple mode of vibration from them. It is possible, but unlikely; for atoms, even when isolated, have a multitude of modes of vibration special to themselves, of which only a few are of practical use to us, and we do not know how to excite some without also the others. However, we do not at present ever deal with individual atoms; we treat them crowded together in a compact mass, so that their modes of vibration are really infinite.

We take a lump of matter, say a carbon filament or a piece of quicklime, and by raising its temperature we impress upon its atoms higher and higher modes of vibration, not transmuting the lower into the higher, but superposing the higher upon the lower, until at length we get such rates of vibration as our retina is constructed for, and we are satisfied. But how wasteful and indirect and empirical is the process. We want a small range of rapid vibrations, and we know no better than to make the whole series leading up to them. It is as though, in order to sound some little shrill octave of pipes in an organ, we were obliged to depress every key and every pedal, and to blow a young hurricane.

I have purposely selected as examples the most perfect methods of obtaining artificial light, wherein the waste radiation is only useless, and not noxious. But the old-fashioned plan was cruder even than this; it consisted simply in setting something burning, whereby not the fuel but the air was consumed, whereby also a most powerful radiation was produced, in the waste waves of which we were content to sit stewing, for the sake of the minute, almost infinitesimal fraction of it which enabled us to see.

Everyone knows now, however, that combustion is not a pleasant or healthy mode of obtaining light; but everybody does not realize that neither is incandescence a satisfactory and unwasteful method which is likely to be practiced for more than a few decades, or perhaps a century.

Look at the furnaces and boilers of a great steam-engine driving a group of dynamos and estimate the energy expended, and then look at the incandescent filaments of the lamps excited by them, and estimate how much of their radiated energy is of real service to the eye. It will be as the energy of a pitch-pipe to an entire orchestra.

It is not too much to say that a boy turning a handle could, if his energy were properly directed, produce quite as much real light as is produced by all this mass of mechanism and consumption of material. There might perhaps be something contrary to the laws of nature in thus hoping to get and utilize some specific kind of radiation without the rest, but Lord Rayleigh has shown in a short communication to the British Association that it is not so, and that therefore we have a right to try to do it.

We do not yet know how, it is true, but it is one of the things we have got to learn.

Any one looking at a common glow-worm must be struck with the fact that not by ordinary combustion, nor yet on the steam-engine and dynamo principle, is that easy light produced. Very little waste radiation is there from phosphorescent things in general. Light of the kind able to affect the retina is directly emmitted; and for this, for even a large supply of this, a modicum of energy suffices.

Solar radiation consists of waves of all sizes, it is true; but then solar radiation has innumerable things to do besides making things visible. The whole of its energy is useful. In artifical lighting nothing but light is desired; when heat is wanted it is far best obtained separately by combustion.

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THE paradoxical discovery that the speed of a sailing vessel may be increased by perforating its sails is claimed by Capt. Vasallo, an Italian mariner. He supposes that the fixed cushion of air filling up the hollow of an inflated sail lessens the effect of the wind, and he has sought to prevent the collecting of this cushion by making a number of holes in the canvas. Several trials, made in all weathers, have given surprising results. In a light wind a vessel made 4 knots with ordinary sails, and 5 knots with perforated sails; in a fresh breeze, 7 and 8¾ knots respectively, and in a strong wind, 8 and 10 knots. The ship's value would be increased one-fifth—its trips of five weeks being reduced to four weeks—if the increased speed can be sustained throughout a long voyage.

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THE following simple formula will purify ordinary water, especially in reservoirs and filtering basins: Calcium permanganate, one part, aluminum sulphate, ten parts; fine clay, thirty parts. These are thoroughly mixed and one part is added to about 10,000 parts of water. It is said that even sewer drainage is almost completely purified by this mixture. It precipitates all of the impurities and living organisms, and the clear portion may be drawn off and used with perfect safety.

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AN unfinished invention left by John Ericsson, when he died, was a mechanism for developing power from solar heat. The idea appears to have been taken up again, as a corporation, to be known as the New England Sun Power Company, has been organized in Portland, Maine, with a capital of $6,000,000, to utilize this kind of heat on a large scale.

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BLEUNARD finds that the X rays do not penetrate certain chemical substances, among which is potassium bromide. He has written a letter in an ink containing potassium bromide, and on placing this letter in an envelope by means of the X ray has obtained a perfect and legible reproduction upon a photographic plate.

# Mechanical Progress.

## New Hoisting Machinery.

The mines of the Anaconda Copper Mining Co., in Montana, have produced in fifteen years 400,000 tons of fine copper, with considerable silver and gold, the operations being now 1200 feet deep. In the same period, says John Birkenbine, over 580,000 gross tons of copper were obtained from the Lake Superior mines, but the present output of copper from the Lake region is less than that of Montana. To illustrate the class of machinery at the Calumet and Hecla copper mines, the dimensions of one pair of quadruple expansion engines may be given. Each engine has its four cylinders, 18 inches, 27¾ inches, 48 inches and 90 inches in diameter, with a stroke of 60 inches, driving through gearing, conical hoisting drums, 14 feet to 24 feet in diameter, and 12 feet wide, which lift cages carrying six tons of ore at the rate of a mile in one and one-half minutes. At the Tamarack mine an average hoisting speed of 3200 feet per minute has been obtained by a direct-acting engine, having 42x84-inch steam cylinders, driving hoisting drums 30 feet in diameter. At the same mine a 32x84-inch engine operating a double-cone drum 13 feet 6 inches to 36 feet diameter, lifts a cage carrying two and one-half to three tons 4500 feet in one and one-half minutes. These are vertical shafts. At the Quincy mine there are two principal shafts. No. 6, on a slope 51 deg. 44 min., has a total depth of 3680 feet, the weight of the loads hoisted being about six tons. No. 2 shaft, with the same average dip, has a total depth on the slope of 3954 feet, the loads hoisted weighing about ten tons each. The governors of the hoisting engines are set so that the maximum speed does not exceed 3000 feet per minute. Other important mines in the copper region could add points of interest in the extent of underground workings, machinery equipment, concentrating plant, including pumping machinery of great capacity, refining works, or even in the handling and distribution of the refuse slimes.

As an instance of the economic results achieved in this district the Atlantic mine may be mentioned, which obtains the copper-bearing rock at an average depth of 1800 feet below the surface. The rock is mined out with explosives, sent to the surface, crushed, hand-sorted, carried to concentrating mill, passed through stamps to jigs and slime tables, the concentrate is finally conveyed to a smelting works, and the entire operation was carried on with a profit, although the ore yielded but three-fourths of one per cent of copper, and but 10 cents per pound was obtained from the refined metal. In other words, the operation of this mine was successful and profitable when the company received but $1.70 for each ton of "pay-rock" which was mined, crushed, pulverized, concentrated, and the metal refined.

As indicating what has been accomplished in the copper district, the operations of the Quincy Mining Company may be quoted. On a paid-in capital of $200,000, dividends of $7,670,000 had had been paid to the close of 1895, the total expenditures having exceeded $20,000,000. During the year 1895 the average force employed was 968 men, of whom 336 were miners, earning an average of $50 each per month; 563,560 tons of rock were mined, from which 16,304,721 pounds of copper were obtained. Still larger figures could be used to indicate the operation of several other mines.

Near Thunder Cape, 1300 feet above the lake and three-fourths of a mile from the Canadian shore of Lake Superior, is Silver Islet, originally a mass of rock 90x90 feet, which projected a few feet above the lake surface, but which has been docked and cribbed until three acres are enclosed, to accommodate the shaft-house, shops and miners—barracks for operating the mine, from which $3,000,000 in silver has been obtained. Operations were continued to a depth of 640 feet, and extended horizontally 500 feet under Lake Superior. While the enterprise (owing to the expense of mining the limited amount of ore) cannot be considered as having been successful, its engineering features are worthy of recognition.

Most of the silver sent from the Lake Superior region occurs in a native state in connection with copper on the Keweenaw peninsula. Gold mining has been carried to a depth of 850 feet near Ishpeming, Mich.

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## Improvements in Free Milling Practice.

The successful working of all low-grade free-milling propositions, says H. M. Chance in the *Engineering Magazine*, depends mainly upon the ability of the mill to crush a certain quantity per stamp per day. On ore not requiring crushing finer than to a 30 mesh the output per stamp ranges from 2½ to 5 tons per day, the most successful mills passing from 3 to 4 tons per stamp every 24 hours.

Crushing to 30 or 40 mesh will rarely give as high a percentage of extraction (by simple amalgamation) as crushing to 50 or 60 mesh, and the size to which a free-milling ore should be crushed to yield the largest profit—not the largest gross returns—must be determined separately for each ore. As an example illustrating this problem, we may assume an ore which contains $4 per ton of gold yielding to plain amalgamation, of which 75, 85, 90 or 95 per cent may be recovered by milling to 30, 40, 50 or 60 mesh respectively; a mill of 50 stamps putting through 4, 3, 2½ or 2 tons per day, according to the mesh used, at a cost of $120 per day total milling expenses; and a mining cost respectively of $1.50, $1.60, $1.70 and $1.75 per ton for 200, 150, 125 or 100 tons daily output—the problem being to determine to what mesh the ore should be stamped.

Reducing the assumed data to tabular form, it appears that when crushing to 30 or 40 mesh with only 75 or 85 per cent saved, the profit per ton would be greater than when crushing to 60 mesh with a recovery of 95 per cent of the free-milling gold. It might possibly be better policy to crush to 40 mesh with a daily profit of $150 (saving 50 tons of ore for future work) than to crush to 30 mesh and obtain a profit of $180 per day, the problem, under such conditions, being resolved into a question of whether the present value of 50 tons of ore left in the ground for future use is more or less than thirty dollars. The principle here illustrated has been the keynote to American free-milling practice, involving the pushing of mine, mill, and management to their greatest earning capacity, with large quantities handled at low cost, correspondingly large aggregate profits, and correspondingly large losses in the tailings. This practice has been carried to the limit, some mills running through a 20-30 mesh as much as 5 or 6 tons of ore per day. American milling practice is thus quite in harmony with modern management at large industrial works, where the "intensive" theory of production is applied by working every machine to its greatest capacity, regardless of ordinary wear and tear.

The large capacity attained in present free-milling practice is due partly to the use of narrow mortars and a rapid short drop of the stamp, and partly to the relative larger portion of the work now done by the rock crushers, and is finally made possible by the use of rather large mesh screens; successful amalgamation of the gold under such conditions can be traced to the narrow mortar, with moderately high discharge and the use of inside plates.

The construction and method of operation gives every particle of ore small enough to pass through the screens an opportunity of quickly escaping, while with wide mortars and high discharge, such particles may remain in the mill until repeatedly caught below the stamps and reduced to powder. This construction is also well fitted for working certain special classes of ore, notably those requiring concentration, in which

the subsequent treatment is made troublesome by excessive sliming, and to which it may readily be adapted by lowering the discharge and lessening the height of drop; even when very fine crushing is required, the narrow mortar, with moderately high discharge and short rapid drop of stamps is capable of doing good work.

# Electrical Progress.

### Electricity in Railroad Work.

Discussing this subject, Dr. Louis Duncan sums up that speeds as high as 120 or 150 miles could be made without increasing the power to an impossible amount, provided the train is of a proper shape. The form of electric machinery allows the builder to dispose weights near the track, and so allows higher speeds to be safely used than could be allowed with the present type of equipment. The rotary motion of the armatures is much more advantageous than the reciprocating motion of the piston, and the wear on track and bridges would be much less. Up to the present rotary field alternating motors have been used only experimentally, but the experiments have been promising, and the characteristics of the machines fit the requirements of the traffic. Such motors are most efficient for the constant speeds, while their construction and regulation are of ideal simplicity. Besides this, the multiphase alternating system is peculiarly adapted to long-distance transmission. The great plant at Niagara, which is in successful operation, and from which it is proposed to transmit power over long distances, is a multiphase plant. The system allows us to use any voltage we wish on the line, and the problem which has not yet been attacked—the collecting of the current at these speeds—is helped by this fact.

The first road that may, to a certain extent, fulfill the conditions of an electric express road is now being built between Baltimore and Washington, and its operation will solve many of the questions which come up in the higher speed work, such as the type of car that may be used, the mounting of the motors, etc.

It is only between crowded centers of population that such roads can be made to pay. Between Washington and New York, New York and Boston, and possibly between New York and Chicago, they might be constructed at present; but, as the distances increase, the demands for the comforts of trains like the Chicago limited work against the condition of light trains. On long trips one is accustomed to dining and sleeping cars, to observation and smoking cars, and trainmen cannot provide all these on an electric train run at 100 or 120 miles an hour. The safety of such a service should be equal to the present system. With a perfectly clear track for express trains, with simple machinery that permits a low center of gravity, with less strain on the roadbed due to the rotary motion employed, with a perfect track construction and the definite block sytem that electricity permits, the service could be absolutely safe. The comfort of the passengers would depend on the construction of the track and of the cars. Such a system offers a service frequent, rapid, comfortable and safe, and there is no problem involved which our present knowledge of electric traction and transmission will not enable us to solve successfully.

### The Collet and Engelhard Electric Drilling Machine.

A movable drilling machine has always been a long felt want in machine shops, boiler works, etc. All the machines of this kind that have been produced so far had to be stationary on account of their weight, while those which receive their power from an independent motor, could not always be connected conveniently with this motor. In the electric drilling machine constructed by Collet and Engelhard, of Offenbach, Germany, the problem is solved and all the mobility desired is obtained by it. The motor is placed upon a small two-wheeled truck of solid construction, which also carries a current interrupter (cut-out) and the armature for the drill. The motor shaft drives a second shaft, which transmits the motion to the drill. As it is not always possible to reach the place where the work is to be done with the truck the motor can be suspended by a hook. By a special arrangement the rapidity of the drill can be modified according to the diameter of the holes to be drilled. The apparatus is provided with a spool of wire of about 30 feet in length and a cut-out which permits the connection of the motor with the electric light conduits. The motors are constructed to work with a tension of 65 or 110 volts. The shaft makes 13 revolutions per minute and the motive power developed is superior to that of one horse power. The transmission shafts are provided with universal joints and can be moved freely in all directions, and they can be lengthened from 50 to 80 inches. The shafts are of steel, the joints of phosphorus bronze. The weight of the motor is 450 pounds.—L'Industrie.

### A Large Shipment of Electrical Apparatus.

One of the largest single shipments of electrical apparatus was shipped last week by the Westinghouse Electric and Manufacturing Company to Great Falls, Montana. The shipment filled eight freight cars, and the freight of that cargo to its destination amounts to $8000.

The machinery will be used by the Boston & Montana Consolidated Copper and Silver Mining Company in the refining of copper and silver, and is believed to be the largest machinery of its kind ever constructed for electrical refining purposes. The Boston & Montana Company is one of the largest copper mining concerns in the world.

Until a few years ago the copper produced there was not refined, but the copper matte was sent East—some of it to England—and then refined. Since the introduction of electricity into the refining process the companies are in a position to compete with the East.

The Anaconda Mining Company purchased from the Westinghouse some time ago seven 360-horse power generators of an output of 3600 amperes each at 75 volts. Since these machines have been in operation the electrical process of refining has proved a great success. The machinery of the Boston Company will be driven by turbines from the waters of Great Falls.

The generators will be directly connected with the turbines. There are two of them, the largest ever made—each one of 1100-horse power—at an output of 4500 amperes and 180 volts. These machines are shipped in four freight cars, while the others are filled with the detail apparatus, such as switchboard appliances, etc.

C. D. HASKINS has invented a novel target-seeking torpedo. The torpedo travels until it comes within the magnetic range of the ship which it is intended to destroy. A delicate needle attachment is then deflected towards the steel vessel which causes the rudder to be so set that the torpedo travels at great speed towards its destination. Experiments have shown that the torpedo makes not less than 30 miles an hour, and that rough seas, ground swells and violent winds have little effect upon preventing its deadly arrival.

THE success of the long distance power and light transmissions in this State has directed renewed attention to future possibilities in that direction. The inaccessibility of many mountain mines, and the fact that the water flowing downward can be made the means of sending electrical power to those isolated properties, means much to the mining industry of California.

THE recent New York electrical exposition netted a profit of $20,000 to the projectors.

# Practical Information.

### Comparative Cost of Labor.

It will no doubt seem strange to many, says the *American Machinist*, that a machine, the labor cost of which is probably considerably more than nine-tenths of its cost, should be built within about two miles of this office in Brooklyn for considerably less than the same machine could possibly be built for in Germany, the reputed home and source of cheap labor.

Yet this seems to be the case with the Mergenthaler linotype machine. The company which builds it has a factory in Brooklyn, and until recently had an interest in a factory in Germany, where identically the same machine was built, and largely by the same fixtures, tools and system of manufacture. Labor in the German factory was about 40 per cent cheaper than in Brooklyn, but the Brooklyn factory produced the machines at a lower cost in dollars and cents, our authority for the statement being the president of the company.

The firm of Henry R. Worthington is said to have become satisfied that the smaller and medium-sized pumps can be manufactured at lower cost in its Brooklyn factory shops than in England, where its larger pumping engines for European trade are built, on account chiefly of relatively higher cost of material in large pumps and difficulties of transportation.

It is said that the Singer Manufacturing Company manufactures sewing machines in its Elizabethport, N. J., factory at lower cost than in its Glasgow factory, and Mr. Mandon, the French engineer who recently visited this country, told us of several instances in which exact duplicates of well-known American tools had been made in Paris, but could not be sold there as cheaply as the genuine American tools could be, notwithstanding excessive cost of carriage and the French import duty. One of the machines thus specified by him was the Gisbolt tool grinder.

Other proof is not wanting that at least some American machine shops turn out work at lower cost than the same work can be made for in any other country. The facts are cited as proof that, within reason, the highest paid labor is cheapest when employed in machine construction.

### Chromate for Preventing Boiler Incrustation.

A. Rubricius, an Austrian chemist, recommends a new method for the prevention or removal of boiler incrustation which has furnished remarkably good results since about one year that it has been in use at Anina and other localities in Austria-Hungary. To the feed water there is added a mixture consisting of 90 per cent of soluble chromates and 10 per cent of soda. These salts transform the more or less soluble carbonates contained by the water into soluble chromates which settle in the shape of slime without adhering to the walls of the boiler and the latter can easily be cleaned by washing.

The beneficial effect of the process will be felt even in the case of boilers which are already lined with thick layers of incrustation, for these will be gradually reduced and transformed into slime. On an average one-tenth of an ounce of the mixture should be added to 35 cubic feet of water. For an ordinary boiler three to four ounces per day would be sufficient. Where water with very high lime contents is being used, the dose should be increased a little; the exact quantity needed can easily be determined by a preliminary test.—Oesterr. Zeitschr. f. Berg und Huettenwesen.

ETCHING WOOD may be accomplished by coating the surface first with nitric acid and then with hydrochloric acid, which causes the wood to soften to the depth of about two millimeters. When both the acids are used together the wood becoms white, while if only nitric acid is used the part coated becomes blackened. In order to prevent the etch from running the other parts are treated previously with a thick alcohol lacquer, or with liquid wax or a mixture of two parts white wax, two parts mastic and one part asphalt, which are melted together and stirred intimately and then poured upon the places which are to be untouched.

### The Country's Growth.

In 1800 only the country between the Atlantic and the Mississippi belonged to the United States. Since that, the Louisiana purchase in 1803, the Florida, in 1821, the Mexican acquisitions, in 1840, 1850 and 1853 and Alaska in 1867 have been added. The increase, including Alaska, has been from 827,844 to 3,025,600 square miles, but the growth of population has been from 5,308,483 to 62,622,250, or nearly twelvefold. In 1800 the inhabitants were a little less than seven to a square mile (in 1790 they had been less than five, in 1890 they were over twenty-one.)

The place where the population is densest is the District of Columbia, which has 3839 to the mile, the next is Rhode Island 318, then Massachusetts 278, then New Jersey 193, Connecticut 154, New York 125, Pennsylvania 116, Maryland 105. The other States and Territories run below 100, down to Montana, Wyoming, Arizona, Nevada, which have less than one inhabitant to the mile.

The census commissioner notes that in Rhode Island and Massachusetts the density of population is as great as in many of the most densely settled European States, and that the entire North Atlantic division, pre-eminently the manufacturing section, has an average of over 100 inhabitants to the square mile. But it may be a surprise to some that among the old States Maine has only 22, New Hampshire 41, Vermont 26.—Philadelphia Paper.

### The Russian Face-Bath.

The principle of the Russian bath for the face is to bathe it with such hot water that it will make one jump every time it is applied, and then, a minute later, to bathe it with cold water. The reaction which this causes in the blood will cause the skin to glow and tingle with warmth. Then it should be wiped dry with a towel. Day by day the skin will grow firmer, and the wrinkles will gradually disappear. The use of hot and cold water for the face is important in many ways. Hard, cold water will not remove the grease and dirt which settles in the pores of the skin, but if hot water be used first, and then cold, the dirt will be removed and the skin strengthened. Dirt, grit, and grease will settle in the skin when the face is washed only with hard, cold water and soap, and this alone, in time, injures the color and softness of it. One should never bathe the face in hard water if a fair complexion is desired. The water should be softened with a little borax, or a few drops of ammonia. When the face is very hot it should not be bathed. Wait until it cools off a little. — Household Companion.

A FRENCH chemist makes a new kind of candle by dissolving five parts of colorless gelatine in twenty parts of water, add twenty-five parts of glycerine and heating until a perfectly clear solution has been formed. To this is added two parts of tannin dissolved by heating in ten parts of glycerine. A turbidity is produced which should vanish on further boiling. The boiling is continued until the water has been driven off. The mass is then cast into ordinary glass candle-molds. The candles obtained in this way are as clear as water and burn quietly, and without spreading any odor. The idea is a good one and well worth following up as it is not impossible that a number of other substances might be worked into candles of this kind.

# Mining Summary.

## CALIFORNIA.

### Amador.

*Record*: A. B. McLaughlin, above Volcano, at the Iron Mass mine, reports crushing ore at the Acme mill. The previous crushing paid $30 per ton. The shaft is down 200 feet and the owners contemplate putting up a new hoist. The vein runs from four to six feet in width.

*Record*: One hundred tons of ore are to be hauled from the Pine Vetta to the Ione depot for shipment to Selby's.

At the Anita the shaft is down 420 feet in hard granite. The company intends to continue another 100 feet by day labor.

At the Contention, formerly known as the Belden, the shaft has been enlarged to a double compartment to its present depth, about 200 feet, and will be sunk to a depth of 500 feet.

Ten additional men were put to work at the Union Consolidated mine this week.

The shaft of the Argonaut has encountered the slate, and preparations are being made for a station.

### Butte.

The Billingsly claim at Brush Creek is being worked by fifteen miners. A large flume will be put in and the mine worked by the pump system.

Fifty men are now employed in the Magalia or old Pershbacker mine, more will be put on when the pumps clear the water out of the old claim.

### Calaveras.

In the vicinity of Copperopolis, at the Dora mine, Pine Log group, Salt Spring valley, the ore mills $60 to the ton. The shaft is down 90 feet.

At the Maggie May mine, formerly known as the Cape Horn, the owner, Mr. M. Kennedy, expects to put up a 5-stamp mill.

*Citizen*: Work has commenced on the Venus mine, at Campo Seco. E. A. Pennington of Denver, Col., and W. A. Silvia, of Montana, have bonded the Benson mine. At Central Hill the first work will be to pump out the old shaft.

The work of repairing the dam above the Donnellan mine was commenced during the week. When it is completed the mill will be started up on a ten days' run.

The Bisbee and McCormack hydraulic mine at Douglas Flat is showing up very favorably. The run will be unusually long this year, owing to the plentiful supply of water insured by the late snow in the mountains. A partial clean-up of seven boxes, after a three months' run, gave bullion to the amount of $3,500.

### El Dorado.

(Special Correspondence).—An old tunnel on the Eureka mine near Grizzly Flats has been put in working order 257 feet in length. Work on the shaft has gone to a depth of 25 feet. San Francisco people have bonded the property.

The shaft on the Big Sandy is steadily finding its way to greater depth, having reached 260 feet. The contract calls for 500 feet. The property belongs to people in Toledo, Ohio, and has been idle about three years. New hoisting and pumping machinery have been placed in position. There is a 10-stamp mill ready for operation. It is expected that ere many moons the entire plant will be running night and day. This is seven miles north of Placerville.

Roelke Bros. are running a tunnel to crosscut a ledge eight miles north of here. They are into the hill 335 feet.

Preparations are on foot to begin work on the Old Judge mine near Kelsey.

The Grand Victory have again struck a new ore body, this time on the 100 level crosscutting from vein one to three for 35 feet.

H. W. Hulbert, proprietor of the Georgetown *Gazette*, has bonded a patented quartz claim to Freeman and Bell of Auburn who will continue work on the 80-foot shafts and crosscuts. There are three ledges of low-grade ore averaging from 10 to 14 feet.

R. M. Mooer has bonded the Henrietta claim from the Roelke Bros.

N. G. Sturtevant & Son of Oakland have bonded the Mykel claim and begun tunnelling for the ledge.

A few men have been put to work sinking and crosscutting on the old shaft of the Marguerite. This property is under bond to D. H. Jackson.

Placerville, June 22nd, '96.

### Lassen.

At Hayden Hill, at the Golden Eagle mine, there are 300 tons of ore on the dump. The new mill being erected on the Brush Hill claim will soon be ready to commence crushing ore.

### Marin.

(Special Correspondence.) — The Golden Crown Mining & Milling Company is working a property discovered nine months ago on which is a shaft 112 feet with two tunnels 40 feet each way in a 3-foot vein of copper, gold and silver ore. One thousand tons are on the dump. A 28-foot overshot water wheel runs the pumps. There is another 3-foot vein 250 feet east of the former where at a depth of 50 feet ore is being taken out by a whim. Twelve men are employed. W. T. Grider is superintendent.

Bolinas, June 20, '96.

### Mariposa.

The quartz mill at the Vanderbilt mine, near Snow creek, was burned last week.

### Mono.

Sheriff Hayes last week attached the Mammoth mill to secure the payment of $2000 to J. S. Cain of Bodie.

### Napa.

The net earnings of the Etna quicksilver mine for the three months ending May 1st were $20,490. A dividend of $10,000 was paid on the 10th inst.

For the quarter ending June 1st the net earnings of the Napa Consolidated quicksilver mine were $22,043. The usual dividend of $10,000 and an extra one of the same amount will be paid on July 1st.

### Nevada.

Away down 5940 feet on one continuous shoot of gold ore is a long way underground, yet such is the fact in the Idaho-Maryland mine, which has produced nearly $30,000,000 of gold up to date. For the last year or two says the *Transcript*, the ore shoot has been acting about as it did on the 1100 level. Now things are getting into better shape and the old mine promises to soon resume its former productiveness. It is the deepest and longest continuous shoot of gold quartz ever worked in the world and promises to last for quite a while yet.

The *Union* reports a strike in the Pennsylvania mine at Grass Valley, where the men on the 600 level have found free gold ore.

### Placer.

(Special Correspondence).—At the present time the attention of capital is being given to the mines of this county to a greater extent than ever known before. There is nothing of a boom, but many sales are being made, old mines are being reopened, new ones being discovered, and developing is going on with a confidence in results to come such as has not been known before. All of this is being accomplished with very little surface stir. Mines are sold and important enterprises are inaugurated so quietly that even the attention of the local newspapers is not always attracted. A bare list of the new enterprises is instructive and significant of the growing magnitude of the mining industry.

The Hancock & Watson quartz mine, situated at Bath, idle for nearly a quarter of a century, is being reopened. This mine was the second quartz mine discovered in the county. It is on a large ledge, known to be rich in gold, having yielded over $50,000 from the early-day workings.

The Devil's Basin drift mine at Deadwood and several adjoining drift properties have been bought by a San Francisco company who will work these properties on an extensive scale. The Devil's Basin mine has been closed for twenty-five years, though of known richness, having yielded half a million dollars in the early-day workings.

The Drummond quartz mine, which has been shut down for three years, is being started up again under a new ownership. This mine yielded about $100,000 from upper workings but lack of capital has heretofore prevented the mine being opened at greater depth.

The Oro & Mountain View Consolidated drift mine near Iowa Hill is also being developed under changed ownership after being idle for several years.

The Horseshoe Bar Consolidated, a river-bed mine near Michigan Bluff, is another mine that has been closed for several years that is now being reopened with increased facilities for working. A ditch is being constructed which will bring water to the mine under 400 feet head to be utilized by a hydraulic elevator.

The Gold Blossom quartz mine at Ophir is being reopened by C. F. Reed, the owner, and the working shaft will be deepened 200 feet to prospect the mine in depth.

The winter's work at the Barton or Herrmann quartz mine on the Deadwood ridge has been so satisfactory in returns that the owners are buying all the adjoining land offered, acquiring with it many promising quartz ledges. They intend building their own saw mill this summer.

The Redstone quartz mine at Blue Canyon, in the hands of the new owners, is being extensively developed and its output increased by the enlargement of its mill.

The Gray Eagle drift mine near Forest hill is yielding rich gravel and the working force has been doubled. Projected improvements will largely reduce the cost of mining and milling at this mine.

All these enterprises aggregate the employment of many more men than last year and are certain to largely increase the gold yield of this year over any former year.

Auburn, June 23, '96.

(Special Correspondence). — One of the claims purchased by the predecessors of the Big Dipper Mining Co. was the Horman placer mine. The Big Dipper mine embraces several original claims, and the name "Horman" has long since given way to that of "Big Dipper." The Big Dipper mine is also sometimes called the Hoorman, Harmon, Harman, Hermann and other similar names.

The Big Dipper mine is situated three miles from Iowa Hill, the claim adjoining that of the Morning Star Mining Co. (the claim comprising some 300 acres), and is working by the drifting process the same cement gravel channel that the latter company is operating upon. The channel, which has been worked for a distance of some 2500 feet and at a width of 150 feet, is tapped by means of a bedrock tunnel. Tunnels and drifts are driven and gravel breasted by means of three-inch machine drills and compressor. The gold is recovered by the sluicing process after being passed through a rock-breaker and 10-stamp mill. The mine is superintended by George D. Blood. The president of the company is Columbus Waterhouse. The main office of the company is located at 16 Beale St., San Francisco, and is in charge of the vice-president, E. W. A. Waterhouse.

Iowa Hill, June 24, '96.

*Sentinel*: Extensive preparations will be made this summer to work the Dam claim near Sunny South on a large scale. The Hidden Treasure Company has leased the old Dam tunnel and for the past year has had a force of men at work opening up the extension of the Hidden Treasure channel which lies between the Hidden Treasure mine and the Old Mountain Gate mine at Damascus. It promises to be one of the most extensive drift mines on the Forest Hill divide. An order for 140,000 feet of lumber for the construction of necessary buildings has been given and the work will go ahead at once. A splendid road has been graded to the mine and is one of the best grades in the mountains. Harold T. Power, superintendent of the Hidden Treasure Co. has charge of the work and it is needless to say that it will be ably managed.

Wm. Muir informs the *Sentinel* that preparations are being made to operate two hydraulic elevators at Horse-shoe Bar, below Michigan Bluff. They will be 800-horse power.

The new machinery recently put in place at the Pioneer mine works admirably and the mine continues to show up well. Some of the best dividends in the history of the mine have been declared this spring.

Work is progressing rapidly on the Redstone mine, which is situated three miles from the Pioneer on the Blue canon side. The boarding house and other necessary buildings are now going up and the new machinery will be put in place before the summer is over.

The Herman mine at Westville is doing well. There is plenty of good ore in sight. The mine never looked better.

*Sentinel*: The South Yuba Canal Company has purchased the Predmore place at Clipper Gap and intend to build a large storage dam there this summer. The dam will be built about 40 feet high and its storage capacity is estimated at about 10,000 inches or over 150 million gallons.

### Plumas.

Regarding the proposed debris dam to be built by the Quincy Hydraulic Mining Co. on Spanish creek, Wm. Watson reports in the *National-Bulletin* that the site chosen is near the northern extremity of the Devil's Elbow, 400 feet west of its extreme north point. The principal dimensions of the dam are as follows: Length of crest on top of dam, 500 feet; width of crest, 40 feet; height of dam, 109 feet; thickness of dam at base, 420 feet. The average width of the canyon at the base of the dam is 200 feet and the inner and outer slopes of the dam are 30°. The number of cubic yards of material required for the dam is 278,631, which will weigh 417,946 tons. The pressure of water against the inner slope of the dam filled to the crest would be 112,218 tons, which gives a factor of safety in favor of the dam of 3.72. In all probability, as will be seen below, the dam would never be filled to within 14 feet of its crest, and the maximum pressure against the inner slope would never exceed 97,500 tons, which would give a factor of safety of 4.28, or a little more than four and a quarter tons to resist one ton of pressure.

Advantage is to be taken of the adjacent gold-bearing gravels situated on either Gopher, Badger or Shore's hill, the base of these gravels lying from 200 to 400 feet above the level of the crest of the proposed dam. These gravels are to be hydraulicked and conveyed by flume to the proposed damsite and dumped into place behind brush barriers carried up on both inner and outer slopes as the water-borne materials accumulate. In order to secure the brush from being carried away by the pressure of water and accumulating gravels, etc., the brush would be laid in wire-bound bundles parallel with the axis of the stream, stakes would be driven through these bundles, and these stakes secured with barbed wire stretched from post to post, with the ends anchored outside the area subject to overflow. By keeping the brush on the outer slope from 2 to 3 feet higher than the inclosed material, it would form a settling reservoir, and the water percolating through this barrier would be relieved of a great part of its sand and sediments.

The spillway or outlet to the dam is at the south end, advantage to be taken of a slight depression in the Devil's Elbow range. The bottom of the spillway is to be 20 feet below the crest of dam and its width 75 feet. The sides and bottom of spillway would be in a hard micaceous schist, the bottom having a slope of 5 feet to the mile. The watershed above the proposed dam has the following area: Spanish creek basin 29 square miles; Rock creek basin 32 square miles, making a total area of 61 square miles. A run-off of 1 inch of rainfall in twenty-four hours from this area would give a discharge of 98,387 cubic feet per minute, equal to 65,591 miners inches. The area of the proposed spillway is 1500 square feet, and assuming the spillway filled to a depth of 10 feet or 10 feet below crest of dam, the area occupied by the water would be 750 square feet. This body of water would have a mean velocity of nearly 9 feet per second and the discharge would approximate 399,960 cubic feet per minute, an equivalent to a run-off of 4 inches of rainfall in twenty-four hours over 61 square miles of area. The thickness of barrier presented by the dam 10 feet below crest would slightly exceed 70 feet.

The areas flooded by the proposed dam are Spanish creek basin 90.5 acres, Rock creek basin 47.5 acres, making a total of 138 acres, with a total storage capacity (assuming that the tailings will grade back on a grade of 13 feet to the mile, which is the average slope of Spanish creek through American valley) of 11,377,350 cubic yards.

The work comprises the washing down and conveying to dam-site of 278,631 cubic yards of gravel, etc; 2350 cords of brush for inner and outer slopes of dam. The necessary posts, plain wire and barbed wire for same; 5700 cubic yards of rock excavation for spillway. The building of 6000 feet of new grade for county road, and a 175-foot span bridge. One of the principal elements of safety in the proposed dam is the fact that the overflowing waters from the spillway would regain the bed of Spanish creek some 800 feet below the outer toe of dam, and assuming that the creek there is filled with tailings to a depth of 30 feet, the hole excavated by the escaping waters would have no perceptible effect on the structure of the dam itself.

Numbers of prospectors pass daily through Quincy.

The superintendent of the Lucky S. mine, at Taylorville, has orders to shut down the mine. Two or three men are retained to run the mill. All the other employes are discharged.

Several hundred men will be at work on Slate creek as soon as the water gets low enough so that flumes can be put in. Dr. Mussey, in charge for the English syndicate, has leased several thousand feet to both white men and Chinese.

*National Bulletin*: At Thistle Shaft, about 85 men are employed. Twenty men are doing development work at Gold Bar.

At the Good Hope hydraulic mine, below Sawpit Flat, twenty miners are kept busy.

Horace Taber has resumed work in his drift mine below Gibsonville. The tunnel is to be pushed ahead to open up the channel.

Three shifts of men are employed in driving the tunnel ahead in the Claybank mine above La Porte. In an upraise, not long since, a fine channel of blue gravel was cut on the rim. By pushing the tunnel ahead about 150 feet it is expected to open up the bottom of the channel.

### San Bernardino.

The mill at the Altoona mine, Morongo district, was started last week. The Rose mine, which has never been closed since its discovery is now working eighteen men and the mill is running at its full capacity.

The Fremont district, eighty-five miles from San Bernardino, is midway between Oro Grande and Barstow, ten miles from a railroad switch. A shaft has been sunk to a depth of thirty-feet showing a ledge twenty inches wide carrying rich ore. The Robert L. at ten feet from the surface is producing ore. Kerr Bros.' mine, the Razzle Dazzle, has a shaft ninety feet in depth on a four-foot ledge, the ore going $30. A mill will be erected.

### San Diego.

It is reported at Escondido that some of the stockholders in the Geneva Mining Company have decided to a stop. They refuse to sell or allow any work to be done on the property, and things are in a bad shape, according to the *Advocate*.

W. H. Bradley is developing the Messenger mine, forty-five miles northeast of Salton in the Eagle Mountain district. There are said to be several good mines in the district, and a large number of men are at work, mostly prospectors. A stage line runs from Salton. The Messenger mine employs fifteen men sinking a shaft and doing general development work. Mill tests of the ore show a general average of $22 a ton. A mill is to be erected, the ore at present being piled on the dump.

An assay of ore from the Owens, at Julian, sent to San Francisco went free gold $334.19 per ton, free silver $401. The mine will save the sulphurets and ship them to San Francisco.

### Santa Barbara.

The Annie Moore mine on the H. C. Pierce ranch near Santa Ynez is being opened up. The tunnel is in 200 feet.

### Shasta.

*Free Press*: The Mountain Mines, limited, have suspended for a month. There is a large quantity of ore on the dump at the smelter and the experimental tests of the machinery can be continued. The work of building the large roaster will go steadily on. The cause of this suspension is said to be on account of the inability of the stockholders and officers to arrive at an agreement as to the proper plan of procedure. William H. Freeman, a foreman for the company, is now in Denver, Colorado, inspecting the smelting plants. The company is negotiating for the purchase of all the ore of the original Quartz Hill Gold Mining Company, which they expect to work in their new mill, which will shortly be erected. The electrical power for this mill will be generated by the new power plant in contemplation at Keswick.

The Conant mine at Harrison Gulch reports considerable rich ore, and Supervisor Conant is credited with intention to build a mill on his property.

*Free Press*: Rahn & Schmidt have twelve men employed at the Forbes mine, Rich Gulch, under the foremanship of J. H. Cox.

### Sierra.

At Beckwith, C. B. Wyckoff has run 1000 feet of tunnel on his property. This was formerly a paying mine, and doubtless will be again.

### Siskiyou.

The O. & C. Mining Co., of Ashland, Or., have sold their quartz mine on the Klamath, three miles from Henley, to San Francisco men represented by E. S. Smith, for $20,000, to be paid July 1st. The new company will commence developing the property by driving a 200-foot tunnel which will tap the vein at a depth of 85 feet below present workings.

*Journal*: At the Black Jack mine, near Henley, they have been crushing the ore which has been on the dump and which they have been using as ballast for the track, and are making $3 a day from it.

Jillson & Co., at Henley, have sunk a shaft and run a tunnel about 400 feet.

Wm. Hobart, who has been working the Quartz Valley hydraulic mine in Quartz Valley, has closed down. He worked 120 days, and has cleaned up $9000 with the ground sluices and a portion of the bedrock to be cleaned yet.

The Wright & Fletcher and the Eastlick Bros. hydraulic mines at Oro Fino will probably continue in operation until the middle of next month.

The 10-stamp mill at the Nebraska mine on

Cherry creek, leased by Means & Mahan, will soon be in operation.

The Seattle Placer Mining Company on Thompson creek, which purchased the old Shinar claim, have completed their ditch from Thompson creek to the mine, three and one-half miles. They were employing over sixty men a short time ago, but the number has been reduced.

Superintendent Gault, of the Del Monte Milling & Mining Co., of Sacramento, is putting up a 10 stamp mill on French Creek, to cost $10,000.

F. Beaudry, who has bought 1,600 acres placer ground near Callahan's and 1,000 acres gravel on Scott river, reports that, as far as worked, the ground pays $1 to the cubic yard.

#### Trinity.

*Journal*: At Trinity Center all the placers are at work. The time for the Berlin syndicate to make its first payment on the property bonded by it was up June 7th and no payment made or extension of time asked for.

The old Rumfelt placer mine is being worked this season after lying idle for years. There is a 40-foot bank of good prospecting gravel.

On Morrison gulch J. B. Graves and others have located 100 acres of placer ground and have named the mine the Blue Jib. The ground lies on the mountain side, has plenty of dump, with water abundant and convenient. The gravel prospects unusually well.

Considerable work is now being done on the quartz mines above Trinity Center at Carville. On the Graves Brothers' mine a tunnel has been run in on the ledge 130 feet. At the face of the tunnel the ledge is about eight inches, of very high-grade rock, going $150 a ton. The walls are about 5 feet apart and filled with ledge matter, although as yet there is only 8 inches of solid quartz, the vein widening. A second tunnel will be run to tap the ledge 100 feet deeper. There are about fifteen or twenty tons of ore on the dump. The mine is equipped with an arrastra.

H. P. Gordon, superintendent of Minersville Hydraulic Gold Mining Company, has about 100 men employed. The company operates on nearly 3500 acres of gold bearing gravel, using 4000 feet of hydraulic pipe, and three giants. The *Journal* reports that the ditch being too small and a new one is being dug to carry 2500 inches of water, to be completed July 4th. A telephone system and an electric light will be erected.

#### Tuolumne.

*Independent*: At the Jumper mine, east of Stent, the new 20-stamp mill of the company is in operation.

At the App mine, W. Moreland superintendent, work is being resumed on the 400-foot level to continue until connection is made with the lower shaft now separated by tunnel.

Work on the Confidence gold mine, abandoned in the early eighties, is progressing. There is yet 150 feet of water to be pumped out. A pump is hoisting 450,000 gallons every twenty-four hours.

At the Santa Ysabel Gold Mining Co.'s property, known as the Miller & Holmes mines, situated between Quartz mountain and Stent, work is going steadily on day and night. Three shafts are being sunk, also crosscuts and drifts, and results are satisfactory; deepest shaft, 600 feet. As soon as other shafts are deep enough, a level will connect all three. The hoist and power house is run by electricity. With the force of men now at work a total extension of work in shafts, tunnels, etc., is 120 feet per week. The company will put in a stamp mill commensurate with demands soon. W. A. Holmes, assistant superintendent, runs the mine.

### NEVADA.

#### STOREY COUNTY.

Following are the official weekly letters from Chollar and Potosi:

CHOLLAR—In the stope above No. 2 crosscut, 450 level, the eighth and ninth floors continue to yield fair grade ore.

In the south stope on this level on the third and fourth floors we are extracting ore of fair grade from stringers and old fillings.

We have shipped to the Nevada mill for reduction during the past week 134 tons and 600 pounds of ore. The average battery sample of ore with that heretofore extracted was $23.76.

Brunswick Lode—The south drift, 200 level from No. 1 shaft, was advanced 20 feet, face now being 120 feet south of Chollar-Norcross line. Face is in porphyry.

At a point 115 feet in an east crosscut has been started and advanced 51 feet.

When in 18 feet it cut a streak of ore 14 inches wide, assaying from $7 to $28 per ton, and when in 24 feet another one 10 inches wide, assaying $25 to $30 per ton. The face is in porphyry, with stringers of quartz through it.

On the 300 level the joint Hale & Norcross and Chollar south drift from the station is out 64 feet, skirting the footwall, which is well defined at this point.

Have resumed sinking incline No. 1, which is down 469 feet.

We have shipped from the Brunswick lode 24 tons of ore, saved in running the 200 level south drift, to the Nevada mill for reduction, the average car sample of which was $68.68 per ton.

POTOSI—The north drift from the top of the raise from the 450 level south drift is now out 145 feet; extended 32 feet during the week; face in porphyry, clay and bunches of quartz. We turned the drift east and cut the clay wall.

The south lateral drift, 650 level, started from the main west crosscut from the shaft, is now out 88 feet; extended 20 feet since last report; face in porphyry.

On the tunnel raise the raise started 50 feet south of the main raise is up 21 feet; top shows bunches of low grade ore.

AT GOLD HILL.—In the Crown Point mine, on the 600 foot level, they started a west crosscut 36 feet north of west crosscut No. 1, during this week, and extended it 9 feet. The face is in quartz assaying from $9 to $14 per ton. They are now putting in square sets preparatory to raising. The south drift from the seventh floor of the raise on the 1100-foot level is out 114 feet. The face is in porphyry and quartz of low grade.

The joint Confidence, Challenge Consolidated and Consolidated Imperial west crosscut No. 1 from the surface tunnel is out 557 feet. The face shows porphyry. West crosscut No. 3 from the surface tunnel is out 10 feet. The face is in quartz showing no value.

In the Belcher mine the usual work is being done. The ore extraction during the past week amounted to 56 mining carloads, averaging $21.72 per ton.

The Segregated Belcher mine yielded during the week 23 mining carloads of ore, assaying upon the average $23.21 per ton.

### OREGON.

At Baker City the Del Norte Mining and Milling Company has incorporated: B. B. Shepherd of Baker City; J. W. McCoy of Des Moines, Iowa, and C. P. Lofgrew of Chicago: capital stock, $100,000.

#### JACKSON COUNTY.

Henderson & Kalfus, lessees of the plant and placer mines of the Siskiyou Gold Mining Co., on Elliott creek, the "Joe Bar diggings," have completed the opening and equipment and are piping day and night.

#### JOSEPHINE COUNTY.

*Journal*: The Hammersly mine is again in operation under the management of the new owners, Jones & Otten. R. Rogers is acting superintendent. It is claimed that the stopes of this mine contain $20,000 of ore. The property was sold last week at the courthouse on an execution sued out by Jones & Otten. Two thousand dollars was offered for the mines and $800 for the mill and machinery. The question of the priority of liens as between them and the laborers on the mine was argued before the Judge, who held that the miners' liens took effect from the date of the beginning of work. Consequently the claims of Jones & Otten become subordinate to the other claims, and the effect of the sale must be to compel the purchasers to satisfy the liens of the men.

### BRITISH COLUMBIA.

A. E. Humphrey at Rossland has signed a contract to diamond drill four holes on the Iron Horse—one in the tunnel where ore was found last summer and the other three at different points on the ledge between the old tunnel and the line of the Virginia.

Vancouver *World*: E. J. Fader, ex-manager of the main Quesnelle Gold Dredging and Mining Company, Cariboo, Tuesday closed a sale of $62,500 for three miles of mining property on the Quesnelle river, with McLean Bros. and Gore, representing an English company. It is the intention of the company to begin operations within six months from date.

### ALASKA.

Two schooners arrived at Tacoma during the week with 803 tons concentrates of an estimated value of $100 per ton from Oonalaska, Unga Island.

F. Meeker, prospecting on Six-mile creek, Cook's inlet, writes, under date of May 19th, that in a prospect hole started after clearing away 10 feet of snow hundreds of colors and small pieces of coarse gold were found. The indications were considered very favorable, as the shaft was not down to bedrock. He tells of seeing washed from two shovelsfull of earth twelve chunks of gold varying in size from a grain of wheat to a pea.

### IDAHO.

(Special Correspondence).—Pierce City mining district is now experiencing a mining boom, as the result of the past winter's work. From forty to fifty men are arriving daily with pack animals, wagons and buggies. Of course, there are some of them get dissatisfied and leave the district without investigating our mineral resources. A recent location made about four miles from Pierce and known as the Golden Standard group gives great promise of being a big mine. The ledge runs northeast and southwest, dips to the east and averages 10 feet in width; some places it is over 20 feet wide. The ore is white and blue quartz, carrying iron pyrites oxidized in some places, but it will nearly all pan a little. Some of it shows up very well. As yet there is very little done on it, as the discoverers are not able financially to handle it profitably. It has been traced for 4500 feet on the surface. Recent work on the Calumet & Hecla group shows up some rich ore showing gold. The Crescent Gold Mining Co. is now down 60 feet below the tunnel level with its shaft, and the ore is still as rich as ever. The company intends sinking 60 feet more before drifting. Dr. H. H. Bole has sold his entire interests here to Messrs. Mitchell & Buchanan of Moscow; consideration unknown. The same parties are also said to have secured an option on the Bond mine. Chas. Henley & Co. are pushing development on the Frisco, and the property looks well. The Caledonia Gold Mining Co. will soon be ready to commence active operations. The Idaho development work proceeds as usual. The Golden Trocadero is producing some ore that runs as high as $450 per ton, and the vein is from 6 inches to 2 feet. A mill run will be made on this ore in a few days, and if expectations are fully realized a mill will be put on the property at once. A deal has been closed on the Climax group. A crosscut tunnel will be run on the property a distance of 400 feet as fast as possible. Placer mining is now in full blast, and with the large quantity of water this season big cleanups are the rule. Messrs. Howes & Sutherland will strike their pay gravel by the first of July. They have expended over $30,000 on this property. Mr. Porter from Coeur d'Alene is now in the camp, having come down to survey the pipe ditch for Howes & Sutherland. The Idaho Consolidated Placer Mining Co. is rushing its flume work and will be ready to handle pay gravel soon. This company will employ twenty men this summer. Erickson & Gaffeny are working in very rich gravel: the bank is 10 feet deep and runs from 75 cents to $2 per yard. Pierce is now enjoying fine weather and the roads are in good shape.

Pierce, Idaho, June 18, '96.

In the Coeur d'Alenes the contractors on the Poorman-Tiger concentrator at Burke have 25 men at work.

The Mammoth is running steadily, working 30 men, shipping all its high-grade ore and leaving its low-grade on the dump.

The *Review* reports the Standard shipping 200 tons per day. One shift has been laid off at the mill at Wallace. The Campbell tunnel is in nearly 2,000 feet and still going in about 8 feet daily. Work has been commenced on the ore bins to use in connection with this tunnel, and when completed they will be the largest and most substantial on Canyon creek.

The Grangeville *Free Press* says: "Geo. Riebold arrived from Warrens via Florence Tuesday with a bar of bullion valued at $1500, the proceeds of five tons of ore extracted from the lower drift of the Little Grant mine. This is some of the richest ore ever taken from the mine, and the extent of the chute has not yet been reached. Mr. Riebold reports the dredge crew busy digging ditches and expecting to resume work with the steam shovel in a few days. The company has an electric light and power plant and sawmill at Boise awaiting the opening of the road over Secesh summit to be taken into camp."

### MONTANA.

*Tribune*: Should the Granite Mountain and Bimetallic mining companies decide to resume operations it will be a great event in the mining history of that State. One of the first and hardest blows Montana mining got through the slump in silver in 1893 was the closing down of these two great mines, both owned largely in St. Louis. The Granite Mountain, the first developed, is a veritable mountain of ore, but not high-grade enough to warrant working with silver at 60 cents. In the few years preceding the panic it made a glorious record, paying dividends at the rate of $100,000 per month with clock-work regularity.

The Bimetallic is almost alongside the Granite Mountain, and by many is regarded as even a greater mine. While the companies are separate, they have practically one management, the principal owner in each being Charles D. McClure, of St. Louis. The mines almost support the two thriving towns of Phillipsburg and Granite; they started and built them up, although other mines in the vicinity now contribute to their growth. Directly and indirectly the two companies employed 2000 men.

In its career the Granite Mountain has distributed dividends amounting to $12,120,000, the Bimetallic $1,630,000.

The two new gigantic engines for the Anaconda mine, which will lift the loaded cages at the rate of 2400 feet a minute, are being put in position and will begin work July 1st.

### UTAH.

Following is a list of dividend paying mines to the 1st ult. Like California, Utah has unincorporated companies who have profitable properties, the returns of which do not appear in such lists as this:

| *Names.* | *No. of Shares.* | *Par Value.* | *Dividends.* |
|---|---|---|---|
| Ajax | 300,000 | $ 10.00 | $1,000,000 |
| Bullion-Beck | 100,000 | 10.00 | 2,000,000 |
| Centennial-Eureka | 30,000 | 50.00 | 1,620,000 |
| Crescent | 600,000 | 25.00 | 280,000 |
| Dalton & Lark | 2,500,000 | 1.00 | 12,500 |
| Daly | 150,000 | 20.00 | 2,850,000 |
| Eureka Hill | 10,000 | 100.00 | 1,450,000 |
| Gemini | 5,000 | 100.00 | 600,000 |
| Horn Silver | 400,000 | 25.00 | 5,187,000 |
| Mammoth | 400,000 | 25.00 | 1,050,000 |
| Maxfield | 300,000 | 10.90 | 117,000 |
| Mercur | 200,000 | 25.00 | 450,000 |
| Ontario | 150,000 | 100.00 | 13,205,000 |
| Silver King | 150,000 | 20.00 | 562,000 |
| Utah | 100,000 | 1.00 | 137,100 |

### WYOMING.

The Sheridan *Enterprise* says: "Stamp mills will be installed here by five more companies this summer. In addition to the three already in operation, this will guarantee a lively camp."

### COLORADO.

Denver *Mining Record*: The Mollie Gibson has a new ore body 20 feet thick, and on this ore one hundred men are working. This mine ships weekly three hundred tons of ore which will average near to 200 ounces.

### NEW MEXICO.

East of Hillsboro in Sierra county, placers worked in a small way on the surface by Mexicans since 1874, are to be worked on a large scale by men who have spent $20,000 in preliminary work. Their engineers and hydraulic experts from this State report a gravel bed 60 feet thick, all pay dirt. Water will be impounded at the head of Animas river by a dam 150 feet high, and conducted to the placers through fourteen miles of 30-inch riveted steel pipes and discharged through monitor nozzles under a pressure of 360 pounds.

### ARIZONA.

*Gazette*: Producing ore by the cyanide process evidently pays in Arizona as McLoish on Thursday shipped to the mint 100 ounces of gold valued at $1,400, the result on nine days run. He worked eight men and the rock they worked is tailings from the Vulture. At many of the old dumps of mines now abandoned the cyanide process will eventually reduce the piles of rubbish that was once thrown away and will have a fair margin of profit.

### MICHIGAN.

The mines on the Gogebic range operated by the Metropolitan Iron Company, the Norrie, East Norrie and Pabst, have suspended work for the present, discharging their forces -1250 men in the aggregate—and nearly all the other mines on that range have reduced their forces about half. The Marquette *Journal* reports the situation as follows:

"The managements say this step has been taken on account of the slack demand for ore. Ever since the producers agreed to abstain from ruinous competition, and not sell ore save at a price that would yield a moderate profit, the furnace owners have bought very conservatively, evidently expecting that a break would come by which they would profit if they held off long enough. It is to meet this attitude of the furnacemen that the leading mines have resorted to the heroic expedient of either closing down entirely or reducing their forces, their argument being that if prices are to be maintained at a fair basis the way to do this is to quit producing until the consumers quit hanging back and show a willingness to purchase freely. The hardship to labor involved in the determination of the mining companies is deeply to be regretted, but it will be better for the men in the end to have the producers of ore stand out unyieldingly for a fair price than to keep on producing and shipping until the market is overstocked and the furnace owners are in a position to force the acceptance of prices which will not admit of a proper remuneration for the labor employed in the mines or any profit for the mine owners."

## List of U. S. Patents for Pacific Coast Inventors.

**Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.**

FOR WEEK ENDING JUNE 16, 1896.

562,113.—RUBBER HEELS—A. N. Barrett, Los Angeles, Cal.
562,348.—WAGON BRAKE—H. A. Baxter, Seattle Wash.
562,171.—CAR FENDER—Cogniasse & Shultz, S. F.
562,056.—THILL TUG—A. W. Cook, Stockton, Cal.
562,127.—FAUCET—Fowler & Fettic, Genoa, Nev.
562,333.—CRUTCH—F. A. Lund, Los Angeles, Cal.
562,317.—WAVE MOTOR—C. R. Martin, Redondo, Cal.
562,017.—CURTAIN HANGER—J. M. Murdock, Oakland, Cal.
562,021.—SHAWL STRAP—L. Phelan, S. F.
562,028.—CAR COUPLING—L. E. Redden, Tempe, A. T.
562,158.—ROASTING FURNACE—J. R. Sears, Stockton, Cal.
562,254.—LAMP STOVE—M. H. Sinclair, Los Angeles, Cal.
562,102.—GATE—R. G. Stingley, Franklin, Or.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AUTOMATIC CAR FENDER.—C. Cogniasse and D. F. Shultz, San Francisco, Cal. No. 562,171. Dated June 16, 1896. This invention relates to a protecting device for railway cars. It consists essentially in an automatically operating fender, comprising a swinging fender depending from the front end of the car, a curved receiving fender depending at a point in rear of the first fender and in front of the wheels of the car, a spring by which the lower edge of the receiving fender is normally tilted upward above the surface of the street, rocker arms projecting upwardly from the shafts of each of the fenders, an elastic connection between the two whereby the swinging of the front fender also moves the rear one, with its edge in close proximity with the surface, and a pawl and ratchet mechanism by which this fender is locked in position until released.

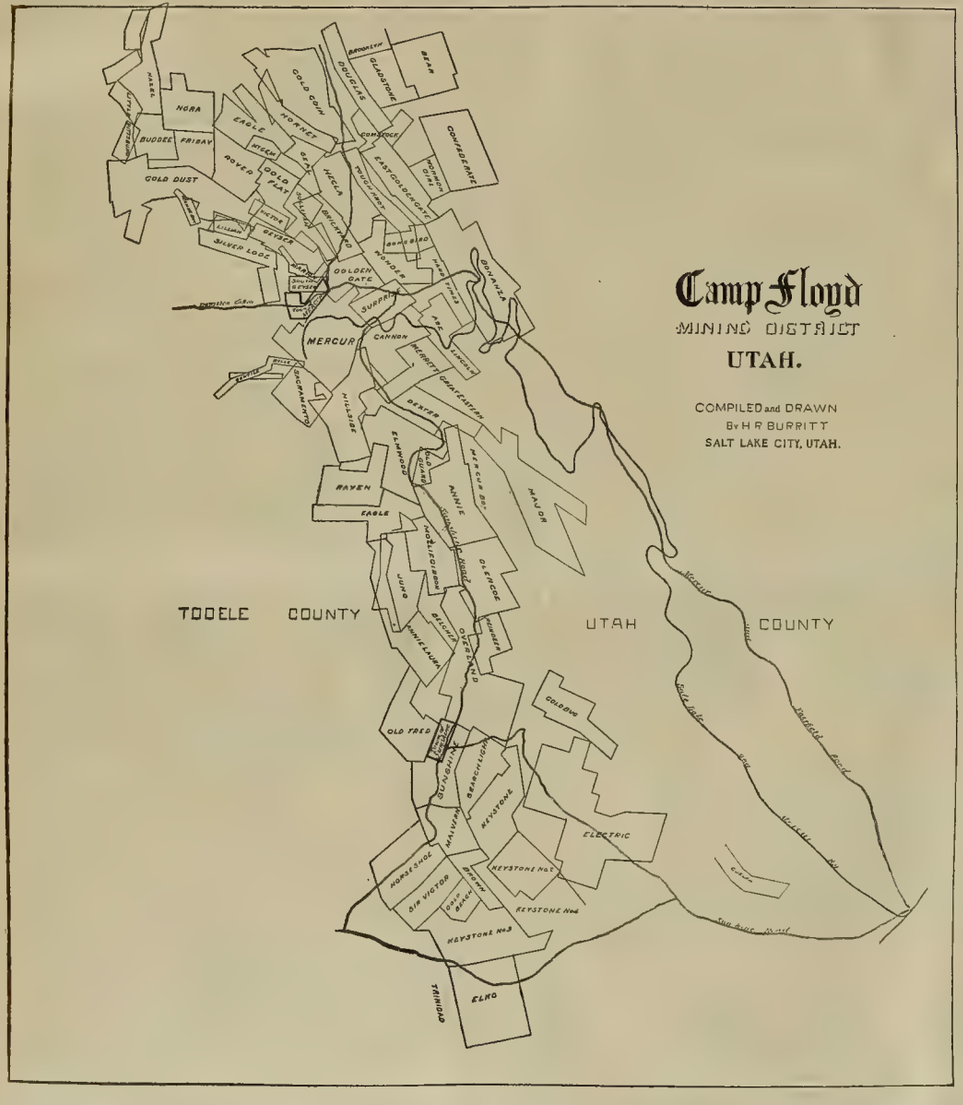
ROASTING FURNACE.—James R. Sears, Stockton, Cal., assignor of one-half to D. C. Matteson of same place. No. 562,158. Dated June 16, 1896. This invention relates to that class of roasting furnace in which the body of ore is slowly passed from one end to the other, through a rotating cylinder. It consists of a horizontal cylindrical chamber extending approximately the length of the furnace, having closed heads at the ends provided with central openings, hollow trunnions extending from the heads to and beyond the outer walls of the furnace and journaled in bearings on wheels, the cylinder having its discharge end slightly lower than the receiving end, a driving mechanism connected with the trunnions at points exterior to the walls of the furnace, whereby the cylinder is rotated from the ends, a heating chamber within which the body of the cylinder is enclosed and through which the trunnions project, supporting rollers at the center of the cylinder and a means for delivering hydrocarbon fuel and burning it beneath the cylinder, with passages through which air is admitted adjacent to the burner. The cylinder has longitudinal hollow triangular ribs, with openings in them and a means for delivering air into these ribs so as to discharge it into the interior of the furnace along with the body of roasting ore.

## "The Johannesburg of America."

An illustrated description of the cyanide process at Mercur, Utah, in the MINING AND SCIENTIFIC PRESS of the 23rd ult. has occasioned so much inquiry about that district that further pictured reference to that part of Utah is in order. On page 521 of this issue appear some portraitures of Camp Floyd district that to a miner are self-explanatory. On this page appear an outline map of the locations in the district and two sectional views of the rock formation.

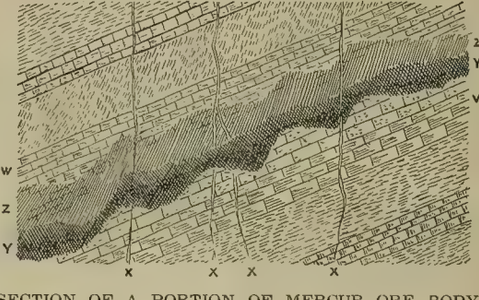
Twenty-five years ago the Camp Floyd Silver M. Co. was organized, the "Sparrow Hawk" mill erected, and about $700,000 expended, about 25 per cent of that amount being realized from the ore. Through the years the camp had its ups and downs, and all sorts of projects had their day, even to a determined and expensive effort in '89 to successfully produce quicksilver. In '92 it was demonstrated that the cyanide process would recover the gold from the "ore carrying gold that the pan could not find," and for the last three years mining for gold has been carried on at a profit. For a description of the process at Mercur the reader is referred to the issue of this paper dated May 23, 1896.

There is some similarity between Leadville and Mercur, in each locality the profitable ore occurring in carboniferous limestone, in association with emptive rock. Mercurites, however, have styled the district "the Johannesburg of America," claiming that the character of the ore, its manner of deposit, the quantity of low-grade ore, and the manner of recovering it, form conditions analogous to the South African gold metropolis. The outline engravings of the rock formation and ore deposit are of interest. Lewiston canyon outcroppings show two ore-bearing zones about 150 feet apart, each dipping from the center of upheaval. In the lower zone silver occurs in the quartzite; in the upper zone gold is found in the limestone and shale, the theory of deposition being that the gold was diffused from below in microscopic particles. Oxidized and arsenical ores are present throughout, the producing mines working on the former; an addition to the plant is now proposed to roast the baser ore in connection with the cyanide treatment—a metallurgical problem that will be of general interest. The Mercur, Geyser, Marion, Sunshine, Sacramento, and Golden Gate works are herewith illustrated. Sunshine is a mine and mill with a townsite of its own, and claims to have the best mill of the lot, the total cost of the sixty-ton plant's ore operations being placed at $2 per ton, which includes mining the ore. In the Sunshine ore there is no trace of silver.



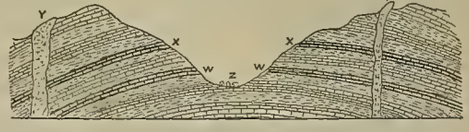



SUNSHINE MINE AND MILL.




SECTION OF A PORTION OF MERCUR ORE BODY.

Y—Ore, With Chert Nodules.
Z—Shaly and Soapy Material.
V—Crystalline Limestone Floor.
W—Drab Limestone Roof.
X—Heavy Spar Veins.




NORTH AND SOUTH SECTION, ACROSS LEWISTON CANON.

Z—Mercur town.
Y—Dikes.
X—Gold-Bearing Zone.
W—Silver-Bearing Zone.

The following figures are believed to be approximately correct:

DAILY ORE TONNAGE.

| *Mines.* | *Tons.* | *Value Per Ton.* | *Loss Per Ton.* | *Gold Extraction.* |
|---|---|---|---|---|
| Mercur | 200 | $14.00 | $2 10 | $2,380 00 |
| Marion | 55 | 9.00 | 1.80 | 396.00 |
| Geyser | 50 | 10.00 | 2.00 | 400.00 |
| Sunshine | 60 | 9.00 | 1.35 | 459.00 |
| Sacramento | 50 | 10.00 | 2.00 | 400.00 |
| Total | | | | $4,035.00 |

Northeast of Mercur the Golden Gate property has by recent development work shown large deposits of oxidized ore that give promise of continued profit. The district furnishes a good example of what can be done by scientific mining methods. Plenty of low-grade ores, intelligent, economial management and facility of transportation make the production of gold as prosaic and legitimate a business as any other department of the commercial world.

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CANADA names its districts on the Arctic ocean Ungara, Franklin, Mackenzie and Yukon. They contain 1,421,000 square miles.

## Glossary of Mining Terms.

*(Continued from L. W. Tatum's Compilation.)*

Dam—A bulkhead.
Day shift—The gang of miners working during the daytime. Night shift, working nights.
Dead quartz—Quartz carrying no mineral.
Dead riches—Base bullion.
Dead work—Work that is not directly productive, as opening up a mine.
Debris—Fragments of rock; mine refuse.
Deep—The lower portion of a vein.
Denouncement—The Mexican or Spanish equivalent to "Location and Record" of a claim.
Deposit—Ore bodies not confined to a lode.
Descension—The theory that the material filling veins came in from above.
Diggings—Name applied to placers being worked.
Dike—A fissure made and filled by plutonic action. Its rock is most commonly porphyry. It is often barren, but in some cases mineralized, or may carry a mineralized selvage and so appear as the wall of a lode.
Divide—Any continuous range of mountains from which the streams flow in opposite directions. The Rocky mountains are called The Great Divide.
Diluvium—A surface deposit of sand, gravel or loam.
Dip—The slope or pitch of a vein or mine, with regard to the plane of the horizon.
Ditch—An artificial water course dug in the earth; a flume or canal.
Divining rod—A stick of witch hazel or other like device used in prospecting for lodes.
Dollar—From the German (thaler) 100 cents. Gold: 23.22 grains, alloy 2.58 grains, weight 25.8 grains; coined 1849-1889. Silver: 371¼ grains, alloy 41¼ grains; weight 412½ grains; coined 1794-1804, 1836-1838, 1840-1873, 1878-1893. Legal tender unlimited. The Mexican dollar contains 377.17 grains silver and 40.62 grains alloy. Spanish dollar the same.—E. O. Leech, Director U. S. Mint.
Down-cast—A ventilating shaft with descending current of air.
Drag—The point of union of two veins which meet without intersecting.
Drift—A tunnel; a horizontal passage underground, driven on or along the vein.
Driving—Extending excavations horizontally.
Drum—The cylinder on which the hoisting cable is wound.
Druse—A cavity lined with crystals.
Dump—A place of deposit for ore or refuse.
Dumb-drift—A gallery which conducts the air around a ventilating furnace to the upcast shaft.
Dyke—A wall-like mass of mineral foreign to the general formation.
Erosion—The act of being gradually worn away. Thus valleys are made by running water.
Escrow—A conditional deed delivered to a third person.
Exploder—A chemical employed for the instantaneous explosion of powder.
Exploitation—Working of a mine; amount of work done.
Eye—The hole in a pick or hammer head for receiving the handle. The top of a shaft.
Face—The end of a drift, tunnel or slope.
Fathom—Six feet square; a fathom of ore is six feet long, six feet high, the width of the vein.
Fault—The displacement of a stratum or vein so that they are not continuous.
Feeder—A small vein joining a larger one.
Feldspar—A viterous crystalline constituent of granite, gneiss, porphyry and many other rocks.
Ferruginous—Relating to iron.
Fire damp—A carburetted hydrogen gas, inflammable and specifically lighter than air.
Fire setting—The process of exposing very hard rock to intense heat, rendering it thereby easier of breaking down.
Fissure vein—A crack or cleft in the earth's crust filled with mineral matter, both walls having same geological formation.
Float—Loose ore or rock detached from the original formation and found below it.
Float gold—Fine particles of gold difficult to precipitate or amalgamate.
Flour gold—Gold in a very fine state of division; difficult to save by ordinary milling processes.
Floor—The rock underlying a horizontal vein or deposit; the stratum below a mineral bed.
Flume—A pipe or trough to convey water.
Flux—Substance used to promote the fusion of ores.
Footwall—Layer of rock immediately beneath the vein.
Forfeiture—A failure to comply with the laws prescribing the quantity of work.
Formation—A term applied to the country rock traversed by veins.
Free—A term employed in speaking of metals in ores, as free-milling gold or silver ores.
Free gold—Gold uncombined with other substance.
Free milling—Ores containing mineral that will separate from the gangue by simple methods.
Free silver—Silver uncombined with other substances.
Freestone—Sandstone easily dressed.
Fuse—A tube, ribbon or wire filled or saturated with a combustible compound, used for exploding powder.
Fusion—The state of melting.

*(To be Continued.)*

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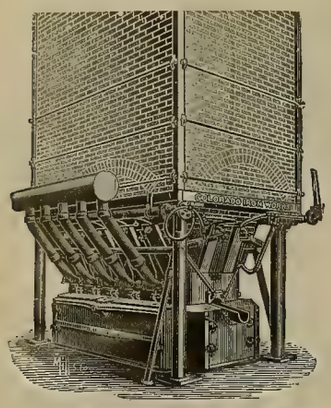
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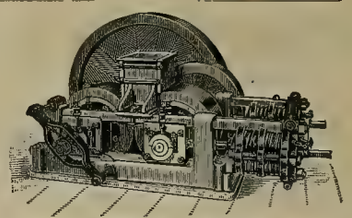
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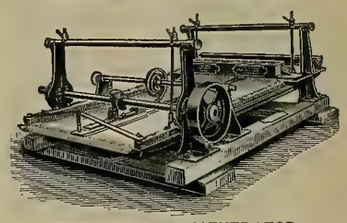
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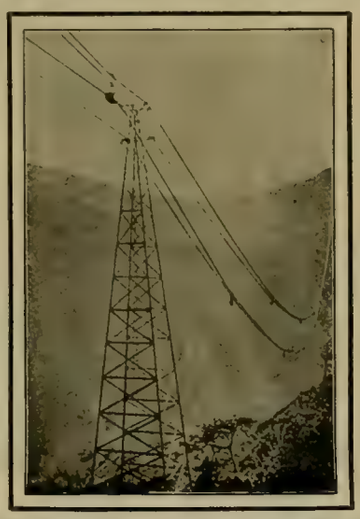
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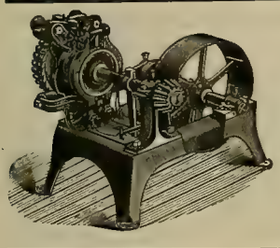
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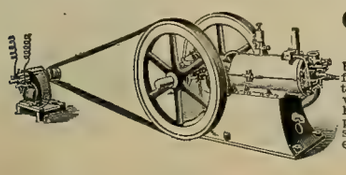


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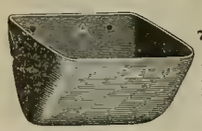
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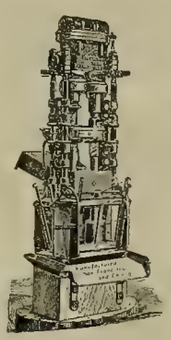
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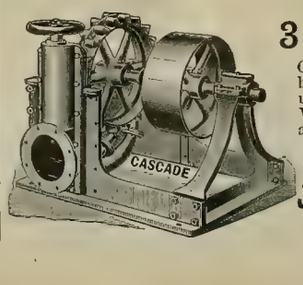


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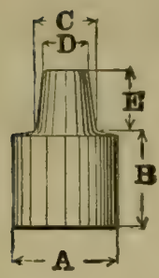
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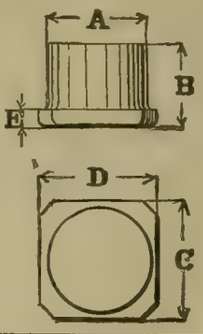

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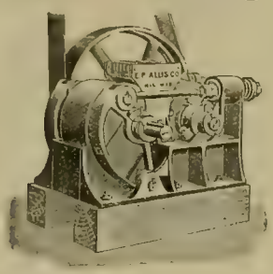
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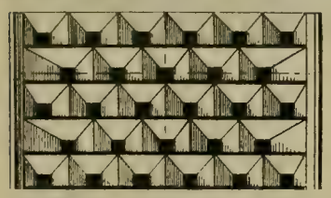


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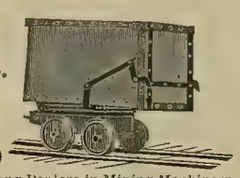
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OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American reports, with full copies of U. S. patents since 1872. All worthy inventions patented through Dewey & Co's Patent Agency will have the benefit of a description in the *Mining and Scientific Press.* We transact every branch of patent business, and obtain patents in all countries which grant protection to inventors. The large majority of U. S. and foreign patents issued to inventors on the Pacific Coast have been obtained through our agency. We can give the best and *most reliable* advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior.

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## Coast Industrial Notes.

—The oil refinery at Ventura is turning out a fair product of illuminating oil.

—Mendocino county reported a sale of wool this week aggregating 275,843 pounds, at 9c to 10½c a pound.

—The lumber cargo shipments from Oregon and California to San Francisco in May aggregated 19,278,611 feet.

—The present number of men at work in the Vallejo docks and yards (800) will be increased to 1000 on July 1st.

—It is estimated that the prune crop in California this year will exceed 60,000,000 pounds of cured fruit. In Oregon the prune crop is reported to be a failure.

—The S. F. & S. J. V. R. R. is completed to fourteen miles south of Merced, a total mileage of seventy-nine miles from Stockton. The road is expected to be finished to Fresno by Sept. 1st.

—The differences between the salmon cannerymen and fishermen on the lower Columbia river have been adjusted, and there is now a daily catch of nearly $10,000 worth of salmon near Astoria, Or.

—The Utah and California Railroad has filed a map in the United States Land Office in Carson, Nevada, showing the course of the road from Milford, Utah, entering Nevada in Clover valley, running through Lincoln county, thence through California to Los Angeles.

—The Corral Hollow Railway is in active operation, trains running between Stockton and the mine. Jos. Treadwell says he will begin taking out coal August 15th, and will employ 2,000 men. The present thirty-six miles of railway will, he says, be ultimately extended to San Francisco.

—The Gold State Oil Co. of Fresno has incorporated; capital stock $5,000,000; J. M. Guffey, Pittsburg, president; F. Barrett, Selma, vice president; J. M. Cooper, secretary. The company has located 17,000 acres at Coalinga and is locally credited with the intention to bore one hundred wells this year.

—The Redlands Orange Growers' Association shipped this year 6,000,000 pounds of oranges of which about two-thirds were navels. The total number of boxes shipped was 83,728, or 279 cars of 300 boxes each. The last shipment for the season was made last week and consisted of two cars of Valencia lates, which were sold at $3 per box f. o. b.

—Traffic Manager J. C. Stubbs says that the Southern Pacific will shortly make Galveston the entrepot for its Atlantic Steamship line instead of New Orleans. As soon as the Charleston harbor shall have been dredged to the proper depth the Morgan Line of steamers will carry transcontinental freight to that port, thus reducing the rail haul by 311 miles and giving the Sunset route a greater competing advantage. It is said that the Southern Pacific will extend its lines from Houston to Galveston, instead of using the Gulf, Colorado and Santa Fe between those points, as it does at present.

—The report of the Southern Pacific Co. for the year ending December 31st, 1895, shows that the net earnings per mile of road have decreased from $5763.97 in 1872 to $2296.62 in 1895. The decrease in the net earnings is explained by the decrease in the receipts per ton, all of which is attributed to reduced freight rates. The figures show that the traffic has increased and the net earnings at the same time have decreased. During the eleven years which the Southern Pacific Co. has been operating the lines and branches which comprise the system it has accumulated a surplus of $10,160,712.78. The total net earnings during that time have been $25,243,622.51; of this amount $15,082,909.73 has been spent for betterments and additions.

—Very little merchandise is now imported from the United States into Mexico. Mexicans get their machinery mostly from England, except that used in mines; Germany furnishes hardware, crockery and house furnishings; dry goods come from France, and they import most of their groceries from Italy. The high charges for hauling freight from the United States is one thing that keeps Mexicans from trading with their northern neighbors. It costs only 14 shillings, $3.50, to ship a ton of freight from an English port, which is cheaper than the same ton of freight could be brought by water from the United States. Buying goods in the inland United States cities is almost out of the question, for the rate for hauling by rail places everything out of their reach. If both republics were doing business on the same financial basis, most of the difficulties that now stand in the way of close trading would soon vanish.

—The "Dressed Lumber Case" has been a topic of considerable importance to the coast. The United States Circuit Court, District of Vermont, has just reversed its former ruling and rendered a decision which practically admits all lumber free. The following is the decision as rendered: The appellant imported inch boards and 3-inch plank, planed on both sides and tongued and grooved. The collector assessed a duty of 25 per cent on it as a manufacturer of wood, under paragraph 181; the appellant protested that it was free under paragraph 676; the board of general appraisers found, on the opinion of twenty-four witnesses out of forty-six examined by them, "that the merchandise is not commercially known as dressed lumber, but has passed beyond that description by the process of tongueing and grooving, which are additional to dressing," and affirmed the classification of the collector. The testimony of another witness to the contrary has been taken since. That this material is still lumber and is bought and sold by the thousand feet, as lumber, nearly all the witnesses agree; that it is not akin to the articles of wood mentioned in paragraph 181 is quite apparent. That paragraph expressly refers to house or cabinet furniture wood, wholly or partly finished; and then to manufactures of wood without reference to the extent of finishing, thereby implying that these are referred to as finished. Manufactures of wood are articles made of wood and completed into things different from what the wood of which they are made was before. Hantranft vs. Wiegman, 121 U. S. 609; Maddock vs. Magone, 152 U. S. 368. Paragraph 676 does not refer either to sawed lumber or to dressed lumber by itself, but after naming sawed boards and plank, which the two kinds of this importation are, it mentions other lumber, rough or dressed, which must mean, as lumber is divided into two classes, rough or dressed, all other lumber whether rough or dressed. This is lumber dressed for use, and has not been made into anything beyond lumber so dressed. Articles used for kindred purposes, and which are completed things having names of their own which would not be included under the general head of lumber, are expressly placed on the free list in this schedule, indicating an intention that all those should be free. Neither sawed nor dressed lumber is usually dealt in by those names, but by what it is wanted for, so this is not a question of trade names, but of what the material is. If it is dressed lumber in fact, it is free. Robertson vs. Perkins, 129 U. S. 233. The finding of the board of appraisers upon conflicting evidence is entitled to great weight, but they did not have all the witnesses before them; and the evidence and their finding fall short of really showing that these are completed manufactures of wood. Passing them beyond dressed lumber by tongueing and grooving does not make them anything else. Classification reversed.

## Personal.

THOS. PRICE has returned from Gibsonville, Cal.

J. F. WARDNER is at Granite Basin, Plumas county.

GEO. E. AMES has returned from Los Angeles.

T. L. PETERSON is Idaho's new State mine inspector.

JOHN PARR is the new superintendent of the Bodie mine.

CAPT. A. H. WARD returned to his Mariposa property yesterday.

CURTIS LINDLEY goes to London this week on mining business.

E. B. DORSEY is in Mariposa Co., making inquiry concerning the grant.

HAMILTON SMITH is returning to London via Cripple Creek and New York.

SAMUEL ROWE is now foreman of the White Swan M. & M. Co., Baker City, Or.

E. K. STEVENOT, of this city is superintending operations at the Unity mine, El Dorado Co.

JOHN HAYS HAMMOND left Capetown, South Africa, last Wednesday for California via England.

A. D. FOOTE succeeds R. R. Roberts as superintendent of the North Star Mining Co., Nevada Co.

H. M. LANE goes this week as assistant engineer in charge of the Great Falls, Mont., Iron Works plant.

W. H. STORMS, of the State Mining Bureau, has returned from an official tour through Southern California.

SAMUEL J. HENDY, president Joshua Hendy Machine Works, has returned from a business trip through Colorado.

BARNEY BARNATO, of South African fame, is said to be turning his attention to British Columbia mining investments.

GEN. WADE HAMPTON, U. S. Railway Commissioner, is expected here next Saturday on his annual tour through the country.

W. F. ENGLEBRIGHT, of Nevada City, Cal., has completed the survey for the new dam to be built by the South Yuba Water Co.

R. C. CAMPBELL returned from Red Rock, Montana, last Wednesday, and left the following day for the Quesnelle, Cariboo, B. C.

EDWARD SHAMP has been appointed Gen. Supt. of Maricopa, Phœnix and Salt River Valley Railway, vice G. H. Honshell, resigned.

GENERAL LAND OFFICE COMMISSIONER LAMOUREAUX was in the city this week. He is making an inspection of the several land offices of the country.

F. W. MAACK, formerly foreman at the Golden Butterfly at Morris Ravine, Butte Co., has gone to the Copper Queen mine at Bisbee, Arizona.

PRINCE PONIATOWSKI has returned from England, accompanied by Messrs. Doris & Tarbutt, of London, who represent English capital enlisted in recent Tuolumne county mining enterprises.

LEGH HARNETT, correspondent of this paper twenty years ago, and well known to all the old miners of northern California and Oregon, died at Wolf Creek, Or., last week, in the 70th year of his age.

CAPTAIN THOS. MEIN of the Robinson mine and Charles Butters, managing director of the Rand Central Ore Reduction Company, have arrived in England from South Africa on their way to California.

THE Redding *Searchlight* says the Mountain Mines Co., of Shasta, have engaged "Mr. Keller, of Montana, who will receive a salary of $600 per month and be in complete charge of the mine and smelter."

E. J. MURRAY, of this city, this week assumes charge of a mining property four miles north of Shasta for San Francisco men who will spend $15,000 developing the property before putting up a mill. The purchase was completed last Tuesday.

JUSTICE FIELD, who is now in his thirty-sixth year of service as one of the justices of the Supreme Court of the United States, says he has no intention of resigning. In a few months he will have the longest record of any member of that tribunal.


THE HARRINGTON & KING PERFORATING CO. CHICAGO.



METALS PERFORATED AS REQUIRED FOR

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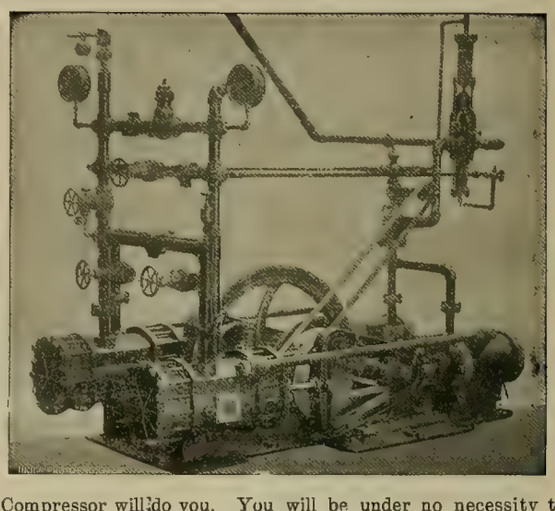
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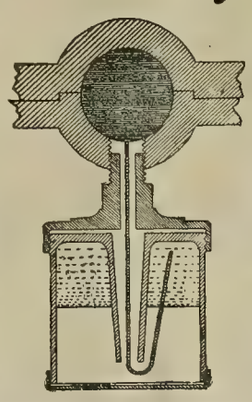
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This is a cut of the Double Pipe AirCompressor, the Compressor that is guaranteed to save 30% in power over any other make. It is cheapest to buy, cheapest to carry about and cheapest to run. If your fuel or water costs you anything, you want this Compressor. If you can get railroad freights free, and can carry machinery to your mine without cost, and your power costs you nothing, any make of Compressor will do you. You will be under no necessity to write to PNEUMATIC POWER CO., at 306 Pine St., San Francisco, Cal. We could save you money, though, in cost of foundations, as our Compressors are half the size of other makes.

Positively Reduces Oil Bills 75 Per Cent.



THE FINCH OIL CUP.

Frictional vibration by the motion of the shaft against the point of the wire causes the oil to flow, and that this flow is not produced simply by syphonic or capillary action but by frictional vibration is proven by the fact that if the wire does not rest on the shaft then the oil will not flow. When the machinery stops the feed stops, therefore **the Finch Cup is Absolutely Automatic, Feeds Enough Oil and No More, Prevents All Waste, Needs Very Little Attention.**

Read One of the Many Testimonials:

UNION GAS ENGINE CO. SAN FRANCISCO, July 19, 1894.

During the past three years we have used your Cups for the crank shaft bearings of our engines, and also on all bearings of shaftings and tools in the shop. Our engines now *require no attention* except to fill the Cups occasionally, and therefore we can cheerfully recommend the Finch Cups to any one as *being the best in the market.*

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General Agent for Pacific Coast. Send for Circular.

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SAN FRANCISCO, CAL.

## Commercial Paragraphs.

A Dow pump, 4-inch suction, 3-inch discharge, is unwatering the Butts mine, Angels, Calaveras Co.

Mr. Jones has completed a new mill of his own design at the National Iron Works, Main and Beale streets, this city.

Superintendent Strong of the Adelaide mine, at Robinson's Ferry, Calaveras Co., has set up a Kinkead mill on the property.

The Westinghouse Electric and Manufacturing Company has declared a quarterly dividend of one and three-quarters per cent on preferred stock, payable July 1.

D. B. Hanson, the San Francisco representative of the Edward P. Allis Co., has furnished the Western Lumber Co., of Portland, Or., a complete band mill to take the place of the one recently destroyed.

At Seattle, Wash., Moran Bros. are getting on in the building of the revenue cutter Golden Gate and the torpedo boat, which is to develop a speed of 26 knots an hour. The two are to be finished Jan. 1st, '97.

The Electrical Engineering Co., 34 Main St., this city, this week put in a double worm-gear electric elevator hoist, to run an electric elevator corner Leidesdorff and California streets, which is to be swift and noiseless. The Electrical Engineering Company is meeting with considerable success in this and other branches of electrical work in this city and elsewhere.

One of the most important electric power installations in the country has been completed and started up. The station is located in the Big Cottonwood canyon, 14 miles from Salt Lake City, where 3,400 cubic feet of water per minute is available at the lowest stage, which will produce 2,450 horse power. The water is brought to the wheels through 2,000 feet of 48-inch pipe, made of plate steel, varying from $\frac{1}{4}$-inch to $\frac{3}{4}$-inch in thickness. The power station consists of four 60-inch Pelton wheels, capacity of 650 H. P. each, running under 370 feet head at 300 revolutions. These wheels are direct-connected to four General Electric generators, three-phase type. Special wheels are provided for running the exciters. The power thus generated is transmitted to Salt Lake City and used for running an extensive street railroad system, as also for lighting the city and for general power purposes. An additional water supply is available, which it is proposed to utilize later, increasing the capacity of the station to 5,000 H. P. These works have involved an outlay of something over $500,000, all of which has been furnished by Salt Lake capitalists. Contracts for power have already been made amounting to more than $100,000 per year, with a surplus of power yet to be disposed of. It is expected that the investment will pay 20 per cent per annum over operating expenses.

## Recent California Mining Incorporations.

Dolly G. M. and M. Co., San Francisco; capital stock, $2,500,000; $625 subscribed; same directors as North Star G. M. and M. Co.

Spencer Gold Mining Company, S. F.; capital stock, $100,000; $1000 subscribed; P. J. G. Kenna, J. H. Page, G. M. Foote, J. G. Johnson, E. A. Crepin.

Harrison Gold Mining Company, S. F.; capital stock, $100,000; $2000 subscribed: C. R. Bishop, J. Tyson, W. Thomas, W. M. Rank, W. H. Chickering.

Del Ray G. M. Co., Jackson, Amador Co.; capital stock, $300,000; A. and K. McIntosh, Menlo Park; L. V. Lonsway, G. W. Morrow, J. Wilson, Jackson.

Dividend G. M. Co., San Francisco; capital stock, $500,000, $25 subscribed; C. F. Bunker, H. Nolt, A. Walsh, San Francisco; S. P. Mesick, Alameda; G. M. Foote, Hollister.

Dividend G. M. Co., San Francisco; capital stock, $500,000; $25 subscribed; S. P. Mesick, Alameda; G. M. Foote, Hollister; H. Holt, A. Walsh, C. F. Brinker, San Francisco.

Harrison G. M. Co., San Francisco; capital stock, $100,000; subscribed $2000; C. R. Bishop, J. Tyson, W. Thomas, San Francisco; W. M. Rank, W. H. Chickering, Oakland.

Golden Eagle Mining Company, Red Bluff; capital stock, $1,000,000; all subscribed; J. B. Woolson, C. W. Vestal, J. C. Cowles, S. Cameron, T. N. Kincaid, D. K. Eubanks, Red Bluff.

North Star G. M. and M. Co., San Francisco; capital stock, $2,500,000; $625 subscribed; G. H. Sanford, Lincoln, Nebraska; L. E. and H. L. Van Winkle, J. W. Douglas, R. H. Gray, San Francisco.

Spring Gulch and Minersville Consolidated Hydraulic Mining Company, Douglas City; capital stock, $100,000; $80,000 subscribed; A. G. Dunbar, S. J. Thayer, M. C. Jordan, F. C. Dunbar, H. Score, Douglas City.

Mackay Gold and Silver Mining Company, S. F., to mine in the Virginia mining district, Storey county, Nev.; P. J. Keyes, Virginia, Nev.; and J. M. Dor Mer, W. T. O'Neale, R. M. Daggett, T. Eagar, San Francisco; capital stock, $15,000,000; all subscribed.


**"HISTORY OF CRIPPLE CREEK."**

We have just issued in book form the only authentic and reliable history of Cripple Creek gold camp, the marvel of the mining world. The book contains numerous full-page illustrations (with map) of gold mines true to life. With the sole object of introducing our big 8-page 56-column illustrated weekly paper (established 1890) we will send a copy of the above interesting book free to all who send us 25c (stamps or silver), for a 3 months' (13 weeks) trial subscription to our big weekly, which contains the latest mining news and illustrations of Rocky mountain scenery. Club of 5 and 5 books, $1. Mention The Press and address, *Illustrated Weekly*, Denver, Colo.


## Recently Declared Mining Dividends.

The Ontario mine, Utah, pays a dividend of 10 cents per share ($15,000) next Tuesday.

The Union mine, Colorado, paid an $11,000 dividend last Tuesday.

The Elkton Con. mine, Montana, paid a $10,000 dividend on the 20th.

The Smuggler Union Mining Company, Colorado, pays a dividend of $1 per share next Wednesday.

The Homestake mine, South Dakota, paid a dividend of $31,250 last Thursday.

The Isabella gold mine, Colorado, paid a dividend of $22,500 on the 25th.


Unitarian literature sent free on application. Address Postoffice Mission Committee, First Unitarian Church, corner Geary and Franklin streets, San Francisco. Mention this paper.

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DO ALL OUR OWN EXPERT AND CHEMICAL WORK.


## DIVIDEND NOTICE.


**The German Savings and Loan Society,**

526 CALIFORNIA STREET.

For the half year ending June 30, 1896, a dividend has been declared at the rate of four and twenty-six hundredths (4.26) per cent per annum on Term deposits, and three and fifty-five hundredths (3.55) per cent per annum on Ordinary deposits, free of taxes, payable on and after Wednesday, July 1, 1896. GEO. TOURNY, Secretary.


## DIVIDEND NOTICE.


**SAN FRANCISCO SAVINGS UNION,**

532 California Street, Cor. Webb.

For the half year ending with the 30th of June, 1896, a dividend has been declared at the rate per annum of Four and thirty-two one hundredths (4.32) per cent on Term Deposits and Three and sixty one-hundredths (3.60) per cent on Ordinary Deposits, free of taxes, payable on and after Wednesday, the 1st of July, 1896. LOVELL WHITE, Cashier.

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**GOLD MINING PROPERTIES.**

Having thoroughly canvassed this section of country during the past seven months, I am enabled to furnish valuable information to capitalists desirous of bonding or purchasing meritorious mining properties in El Dorado county. Prospects, partially or wholly developed properties, or purchasable interests ready for operation but lacking capital, can be had on favorable terms. Address, A. E. HAMILTON, P. O. Box 66, Placerville, Cal.

**WANTED.**

For free milling and smelting property (gold) near Prescott, Arizona, competent mine superintendent who can make his own assays and run his own levels. Must have gilt-edged references; developed property. Address,

**L. A. DAVIES,**

**189 La Salle Street.....CHICAGO, ILL.**

**An Experienced Millman**

Desires position in mill; understands concentrators; has had 8 years' experience. Address Amalgamator, care Mining and Scientific Press.

**WANTED.**—Position with Mining Company, by man competent to do the engineering and assaying. C. H. B., care J. McNeil, 1715 Bay St., San Francisco, Cal

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All right; you need **CHEAP Power. One Cent per Horse Power per Hour is CHEAP. Weber Gasoline Engines** *run anything. "Economy in Power" is our motto. For Catalogue and testimonials address* **WEBER GAS & GASOLINE ENGINE CO.,** *450 Southwest Boulevard,* **Kansas City, Mo**



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Consign shipments to Vallejo Junction, Cal.

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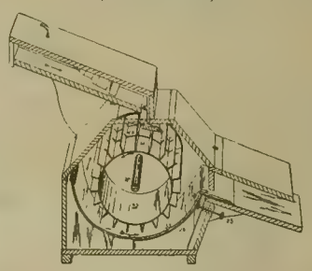
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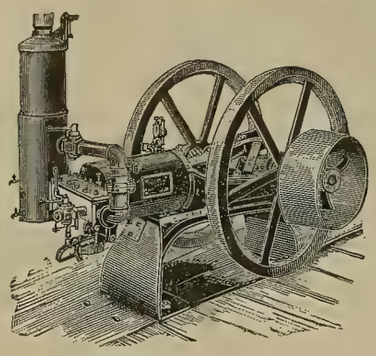
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THIS IS WHAT THEY CAN DO:

**Will furnish power for one-tenth of a cent per horse power per hour. It is the cheapest power ever produced, as shown in the following table, and which is based upon a test of ten hours' run with one of our five-horse power Gasoline Engines,** using gasoline (74°), coal gas, common domestic coal oil, crude petroleum, asphaltum base, crude petroleum, paraffine base, as follows:

| | |
|---|---|
| Coal Gas, ten hours' run, 1000 feet | $2 00 |
| Gasoline (74 deg.), ten hours' run, 8¾ gallons @ 14c. | 1 25 |
| Coal Oil, ten hours' run, 7½ gallons @ 10c | 75 |
| Crude Petroleum, asphaltum base, 16 gallons @ 3c | 48 |
| Crude Petroleum (36 deg.), paraffine base, 13 gallons @ 5c | 65 |

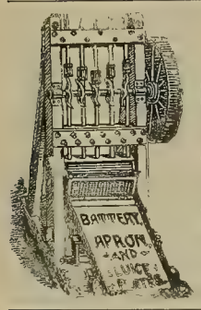
On the crude petroleum with asphaltum base we had an over-product of 7 gallons of asphaltum; the market price is 3 cents per gallon—21 cents. This deducted from the first cost of the crude petroleum for ten hours' run leaves a net balance of 27 cents. And from the crude oil with a paraffine base we had an over-product of 3 gallons of good lubricating oil, which we consider equal to any we have ever used, but will estimate its value conservatively at 20 cents per gallon, making 60 cents; this deducted from the first cost of the crude oil leaves a balance of 5 cents, total cost of running ten hours.

It will be readily seen that the operation of these Engines with crude petroleum reduces the cost of operation to a minimum. Crude petroleum with paraffine base at 1-10c per horse power per hour; on crude petroleum, asphaltum base, ¼c per horse power per hour; on domestic coal oil, 1¼c per horse power per hour; and on gasoline, 2½c per horse power per hour.

SEND FOR CIRCULARS AND PRICE LISTS.

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Silver Plated Copper Amalgam Plates

For Saving Gold.

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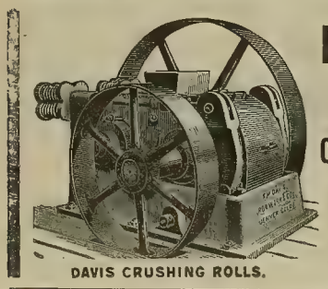
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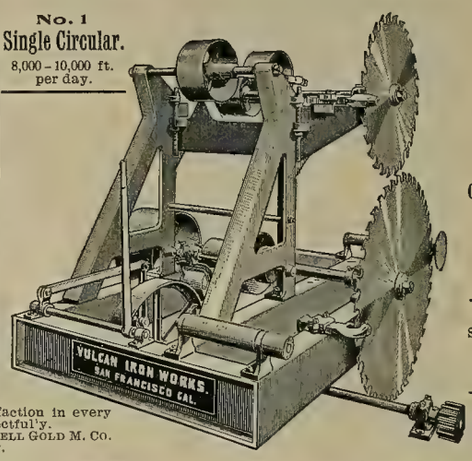
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**No. 0 Single Circular.** 4000–6000 feet per day.

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Alaska Treadwell Gold Mining Co.
SAN FRANCISCO.
Feb. 20, 1896.

*Vulcan Iron Works,*

GENTLEMEN: Our Double Circular Saw Mill of about 20,000 feet daily capacity, for which you made plans and built the machinery complete, including a set of three 6-inch beam Vulcan Head Blocks, 60-inch opening, has given us complete satisfaction in every respect. Respectfully,

ALASKA TREADWELL GOLD M. CO.
A. T. CORBUS, Sec'y.

For Mining Companies —OR— Other Consumers of Lumber at Remote Points.

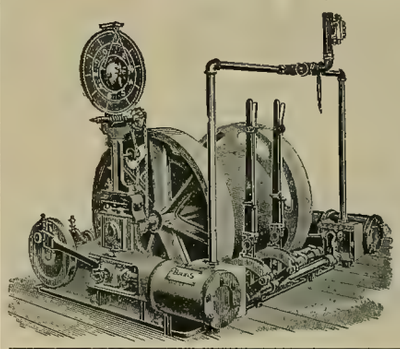
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# Hendrie & Bolthoff Mfg. Co.,

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LATEST IMPROVED

Patent Friction Hoisting ENGINES,

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IMPROVED GOLD STAMP MILLS.

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A SUPERIOR ARTICLE AT A SMALL COST.

250 Square Feet, with Nails and Paint Complete.....$4.00

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CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.





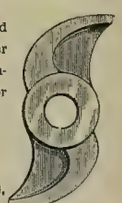


These castings are extensively used in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to the above conditions. When ordering, send sketch with exact dimensions. Send for Illustrated Circular.

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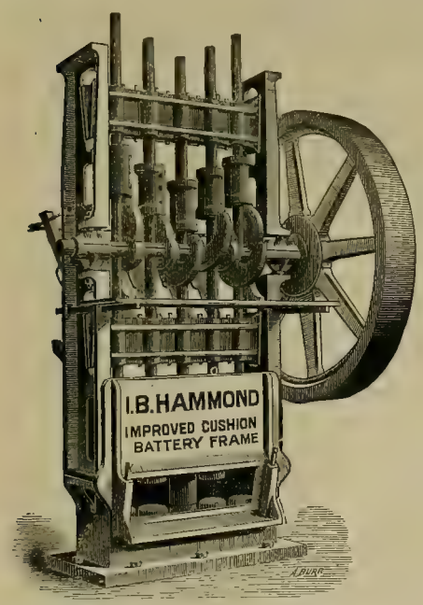
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Improved Self-Contained Cushion-Frame Five-Stamp Mill.
Patented in the United States and Foreign Countries.

**The Improved, Iron-Frame, Self-Contained, Cushion-Frame, Five-Stamp Mill Saves Bills for Heavy Timbers, Millwright and Mechanics' Labor, and a Large Amount of Space. The term "Setf-Contained" Means a Great Deal to the Mine Owner, and Can Be Readily Recognized and Appreciated in Making an Estimate For an Ordinary Five-Stamp Plant, When the Comparative Cost is Considered Over a Wood-Frame Mill.**

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**SECOND: The Saving in Mill-Wright and Mechanics' Labor in Framing and Erecting.**

**THIRD: The Large Amount of Space Saved.**

Late improvements in the amalgamation and concentration of ores enable us to offer to the mining public, in connection with our Self-Contained Mills, an apparatus which amalgamates and concentrates at the same operation and provides a perfect trap for escaping quicksilver. Write to us for information.

Send for Catalogue and Price List.

CORRESPONDENCE SOLICITED.

# W. A. WEIGELE PIPE WORKS.

Telephone 1312

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FOR WATER WORKS, WATER POWERS, ETC.

Sixty Thousand Feet of Steel Pipe Made in 1895.

**SHEET STEEL WORK of all kinds.**

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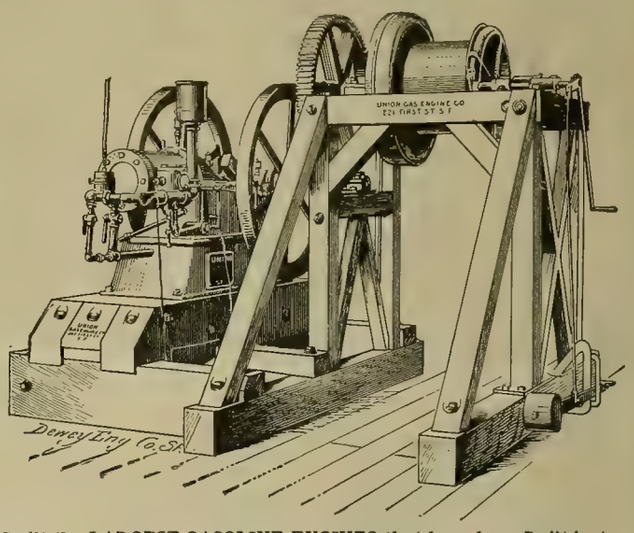
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Dr. J. C. Anthony, of 86 and 87 Chronicle Building, who for the past four years has met with universal success in the cure of Ruptures, now guarantees a cure in from 10 to 16 days. There is no pain, no blood drawn and absoutely without danger. Usually but a single treatment required.

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309-311 Howard Street, San Francisco, Cal.,



Have Built the LARGEST GASOLINE ENGINES that have been Built in America.

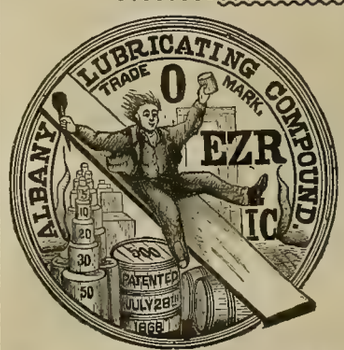
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Engines for Stamp Mills, Hoisting and Pumping for Mines a Specialty.

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## ALBANY

LUBRICATING COMPOUND

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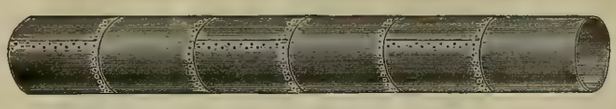
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# Mining Pipe!



**STEEL OR IRON.**—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior in none.
**COATING.**—We use great care in COATING our pipe with a HOT solution of Double Refined Asphaltum and Maltha.
**COMPETITORS.**—Our competitors say we have the best appointed Pipe Shop on the Coast.

**SCHAW, INGRAM, BATCHER & CO., Hardware Merchants,**
SACRAMENTO, CAL.

# Market Reports.

## The Markets.

SAN FRANCISCO, June 25, 1896.

For this time of the year business is good, with orders coming in from all sections. Manufactures report good orders in hand. Iron manufacturers, as a rule, state they have more orders in hand than for several years past. The work is chiefly for machinery and structural purposes. The opinion prevails that notwithstanding this is a national election year there will be good business, better than for fully half a decade. There is a continued good inquiry for gold mining properties. Referring to this inquiry the New York *Wall Street Journal* says: "People with information as to mining speculation in Colorado say there have been a number of important sales of blocks of Colorado mines recently in France, which ordinarily would have attracted attention if the sales had been made to New York houses. There is quite a temper in France to invest in American mines and western people are dealing direct with foreign bankers which is the reason for the transactions here. Western mining brokers say that Eastern people do not begin to investigate and invest with the enthusiasm foreigners are showing."

The local money market is easy with only a moderate call reported by banks. For crop moving some engagements are reported, but so far they do not aggregate as much as in former years. The general impression is that, as a rule, farmers will meet the market, and not store in expectation of better times. The rates of interest are unchanged. The East reports a dull money market, but bankers are hopeful of a much better demand before long. Time money rates were, at last advices, steady, but call money rates are easy.

**New York Silver Prices.**

NEW YORK, June 25.—Following are the closing prices for the week:

| | Silver in London. | Silver in N. Y. |
|---|---|---|
| Friday | 31 7-16 | 68¾ |
| Saturday | 31 7-16 | 68¾ |
| Monday | 31 7-16 | 68¾ |
| Tuesday | 31 7-16 | 68¾ |
| Wednesday | 31½ | 68⅞ |
| Thursday | 31 9-16 | 69⅛ |

| | Copper. | Lead. | Iron. | Tin. |
|---|---|---|---|---|
| Friday | 11 75 | 2 90 | 10 75@13 00 | 13 35 |
| Saturday | 11 75 | 2 90 | 10 75@13 00 | 13 40 |
| Monday | 11 75 | 2 92½ | 10 50@13 00 | 13 50 |
| Tuesday | 12 25 | 3 00 | 10 50@12 50 | 13 50 |
| Wednesday | 12 00 | 3 00 | 10 50@12 50 | 13 50 |

The local bullion, money and exchange quotations current are as follows:

| | |
|---|---|
| Commercial Loans, % per annum | 7@8 |
| Commercial Loans, prime | 6@8 |
| Call Loans, gilt edged | 6@7 |
| Call Loans, mixed securities | 7@8 |
| Mortgages, prime, taxes paid by lender | 6@8 |
| New York Sight Draft | 12½ |
| New York Telegraphic Transfer | 15 |
| London Bankers' 60 days | $4.88¼ |
| London Merchants | $4.86¾ |
| London Sight Bankers | $4.89½ |
| Refined Silver, per oz., 1000 fine | 68⅜ |
| Mexican Dollars | 54@55c |

SILVER.—The market is stronger, with an advancing tendency. A New York exchange just to hand says: "Japan is buying silver, her purchases being confined to the San Francisco market at present. Brokers there, however, do some arbitrage business with Denver and New York. It was the supplying of these orders this week which kept the usual supply from the London market and led to the strength there in quotations yesterday. The New York market is expected to show strength under this buying in spite of the defeat of the cause of silver in the Republican platform." The last steamer for the Orient took out $90,000 in bars for Hongkong and $153,885 for Japan. The impression grows that during the coming presidential election there will be a silver campaign which, it is claimed, will advance the market value of the white metal at home and abroad.

MEXICAN DOLLARS.—There is a fair inquiry. The last steamer for China took out 134,318 dollars.

COPPER.—There is no change in our market, which holds strong at quotations. At the East prices are a shade higher. A New York exchange of June 15th says: "Shipments to Europe have been very heavy during the week, amounting to about 2,700 tons, and making a total of nearly 5,060 tons shipped since the beginning of the month. In the face of this remarkable movement values have advanced in the foreign market. Last cables quoted merchant bars in London at £48 17s 6d for prompt delivery, and the records show that over 7,000 tons, in warrants, changed hands there in the five business days. Electrolytic is quoted at 11⅛@11¼c and casting copper at 10⅝@10¾c, according to brand. Home consumers have placed fair orders for the several varieties of the metal, but export business is still the mainstay of the market.

The market is quoted as follows:

| | |
|---|---|
| Bolt | ¼ & 5-16, 20c; ⅜ and larger, 17c |
| Lake Superior Sheathing | 20 |
| Ingot, jobbing | 13 |
| Ingot, wholesale | 12 |
| Sheet copper | 17 |

QUICKSILVER.—There is an impression in some quarters that the market will do better the coming fall. This opinion is doubtless based on reports of the Rothschilds having virtually secured control of the Spanish mines through a loan to that government.

The market is quoted as follows:

| | |
|---|---|
| Home trade, per flask | 37 00 |
| Distant points up north | 36 25@37 00 |
| West coast of Mexico, for export | 32 50 |

ANTIMONY.—The demand is steady, with the market easy at 8@9c in a jobbing way. New York mail advices quote 7¼@7¾c for Cookson's, 6½c for Hallett's and 6½c for Japanese, from store.

TIN.—The market for both pig and plate is essentially unchanged. The European markets show a hardening tendency for the former.

The market is quoted as follows:

| | |
|---|---|
| Pig, per lb | 14½c |
| Plate, I C coke, heavy, per box | $4 25 |
| " " " light, " | 4 10 |

BORAX.—The market is quoted as follows

| | |
|---|---|
| Refined, in car lots | 6¼ |
| Refined, in sacks | 5¾ |
| Powdered, in car lots | 6¼ |
| Concentrated, " | 5⅞ |

IRON. — Our market is essentially unchanged. New York advices report that Southern iron was offered at a reduction of from 50 to 75 cents per ton. An authority there writes that the trade is in very different shape than formerly, owing to the existence of numerous combinations. These have, up to date, held together well, and he sees no reason to doubt their ability to continue in view of a change in the currency situation. He says that they form an excellent basis for improvement.

Our market is quoted as follows:

AMERICAN.

| | To Arrive. | Spot. |
|---|---|---|
| Sloso | $21 00 | $23 50 |
| Thomas | 22 00 | 23 50 |
| Salisbury | 30 00 | 33 00 |

ENGLISH.

| | | | |
|---|---|---|---|
| Barrow | $21 00 | | $23 50 |
| Gartsherrie | 21 50 | | 23 50 |

LEAD.—Our market is reported unchanged, but Eastern markets have strengthened slightly.

| | | | |
|---|---|---|---|
| Pig | 3 75 | @ | 4 00 |
| Bar | — | @ | 4 15 |
| Sheet | — | @ | 5 50 |
| Pipe | — | @ | 4 75 |

SHOT.—The market is quoted as follows:

| | |
|---|---|
| Drop, sizes smaller than B, per bag of 25 lbs | $1 40 |
| Drop, B and larger sizes, " " | 1 65 |
| Buck, Balls and Chilled, do, " " | 1 65 |

POWDER.—Eastern mail advices state that blasting powder for export has been advanced the same percentage as was the domestic. The demand with us for mining purposes continues exceptionally large.

The market is quoted as follows:

| | |
|---|---|
| Hercules, No. 1, per pound | 11½c |
| " No. 2, " " | 8½c |

COAL.—The market does not show any change since our last report. The demand continues good for all grades; but with liberal coast supplies, no advance can be established.

SPOT FROM YARD—PER TON.

| | | | |
|---|---|---|---|
| Wellington | $7 50 | @ | 8 00 |
| Greta | 6 00 | @ | 6 50 |
| Nanaimo | 6 50 | @ | 7 00 |
| Gilman | 5 50 | @ | 6 00 |
| Seattle | 5 00 | @ | 5 50 |
| Coos Bay | — | @ | 4 50 |
| Cannel | — | @ | 8 50 |
| Egg, hard | — | @ | 11 50 |
| Wallsend | — | @ | 7 00 |
| Scotch Splint | — | @ | 7 50 |
| Brymbo | — | @ | 7 50 |

TO ARRIVE—CARGO LOTS.

| | |
|---|---|
| Australian | 5 50 |
| Liverpool Steam | 6 25 |
| Scotch Splint | — — |
| Cardiff | 6 25 |
| Lehigh Lump | 9 00 |
| Cumberland | 13 00 |
| Egg, hard | 10 00 |
| West Hartley | 6 50 |

COKE.—The market is quoted as follows:

| | | | |
|---|---|---|---|
| Gas Companies' | — | | — — |
| English, to load | 9 00 | @ | 10 00 |
| " spot, in bulk | — | @ | 11 00 |
| " in sacks | — | @ | 12 00 |
| Cumberland | — | @ | — — |

LUMBER.—There is a continued good home and export demand.

The market is quoted in this city from dock or yards as follows:

| | | | |
|---|---|---|---|
| Redwood, Fluming | 17 00 | @ | — — |
| Pine | 14 00 | @ | 19 00 |
| Spruce | 26 00 | @ | 31 00 |

NAILS.—Jobbers report a good demand at quotations.

The market is quoted as follows:

| | |
|---|---|
| Wire, carloads, basis per keg | $3 22½ |
| " jobbing, " " | 3 35 |
| Cut, carloads, " " | 2 97½ |
| " jobbing, " " | 3 10 |

## Mining Share Market.

SAN FRANCISCO, June 25, 1896.

The market held weak on last Friday, but on Saturday, under the lead of Chollar, it was stronger. Yet nothing moved up much outside of Chollar and Potosi. On Monday the opening was slightly weaker, which became more pronounced as the day passed by. This weakening brought in bear sellers who, under the guidance of those connected with the inside pool, caused lower prices each day up to this writing along the entire line, except Chollar, which appeared to have had support at around $2.75. The decline brought in margin sellers and also sellers of cash shares. These sales, together with those of the bears, caused a depreciation in prices. The heaviest decline was in Savage, which closed last night at $1.10 bid, against sales at $1.95 one week ago. When the market was nearing top prices, about three weeks ago, the MINING AND SCIENTIFIC PRESS warned dealers against it, but which had little effect, owing to the strong bull points put out and also bull write-ups in the papers. Then was the time to be a bear, but now, after such a strong depression, prices cut from 40 to 60 per cent and heavy liquidating sales, it is no time to be a bear, for the mines, as a rule, are in a far more favorable situation than for many a long month. Yet it may take several weeks before the best results can be had, and in the meantime there will be favorable and unfavorable reports which will have their effects on the market. The strongest depression at the present time is on the shares in the Gold Hill and north end mines. What this is done for operators must be their own judge. The gas scare has been used quite effectually. Dealers are beginning to think it strange that no other mine on the Comstock is troubled with gas, but the shares of no other mine are so closely watched and followed as are those of Con. Virginia. The work under way on the Brunswick lode is quite important. That the development made so far exceeds expectations is a well established fact, and if the ore found on the 200-foot level, in the grounds of the middle mines, is struck on the 300-foot level much higher prices can be looked for, and justly so, as it will pay to extract and mill. All mining experts who have visited the lode are emphatic in their statements that the ore extends to the 300-foot level, and even deeper. It is well enough for the trading public to know that the mining companies on the Comstock lode having ground on the Brunswick lode are Con. Virginia, Best & Belcher, Gould & Curry, Savage, Hale & Norcross, Chollar and Potosi.

No assessment was levied the past week, but the street was full of rumors regarding them.

The news from the Comstock mines is overshadowed by that from the Brunswick lode, therefore is not so closely followed by those who trade on the complexion of the market. In the Alta group the only work reported is in Alta, but which is essentially the same as has been made public during the past few weeks. In the Gold Hill group our advices are to the effect that in Overman more active work is being done, and as far down as the 1200-foot level. No particulars are reported as to the work in Seg. Belcher and Belcher, but it is reported to be quite interesting but it points to the future. These two companies are raising ore going over $20 a ton. The most active work is in Crown Point, with interest largely centered on that being done around the 600-foot level. Our last advices are to the effect that in the west drift on that level they were in gold ore going from $9 to $14 a ton, but they had stopped work and were putting in a square set of timbers for raising on it. This ore will pay to extract and mill, which will be done at as early a date as possible. This find may increase in value as work is done on it. From Yellow Jacket no advices are at hand. In Confidence they are still raising to the surface from the work done 60 feet above the 200-foot level. When this upraise is finished more active exploiting work can be looked for. Work in the joint Confidence, Challenge and Con. Imperial west crossdrift is still being pushed ahead. It is out over 530 feet. In Alpha and Bullion the work is of the same character as heretofore reported in this department. In Potosi they continue to find stringers of ore. So far as we are advised nothing of importance has been found. In Hale & Norcross the usual work is being done and a few tons of ore raised each week. They are still running for the ore found in Savage. The official letter from Savage was not received yesterday, so no reliable information is at hand at this writing. In Gould & Curry they have started an east crossdrift on the 800-foot Bonner shaft level. The official letter from Best & Belcher does not report any material change in the work from that heretofore reported. The last letter from Con. Virginia reported they were still milling ore. The last run (595 tons) went over $56 a ton battery assay. They expected to resume the extraction of ore this week. The work on the 1000-foot level is being closely watched by mining men. In Ophir work is continued on the central tunnel and 1000-foot levels. This is to the west. In the west working of Mexican, on the 1000-foot level, they have run into stringers of ore. The work in Union, Sierra Nevada, Utah and Andes is on the same levels and direction as heretofore reported, with no material change in formation.

Interest continues to center on the work in the Brunswick lode. Mining superintendents and well-known mining men, who have examined the find on this lode, are very hopeful that the ore will not only be found lower down, but it is liable to assay higher. On the 200-foot level of Chollar, running towards Potosi, they stripped the ore for a distance of 100 feet. Throughout this length it held out in width and value. Some persons say that towards the south line black sulphurets were found. On the 300-foot level the south drift from the Hale & Norcross line will be to the Chollar line within two or three days, when the latter company will take up the work and push it ahead. It is stated that by the middle of July they will run into the ore found on the 200-foot level. From our own advices we are inclined to the opinion that they will be in before that time. A north drift is being run from the Hale & Norcross shaft and at the same time work is being done on the incline winze. Work is being pushed in the Gould & Curry tunnel. Another crossdrift has been started from this level. It is towards the Best & Belcher line. The management are confident of striking ore in this crossdrift. This opinion is grounded on what the superintendents and other well known mining men say. They are still sinking in the Best & Belcher shaft. They are down about 50 feet.

From the Bodie district nothing new is at hand. Active work is being done in Bodie, Bulwer and Mono.

The market opened to-day heavy, with fair trading. After regular Call there were large liquidating sales by holders on a margin, which caused lower prices along the line. The shares that suffered the most were those in the Gold Hill and north end mines, the middles not going off much. All the shares thrown out were taken in, when a stronger tone set in, causing a firm closing at noon. During the decline there seemed to be a panic among holders of Occidental, and under their selling it sold down to 83 cents, closing at 93 cents. There was nothing unfavorable from the mine, for last advices stated that they were running north and south on the 750-foot level with good results looked for. The official letter from Savage was on file to-day. It reports extracting 170 cars of ore, assaying as per car sample $43.80; 150 tons were milled, which returned $40.25 as per battery assay. They ran into old workings, which cut off the yield of best ore, but there was still considerable in sight. On the Brunswick lode, the joint north lateral drift had been advanced to 299 feet. Its course has been changed to a westerly direction, crosscutting the formation. At the 2:30 session, Gould & Curry, Best & Belcher, and all the north end shares sold higher; the middles were unchanged, but the Gold Hill shares were better. It looks as if the market will do better very soon.

The following illustrates the changes of the week:

| MINES. | June 18. | June 25. |
|---|---|---|
| Alpha | $ 15 | $ 18 |
| Alta Consolidated | 19 | 13 |
| Andes | 34 | 31 |
| Belcher | 56 | 49 |
| Best & Belcher | 1 05 | 80 |
| Bodie | 43 | 47 |
| Bullion | 28 | 22 |
| Challenge | 40 | 32 |
| Chollar | 2 80 | 2 75 |
| Confidence | ..... | ..... |
| Consolidated California and Virginia | 2 20 | 1 90 |
| Consolidated New York | ..... | ..... |
| Crown Point | 58 | 48 |
| Exchequer | ..... | 05 |
| Gould & Curry | 1 25 | 1 35 |
| Hale & Norcross | 2 10 | 1 70 |
| Justice | ..... | ..... |
| Mexican | 92 | 74 |
| Ophir | 1 55 | 1 30 |
| Overman | 26 | 23 |
| Potosi | 1 45 | 1 25 |
| Savage | 1 95 | 1 20 |
| Sierra Nevada | 85 | 68 |
| Union | ..... | 66 |
| Utah | ..... | 09 |
| Yellow Jacket | 57 | 49 |

## MINING ASSESSMENTS.

| Company and Location. | No. | Amt. | Levied, Deling't and Sale. | Secretary. |
|---|---|---|---|---|
| Alaska-Willoughby G M Co, Alaska | 1 | 20c | Apr 6..May 25..June 29 | T Pollard, 22 California |
| Alta S M Co, Nev | 52 | 10c | May 4..June 9..June 30 | J E Jacobus, 309 Montgomery |
| Bullion Con G M Co, Cal | 8 | 15c | June 16..July 20..Aug 11 | C A Grow, Mills Building |
| Central Eureka M Co, Cal | 1 | 3c | May 16..June 22..July 18 | W Van Bokkelen, 320 Sansome |
| Channel Bend M Co, Cal | 3 | 5c | June 23..July 31..Aug 22 | J P Langhorne, 39 Sutter |
| Chollar M Co, Nev | 42 | 25c | June 9..July 14..Aug 4 | C E Elliot, 309 Montgomery |
| Horseshoe Bar Con M Co, Cal | 4 | 50c | May 12..June 22..July 14 | D M Kent, 330 Pine |
| Mono G M Co, Cal | 37 | 10c | June 2..July 6..July 27 | M E Willis, 309 Montgomery |
| Mt Diablo M & M Co, Nev | 4 | 5c | May 21..July 2..July 23 | R W Heath, 318 Pine |
| Nimshew G M Co, Cal | 1 | 3c | June 5..July 13..Aug 3 | C D Cook, Mission St Pier No. 1 |
| Occidental Con M Co, Nev | 23 | 15c | June 2..July 7..July 28 | A K Durbrow, 309 Montgomery |
| Old Flag M Co, Cal | 3 | 2c | May 11..June 18..July 6 | F L Olmsted, 315 Montgomery |
| Reward G M Co, Cal | 13 | 3c | June 1..July 2..July 20 | S W Backus, Mills Bldg |
| Silver King M Co, Arizona | 14 | 25c | May 7..June 16..July 14 | J W Pew, 310 Pine |
| Siskiyou Con Q M Co | 11 | 1c | May 5..June 8..June 29 | E F Stone, 306 Pine |
| Ybarra G M Co, Mexico | 4 | 15c | May 21..June 21..July 9 | Jas Coffin, 132 Market |

## San Francisco Stock Board Sales.

SAN FRANCISCO, June 18, 1896

9:30 A. M. SESSION.

| | | | |
|---|---|---|---|
| 700 Alpha | 13 | 500 Mexican | 72 |
| 100 Alta | 13 | 950 Occidental | 1 05 |
| 300 Andes | 31 | 100 Ophir | 1 30 |
| 200 | 30 | 250 | 1 25 |
| 350 Belcher | 47 | 800 Overman | 21 |
| 200 | 48 | 200 | 22 |
| 350 Best & Belcher | 88 | 400 | 20 |
| 400 Bodie | 47 | 200 Potosi | 1 25 |
| 200 Bullion | 22 | 700 | 1 30 |
| 400 | 21 | 1500 Savage | 1 15 |
| 400 Chollar | 2 75 | 200 Seg. B. & B | 13 |
| 450 | 2 70 | 700 | 12 |
| 150 Con Cal & Va | 1 85 | 700 Sierra Nevada | 67 |
| 650 | 1 80 | 100 | 68 |
| 400 Challenge | 31 | 400 Union | 65 |
| 100 Crown Point | 47 | 200 | 66 |
| 250 | 46 | 250 Yellow Jacket | 45 |
| 100 Exchequer | 05 | 500 | 46 |
| 1150 Gould & Curry | 1 25 | 150 | 47 |
| 100 | 1 30 | 200 | 48 |
| 100 H. & N | 1 65 | 50 | 49 |

SECOND SESSION—2:30 P. M.

| | | | |
|---|---|---|---|
| 300 Ophir | 1 30 | 500 Belcher | 49 |
| 200 Mexican | 74 | 100 Utah | 09 |
| 100 | 73 | 200 Bullion | 21 |
| 300 Gould & Curry | 1 30 | 100 Crown Point | 48 |
| 300 | 1 35 | 100 Seg Belcher | 14 |
| 200 Best & Belcher | 89 | 200 | 15 |
| 200 Con Cal & Va | 1 90 | 300 Overman | 23 |
| 100 Chollar | 2 70 | 350 Union | 65 |
| 300 | 2 75 | 200 Julia | 12 |
| 450 Savage | 1 20 | 100 Challenge | 32 |
| 200 Potosi | 1 20 | 400 Occidental | 95 |
| 100 H. & N | 1 70 | 400 Andes | 30 |
| 1400 Yellow Jacket | 48 | 250 Bodie | 45 |
| 900 Alpha | 13 | | |


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## Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMpany. Location of principal place of business, San Francisco, California. Location of works, Silver Star Mining District, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors held on the 2d day of June, 1896, an assessment: No 2o of fifteen cents 15c per share was levied upon the whole of the capital stock of the corporation payable immediately in United States gold coin, to the Secretary at the office of the company, room No 63 Nevada block, No 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of July, 1896, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on TUESDAY the 28th day of July, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

ALFRED K. BURROW, Secretary.

Office—Room No. 63 Nevada block No. 309 Montgomery street San Francisco California.

NIMSHEW GOLD MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, Nimshew, Butte county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 5th day of June, 1896, an assessment (No. 1) of Three cents (3c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the secretary, at the office of the company, Mission Pier, No. 1, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 13th day of July, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on MONDAY, the 3d day of August, 1896, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

C. D. COOK, Secretary.

Office, Mission St. Pier, No. 1, San Francisco, California.

MARGUERITE GOLD MINING AND MILL CO. Location of principal place of business, San Francisco, California; location of works, Auburn, Placer county, California.

Notice is hereby given that at a meeting of the Board of Directors held on the 18th day of June, 1896, an assessment (No. 3) of Ten Cents (10c) per share was levied upon the whole of the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, 237 12th St., San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 28th day of July, 1896, will be delinquent and advertised for sale at public auction, and, unless payment is made before, will be sold on FRIDAY, the 28th day of August, 1896, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS. WINTERS, Secretary.

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